Management of a tracheal intussusception in a dog

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Cardiovascular effects of constant rate infusions of lidocaine, lidocaine and dexmedetomidine, and dexmedetomidine in dogs anesthetized at equipotent doses of sevoflurane

Comparison of an online learning module to hands-on training in teaching a cautery disbudding technique for dairy calves including cornual nerve block application

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“Instructions for authors” are available online
(www.canadianveterinarians.net).

Les «Directives à l’intention des auteurs» sont disponibles en ligne
(www.veterinairesaustcanada.net).
Dear Editor,

I am writing this letter to invite comments from veterinarians and to ask the CVMA Council to consider making a change to the Veterinarian’s Oath. The change I propose is the addition of “prevent and” relieve [animal suffering] to the Veterinarian’s Oath. Currently, The Oath reads “relieve [animal suffering].” We teach and practice prevention of pain, illness, etc., which is a very important part of veterinary medicine. With the addition of “prevent” I believe the Oath will be more reflective of the expectations of veterinarians and what we strive to do. This would apply to almost all animals as, for example, vaccination is for prevention and preventive analgesia is stressed for all surgeries. There are many other situations in which we probably prevent more than we relieve. Following is the Canadian Oath copyrighted in 2017, but dated 2004.

Thank you

Karol A. Mathews, DVM, DVSc, DACVECC
Professor Emerita, Emergency & Critical Care Medicine
Department Clinical Studies, Ontario Veterinary College
University of Guelph, Guelph, Ontario

Constructive and professional comments made in the spirit of intellectual debate are welcomed by the Editor. Writers are expected to be respectful of others and to ensure that letters are considerate and courteous. The Editor reserves the right to remove comments deemed to be inflammatory or disrespectful.

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**A Revision of the Veterinarian’s Oath**

**CANADIAN VETERINARIAN’S OATH**

“As a member of the veterinary medical profession, I solemnly swear that I will use my scientific knowledge and skills for the benefit of society.

I will strive to promote animal health and welfare, [ ] relieve animal suffering, protect the health of the public and environment, and advance comparative medical knowledge.

I will practise my profession conscientiously, with dignity, and in keeping with the principles of veterinary medical ethics.

I will strive continuously to improve my professional knowledge and competence and to maintain the highest professional and ethical standards for myself and the profession.”

— CVMA 2004

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The veterinary profession is relatively small but we have a huge impact on society. Our voice as leaders in animal health and welfare, as well as environmental and public health, is important. Society needs to hear our voice. The CVMA spends much time and resources trying to determine the best way to have our voice heard. The Association’s advocacy and lobbying efforts are the key to the success of CVMA interests and advancing the profession. Advocacy is one of the CVMA’s strengths and directly supports its core competencies. In the past, the CVMA has focused on enhancing the image of the profession and providing our members with benefits. Currently, and in the future, we will have a larger role to play with advocacy, the promotion of the profession, and ensuring our voice as veterinarians is heard.

Our profession has difficulty with advocacy and lobbying. We often struggle with advocacy activities because we are afraid of these being seen as self-promotion. We need to promote veterinary medicine and animal health and welfare, not veterinarians. Historically we have, on occasion, been too quiet on significant issues. This has been a problem particularly with controversial matters and issues that do not have a clear consensus from our members or society. For example, issues such as transportation of livestock, use of animals in entertainment and sport, and feline declawing. During a strategic planning session a few years ago, CVMA Council directed committees to be more decisive with position statements on controversial issues and to be more vocal.

We have also made a more concentrated effort to not only advocate for the profession but to lobby government and policy makers. We have always had an excellent relationship with the government. The CVMA is recognized as a leader and the voice of Canadian veterinarians. Recently, this relationship has become much more visible and significant. Several issues like the importation of companion animals, antimicrobial stewardship, and transportation of food animals have all been reviewed in consultations with government.

Advocacy is key

La profession vétérinaire est relativement petite, mais nous avons un énorme impact sur la société. Notre voix est importante en tant que leaders au chapitre de la santé et du bien-être des animaux ainsi que de la santé environnementale et publique. Par conséquent, la société doit entendre notre voix et l’ACMV consacre beaucoup de temps et de ressources à déterminer la meilleure façon de faire entendre notre voix. Les efforts de défense des intérêts et de lobbying sont essentiels afin d’assurer le succès des intérêts de l’ACMV et de faire avancer la profession. Or, la défense des intérêts est l’une des forces de l’ACMV et elle appuie directement ses compétences fondamentales. Par le passé, l’ACMV s’est concentrée sur l’amélioration de l’image de la profession et la prestation d’avantages à nos membres. À l’heure actuelle, et dans l’avenir, nous aurons un plus grand rôle à jouer pour la défense des intérêts, la promotion de la profession, et la représentation de la voix des médecins vétérinaires.

Toutefois, notre profession éprouve de la difficulté avec la défense des intérêts et le lobbying. Nous éprouvons des doutes à l’égard de nos activités de défense des intérêts parce que nous craignons qu’elles soient perçues comme de la promotion de la profession. Nous devons promouvoir la médecine vétérinaire et le bien-être et la santé des animaux et non les médecins vétérinaires. Historiquement, nous avons parfois été trop silencieux sur des enjeux importants. Cette situation a créé des problèmes, particulièrement pour les questions et les enjeux controversés pour lesquels il n’y a pas de consensus clair au sein de notre société. Par exemple, des questions comme le transport du bétail, l’utilisation des animaux dans le cadre de spectacles et de sports et le dégriffage félin. Il y a quelques années, durant une séance de planification stratégique, le Conseil de l’ACMV a demandé aux comités d’être plus décisifs à l’égard des énoncés de position sur des enjeux controversés et d’être plus vocaux.

Nous nous sommes aussi forcés de défendre non seulement la profession mais d’exercer des pressions auprès des gouvernements.
The CVMA faces a challenge when it comes to lobbying. It takes years to develop government networks and relationships. CVMA representatives work constantly at fostering these relationships and are always looking for new opportunities. A changing political landscape is a reality within which the Association must work. Developing key networks within federal government is important. This highlights the importance of the office being in Ottawa and close to government action. The CVMA also fosters relationships with non-governmental organizations (NGOs) that have similar core values and goals. Collaboration and networking with these groups are becoming increasingly more vital to achieving our goal of successful advocacy. The CVMA is lucky in that it has excellent relationships with its international partners such as the American Veterinary Medical Association (AVMA), and the Federation of Veterinarians of Europe (FVE). The AVMA participates in several lobbying activities as well, and both associations benefit from our combined efforts.

As a profession, veterinary medicine needs to be more active at the local grass roots level. This is where I believe we can have the biggest impact. We should encourage colleagues to develop relationships with policy makers in their own regions. Reach out to government officials both elected and non-elected and form relationships so they call on us for advice and leadership. Also take action to align ourselves with similar-minded NGO groups. Having only one voice for the profession is a challenge. Our profession is diverse and veterinarians will have different opinions based on experience, knowledge, and areas of practice. In order to promote veterinary medicine we must have a wide range of networks. We must work closely with species interest groups and industry leaders. We need to engage all veterinarians in all areas of clinical practice, public service, industry, and academia. Clearly, we will not always agree, but if we work to find common principles and ideas we can move forward. Advocacy is what we do. Our strength is the diversity of the profession.

* Troy Bourque
Veterinary Medical Ethics
Déontologie vétérinaire

Ethical question of the month — July 2017

In modern livestock farming various metrics are used to measure animal productivity. Many of these production metrics are also considered indicators of animal welfare. Mortality rate is one metric used to judge both production efficiency and animal welfare on-farm. By extension, some use mortality rates during transport to judge the welfare of livestock during transport. Whereas livestock on a farm may die from a wide variety of causes including infectious disease, only fit and healthy animals are transported for sale. Therefore the reasons for transport deaths are seldom the same as the reasons for mortalities in the barn. Is transportation mortality an appropriate indicator for judging the welfare of livestock being transported?

Question de déontologie du mois — Juillet 2017

Dans l'agriculture d'élevage moderne, divers paramètres sont utilisés pour mesurer la productivité de l'animal. Beaucoup de ces paramètres de production sont aussi considérés des indicateurs du bien-être animal. Le taux de mortalité est l'un des paramètres utilisés pour évaluer l'efficacité de la production et le bien-être animal à la ferme. Par extension, certaines personnes utilisent les taux de mortalité durant le transport pour évaluer le bien-être du bétail durant le transport. Tandis que le bétail à la ferme peut mourir en raison d'une diversité de causes, dont les maladies infectieuses, seulement des animaux aptes et en santé sont transportés aux fins de vente. Par conséquent, les causes de décès durant le transport sont rarement les mêmes que celles des mortalités se produisant à la ferme. La mortalité lors du transport représente-t-elle un indicateur approprié pour évaluer le bien-être du bétail qui est transporté?

Comments/Commentaires :

Name/Nom :

Address/Adresse :

Responses to the case presented are welcome. Please limit your reply to approximately 50 words and forward along with your name and address to: Ethical Choices, c/o Dr. Tim Blackwell, 6486 E. Garafraxa, Townline, Belwood, Ontario N0B 1J0; telephone: (519) 846-3413; fax: (519) 846-8178; e-mail: tim.e.blackwell@gmail.com

Suggested ethical questions of the month are also welcome! All ethical questions or scenarios in the ethics column are based on actual events, which are changed, including names, locations, species, etc., to protect the confidentiality of the parties involved.

Les réponses au cas présenté sont les bienvenues. Veuillez limiter votre réponse à environ 50 mots et nous la faire parvenir par la poste avec vos nom et adresse à l’adresse suivante : Choix déontologiques, a/s du Dr Tim Blackwell, 6486, E. Garafraxa, Townline, Belwood (Ontario) N0B 1J0; téléphone : (519) 846-3413; télécopieur : (519) 846-8178; courriel : tim.e.blackwell@gmail.com

Les propositions de questions déontologiques sont toujours bienvenues! Toutes les questions et situations présentées dans cette chronique s’inspirent d’événements réels dont nous modifions certains éléments, comme les noms, les endroits ou les espèces, pour protéger l’anonymat des personnes en cause.

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Ethical question of the month — April 2017

Recent studies have shown that taking urban visitors on tours of carefully chosen and well-run livestock operations does not always produce a positive response regarding the care of farm animals. For example, when members of the public visit free stall dairy barns with robotic milking machines where cows are clean and comfortable with only rare cases of lameness and other “production diseases,” the response of the urban visitor is not always positive. Standard farm practices such as the removal of the calf at birth from its mother and the inability of cows to graze at pasture are considered both unnatural and disturbing to many urban visitors. Is educating the public regarding modern livestock production practices the correct approach to convincing the public that current industry practices ensure the welfare of farm animals?

Question de déontologie du mois — Avril 2017

Des études récentes ont montré que l’organisation de visites guidées dans des exploitations d’élevage soigneusement choisies et bien exploitées à l’intention des citadins ne suscite pas toujours une réaction positive à l’égard des soins des animaux d’élevage. Par exemple, lorsque des membres du public visitent des lotettes laitières avec des systèmes de traite automatisée où les vaches sont propres et confortables et que seulement quelques rares cas de boiterie et d’autres « maladies de production » sont observés, la réponse du visiteur urbain n’est pas toujours positive. Les pratiques normalisées des fermes, comme la séparation du veau et de la mère à la naissance et l’incapacité des vaches de brouter dans les prés, sont considérées comme n’étant pas naturelles et dérangent pour de nombreux visiteurs urbains. L’éducation du public à propos des pratiques d’élevage modernes représente-elle l’approche appropriée pour convaincre la population que les pratiques actuelles de l’industrie garantissent le bien-être des animaux d’élevage?

An ethicist’s commentary on conflict between public view of animal welfare and experts

This is by no means the first or only time in my career that I have encountered major conflict between “expert” views of animal welfare and those of ordinary citizens. For example, on one occasion, I was showing our laboratory animal facility to a group of representatives from local humane societies. The facility was brand new and state-of-the-art. It was accredited by the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC) and by implication, by the National Institutes of Health (NIH). The facility was spotless; airflow and temperature were precisely controlled. The people from the Humane Society, however, saw it as far too sterile and austere. Clearly the standards were very different across the different groups.

Something very similar is going on in the current case. And I saw the very same thing while serving on the Pew Commission, the very first detailed study ever undertaken of intensive confinement agriculture and the ethical issues occasioned by such agriculture. When one discusses farm animal welfare with industry groups, one finds the same response — animal welfare is solely a matter of “sound science.”

For example, one representative of the pork industry, testifying before the Commission, answered that while people in her industry were quite “nervous” about the Commission, their anxiety would be allayed were we to base all of our conclusions and recommendations on “sound science.” Hoping to rectify the error in that comment, as well as educate the numerous industry representatives present, I responded to her as follows: “Madame, if we on the Commission were asking the question of how to raise swine in confinement, science could certainly answer that question for us. But that is not the question the Commission, or society, is asking. What we are asking is, ought we raise swine in confinement? And to this question, science is not relevant.”

Judging by her “huh,” I assume I did not make my point.

Questions of animal welfare are at least partly “ought” questions, i.e., questions of ethical obligation. The concept of animal welfare is an ethical concept to which, once understood, science brings relevant data. When we ask about an animal’s welfare, or about a person’s welfare, we are asking about what we owe the animal, and to what extent. A document called the CAST report, first published by United States agricultural scientists in the early 1980’s, discussed animal welfare, and affirmed that the necessary and sufficient conditions for attributing positive welfare to an animal were represented by the animal’s productivity. A productive animal enjoyed positive welfare; a non-productive animal enjoyed poor welfare.

This notion was fraught with many difficulties. First of all, productivity is an economic notion predicated of a whole operation; welfare is predicated of individual animals. An operation, such as caged laying hens, may be quite profitable if the cages are severely overcrowded, yet the individual hens do not enjoy good welfare. Second, equating productivity and welfare is, to some significant extent, legitimate under husbandry conditions, in which the producer does well if and only if the animals do well, and square pegs, as it were, are fitted into square holes with as little friction as possible. Under industrial conditions, however, animals do not naturally fit in the niche or environment in which they are kept, and are subjected to “technological sanders” that allow for producers to force square pegs into round holes — antibiotics, feed additives, hormones, air handling systems — so the animals do not die and produce more and more kilograms of meat or milk. Without these technologies, the animals could not be productive.
The key point to recall here is that even if the CAST Report definition of animal welfare did not suffer from the difficulties we outlined, it is still an ethical concept. It essentially says “what we owe animals and to what extent is simply what it takes to get them to create profit.” This in turn would imply that the animals are well-off if they have only food, water, and shelter — something the industry has sometimes asserted. Even in the early 80’s, however, there were animal advocates and others who would take a very different ethical stance on what we owe farm animals. Indeed, the famous five freedoms articulated in Britain by the Farm Animal Welfare Council (FAWC) during the 1970’s (even before the CAST Report) represents quite a different ethical view of what we owe animals:

The welfare of an animal includes its physical and mental state and we consider that good animal welfare implies both fitness and a sense of well-being. Any animal kept by man, must at least, be protected from unnecessary suffering.

The conflict between these two definitions cannot be resolved by appeal to empirical science. In fact, the nature of the science one does is determined by which definition one adopts!

To clarify: suppose you hold the view that an animal is well-off when it is productive, as per the CAST Report. The role of your welfare science in this case will be to study what feed, bedding, temperature, etc. are most efficient at producing the most meat, milk, or eggs for the least money — much what animal and veterinary science does today. On the other hand, if you take the FAWC view of welfare, your efficiency will be constrained by the need to acknowledge the animal’s natural behavior and mental state, and to assure that there is minimal pain, fear, distress, and discomfort — not factors in the CAST view of welfare unless they have a negative impact on economic productivity.

Precisely the same sort of conflict is going on in the current case. What ordinary citizens consider good welfare for dairy cows is very different from what dairy scientists emphasize. While dairy scientists may expand the public’s view of dairy welfare, they cannot expand the commonsense belief that cows ought to graze, and that calves should stay with mothers, any more than the public will believe that sows are better off in tiny gestation crates or cows should have their tails lopped off with garden shears!

This is exactly what the Swedish public expressed in the 1989 farm animal welfare law, when the legislation granted cattle “the right to graze in perpetuity.” And when ordinary people learn that milk production entails separating the calf from the cow at birth, they are not positively disposed towards the industry.

A far better strategy would be to develop a system, as has in fact been done, in which calves can nurse for part of the day. Similarly, cows should be given some access to pasture. While profits may suffer, it is better to act proactively than to wait for the inevitable coming of societal hammering.

Bernard E. Rollin, PhD

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1. Azole antifungals are commonly used to treat systemic mycosis. Which of the following azoles best penetrates the central nervous system (CNS)?
   A. Fluconazole
   B. Ketoconazole
   C. Itraconazole
   D. Clotrimazole
   E. Enilconazole

2. Which of the following is the most common reason for a non-healing ulcer in a cat?
   A. Improper formation of the epithelial basement membrane
   B. Mycotic corneal infection
   C. Feline herpesvirus type 1 infection
   D. Keratoconjunctivitis sicca (KCS)

3. Concerning heartworm disease in dogs, which of the following statements is least accurate?
   A. Thoracic radiographic findings include right ventricular enlargement and enlarged, tortuous pulmonary arteries.
   B. Eosinophilia and basophilia may be present on a complete blood (cell) count.
   C. Glomerulonephritis results from antigen-antibody complex deposition.
   D. Antigen tests detect antigen present in male heartworms.
   E. Deep S waves on a lead II electrocardiogram are suggestive of right ventricular enlargement.

4. A 2-year-old Quarter Horse is being evaluated for a swollen leg. Further examination reveals edema of one leg only, which had an acute onset. Multiple firm nodules that follow the lymphatics are palpated. Which of the following is the most likely cause of these symptoms?
   A. Nocardia asteroides
   B. Dermatophilus congolensis
   C. Corynebacterium pseudotuberculosis
   D. Trichophyton equinum
   E. Mycobacterium tuberculosis

1. Les antifongiques de type azole sont communément utilisés pour traiter les mycoses systémiques. Lequel des azoles suivants pénètre le système nerveux central (SNC)?
   A. fluconazole;
   B. kétoconazole;
   C. itraconazole;
   D. clotrimazole;
   E. énilconazole.

2. Laquelle des raisons suivantes est la plus commune pour un ulcère qui ne guérit pas chez un chat?
   A. formation inappropriée de la membrane basale épithéliale;
   B. infection cornéenne mycosique;
   C. infection à herpèsvirus 1 félin;
   D. kératoconjunctivite sèche.

3. À propos de la maladie des vers du cœur chez le chien, lequel des énoncés suivants est le moins juste?
   A. Les radiographies thoraciques montrent un agrandissement du ventricule cardiaque droit et des artères pulmonaires tortueuses et augmentées de volume.
   B. L’hémogramme peut présenter une éosinophilie et une basophilie.
   C. La glomérulonéphrite résulte du dépôt du complexe antigène-anticorps.
   D. Les tests antigéniques décèlent l’antigène présent chez les dirofilaires mâles.
   E. Les ondes S avec amplitude allongée sur un électrocardiogramme en dérivation II suggèrent un agrandissement du ventricule droit.
5. An 8-month-old Holstein female is walking on her carpi. No other abnormalities are found. What is the likely diagnosis?
A. Laminitis  
B. Radial paralysis  
C. Pedal fracture  
D. Splints  
E. Sole abscesses

4. On fait l'examen d’un Quarter horse âgé de 2 ans à cause d’enflure à un membre. L’examen plus poussé révèle de l’œdème d’apparition soudaine dans un membre seulement. Plusieurs nodules fermes le long des vaisseaux lymphatiques sont palpables. Lequel des agents suivants est la cause la plus probable de ces symptômes?
A. Nocardioides;  
B. Dermatophillus congolensis;  
C. Corynebacterium pseudotuberculosis;  
D. Trichophyton equinum;  
E. Mycobacterium tuberculosis.

5. Une vache Holstein âgée de 8 mois se déplace sur ses carpes. Aucune autre anomalie n’est rencontrée. Lequel des diagnostics suivants est le plus probable?
A. fourbure;  
B. paralysie radiale;  
C. fracture du pied;  
D. suros;  
E. abcès de la sole.

(See p. 756 for answers./Voir les réponses à la page 756.)

Questions and answers were derived from Review Questions and Answers for Veterinary Boards 2nd ed., a 5-volume series including Basic Sciences, Clinical Sciences, Small Animal Medicine and Surgery, Large Animal Medicine and Surgery, and Ancillary Topics, by kind permission of the publisher, Mosby–Year Book, Inc., St. Louis, Missouri.

Nova Scotia Veterinarian Appointed 69th President of the Canadian Veterinary Medical Association

Dr. Troye McPherson, originally from Cape Breton, Nova Scotia, graduated from the Nova Scotia Agricultural College, the Ontario Agricultural College, and the Ontario Veterinary College, University of Guelph. She began her career in western Canada at a mixed animal practice in Saskatchewan. Dr. McPherson was also the acting director of the Lakeland College Veterinary Technician program in Vermilion, Alberta, and an instructor in its agriculture program. She also worked for the Canadian Food Inspection Agency in meat hygiene.

Dr. McPherson moved back to the east coast and has been a small animal practitioner with special interest in internal medicine and ultrasound for the past several years.

She is currently a member of the Nova Scotia Veterinary Medical Association (NSVMA) committee for RVT licensure and has served as the NSVMA president and its liaison to the Nova Scotia Provincial SPCA and Rabies Task Force. Dr. McPherson is the CVMA council liaison on the NSVMA and the CVMA representative to the Federation of Veterinarians of Europe (FVE).

“I am honored to be the president of the Canadian Veterinary Medical Association,” says Dr. McPherson. “I look forward to contributing to the voice of our profession and helping promote animal welfare and optimal care for animals, people and the environment.”

In her spare time, Dr. McPherson enjoys hiking with her husband and their 5 border collies, and training her dogs in agility and rally obedience; she has completed several dog training courses in the United Kingdom. Dr. McPherson also enjoys cross-country skiing, skijoring, and running. You can often find her in her “happy place” at her nephew’s farm with her dogs.

Dr. McPherson will serve on the CVMA Council from July 2017 until July 2018. The CVMA would also like to take this opportunity to thank Dr. Troy Bourque for his dedication and commitment while serving as president for the past year.
Animal Welfare: Safeguarding the Five Animal Freedoms

Animal Health Week – October 1 to 7, 2017

The Canadian Veterinary Medical Association has been running the Animal Health Week campaign for over 30 years and this year we will emphasize the importance of Animal Welfare. The animals in our care are entitled to 5 basic freedoms in order to survive and thrive. This year we want to showcase the importance of providing the animals we care for with the basic elements all creatures require.

During Animal Health Week, from October 1 to 7, 2017, we are reminding animal owners that they are responsible for meeting the needs of all animals in their care. This year’s theme, Animal Welfare: Safeguarding the Five Animal Freedoms, provides us with an opportunity to remind animal owners of the fundamental elements they are required to provide the animals in their care to ensure them healthy and happy lives.

We’re reminding animal owners they can protect the Five Animal Freedoms by:

• Providing proper nutrition
  – Freedom from hunger and thirst by ready access to fresh water and a diet to maintain full health and vigor.

• Ensuring proper socialization
  – Freedom to spend time with or away from members of their species as appropriate.

• Providing adequate shelter
  – Freedom from discomfort by providing an appropriate environment including shelter and a comfortable resting area.

• Providing appropriate veterinary care
  – Freedom from pain, injury or disease by prevention or rapid diagnosis and treatment.

• Allowing animals to exhibit normal behavior
  – Freedom to express normal behavior by providing sufficient space, proper facilities, and tools/accessories and not punishing animals for carrying out undesired behaviors.

L’Association canadienne des médecins vétérinaires organise la campagne de la Semaine de la vie animale depuis plus de 30 ans et cette année, nous désirons souligner l’importance du bien-être animal. Les animaux confiés à nos soins ont le droit de jouir des cinq libertés fondamentales afin de survivre et de s’épanouir. Cette année, nous désirons souligner l’importance de procurer les éléments fondamentaux dont ont besoin les animaux confiés à nos soins.

Durant la Semaine de la vie animale, qui se déroulera du 1er au 7 octobre 2017, nous rappellerons aux propriétaires qu’ils ont la responsabilité de satisfaire aux besoins des animaux confiés à leurs soins. Le thème de cette année, Protéger les cinq libertés afin d’assurer le bien-être animal, nous offre l’occasion de rappeler aux propriétaires les éléments fondamentaux qu’ils doivent procurer aux animaux confiés à leurs soins afin d’assurer qu’ils mènent une vie heureuse et en santé.

Nous rappelons aux propriétaires d’animaux qu’ils peuvent protéger les Cinq libertés animales en:

• Fournissant une alimentation appropriée
  – Prévenir la faim et la soif en fournissant de l’eau fraîche et des aliments afin d’assurer une santé vigoureuse.

• Offrant une socialisation appropriée
  – Donner la possibilité de passer du temps avec ou sans les membres de leur espèce en fonction de leurs besoins.

• Procurant un hébergement adéquat
  – Fournir un environnement approprié qui comprend un abri et une aire de repos confortable afin d’éviter l’inconfort.

• Fournissant des soins vétérinaires appropriés
  – Favoriser l’absence de douleurs, de blessures ou de maladies par la prévention ou un diagnostic et un traitement rapides.

• Permettant aux animaux de manifester un comportement normal
  – Promouvoir la possibilité d’exprimer un comportement normal en fournissant suffisamment d’espace, des installations adéquates ainsi que les outils et les accessoires nécessaires et en ne punissant pas les animaux lorsqu’ils manifestent des comportements indésirables.

Célébrez la Semaine de la vie animale

Nous invitons les équipes vétérinaires à célébrer la Semaine de la vie animale avec nous. Chaque année, les équipes considèrent que les expositions dans la salle d’attente sont la façon la plus populaire de célébrer la Semaine de la vie animale, suivies de près par les concours à l’intention de la clientèle. En plus de l’affiche officielle de la campagne, les articles suivants sont offerts afin d’inviter toute l’équipe vétérinaire à célébrer la Semaine de la vie animale:

• Ballons biodégradables
• Soucoupes volantes pour Fido; excellentes pour jouer avec les enfants et les chiens (nouveau)
Celebrate Animal Health Week
We invite veterinary health teams to celebrate Animal Health Week with us. Each year veterinary teams rank waiting room displays as the most popular way of celebrating Animal Health Week, followed closely by client contests. In addition to the official campaign poster, the following items are available to engage your entire healthcare team and help celebrate Animal Health Week:

- Biodegradable balloons
- Fido friendly flyer frisbees; great for both child and dog play (new)
- Cotton twill & trucker mesh caps (new)
- Temporary tattoos
- Pet rescue window decals (new design)
- CVMA Activity Book “Big or Small, We Help Them All!”
- Drawstring sports pack, which can be used for a variety of activities like carrying sports gear or beach apparel
- Kid-friendly animal paper hat
- T-shirts and V-neck pullover scrub shirts (both available in men’s and women’s sizes — we’ve worked with our supplier to provide better-fitted apparel!)

Place your order before the early bird deadline on July 21, 2017 for a chance to win a $100 Subway gift card (enough to treat the whole team to lunch!) and other fun prizes. Placing your order online (instead of faxing or mailing it) at (www.canadianveterinarians.net) also gives you a chance to win a $50 Tim Horton’s gift card (treat your hard-working team to some delicious morning steam)! The last day to place your order for Animal Health Week materials is August 4, 2017.

For additional information on Animal Health Week, follow CVMA on Twitter (in English @CanVetMedAssoc and in French @Assoccanmedvet) and like us on Facebook (facebook.com/CanadianVeterinaryMedicalAssociation). Use #AnimalHealthWeek for all your Animal Health Week social media promotions.

Our generous supporters
Generous support of the 2017 Animal Health Week campaign is provided by Principal Plus Sponsor, Boehringer Ingelheim; Principal Sponsor, Petsecure; and Program Sponsors, Elanco, and iFinance Canada (Petcard). This month, we invite you to learn more about our Principal Plus Sponsor, Boehringer Ingelheim.

A message from Boehringer Ingelheim
At Boehringer Ingelheim, we are passionate about animal health and we recognize the critical importance of serving animal health needs globally, with a focus on prevention. We do this because we know when animals are healthy, humans are healthier, too.

One of the ways in which we contribute to animal welfare is through the development of products that are a key component to providing adequate veterinary care. Our products focus on 4 major areas of veterinary care: prevention of disease (vaccines), pain mitigation (NSAIDS), parasiticides, and antimicrobials. By helping protect animals from disease, treat chronic conditions, assist with pain management, and keep them free of parasites, animals are better able to exhibit normal behavior.

We are committed to developing longer-term solutions to ensure a healthy, sustainable future for animals and people.

• Casquette de camionneur structurée en croisé de coton de qualité (nouveau)
• Tatouages temporaires
• Décalques de secours pour les fenêtres (nouveau design)
• Album d'activités de l’ACMV «Petits et grands, ce sont nos patients!»
• Sac à dos sport avec cordon qui peut être utilisé pour transporter de l'équipement de sport ou des accessoires de plage
• Chapeau en papier pour enfants
• T-shirts et blouses chirurgicales avec encolure en V (disponibles en tailles pour hommes et pour femmes — nous avons travaillé avec notre fournisseur pour offrir des vêtements plus seyants!)

Placez votre commande avant la date hâtive du 21 juillet 2017 pour courir la chance de gagner une carte-cadeau de 100 $ chez Subway (assez pour sortir toute l'équipe à manger le midi!) et d'autres prix amusants. En plaçant votre commande en ligne (au lieu de l'envoyer par télécopieur ou par la poste) au (www.veterinairesaucanada.net), vous aurez aussi la chance de gagner une carte-cadeau de 50 $ chez Tim Horton (gâtez votre équipe travaillante le matin en lui offrant du délicieux café chaud)! La dernière journée pour commander des articles de laSemaine de la vie animale sera le 4 août 2017.

Pour en savoir davantage sur la Semaine de la vie animale, suivez l’ACMV sur Twitter (en français à @Assoccanmedvet et en anglais à @CanVetMedAssoc) et aimez-nous sur Facebook (facebook.com/CanadianVeterinaryMedicalAssociation). Servez-vous de #celebronslava pour toutes vos promotions de la Semaine de la vie animale dans les médias sociaux.

Nos généreux commanditaires
La campagne 2017 de la Semaine de la vie animale est généreusement appuyée par le commanditaire principal plus, Boehringer Ingelheim, le commanditaire principal, Petsecure, et les commanditaires de programme, Elanco et iFinance Canada (Petcard). Ce mois-ci, nous vous invitons à en apprendre davantage à propos de notre commanditaire principal plus, Boehringer Ingelheim.

Un message de Boehringer Ingelheim
Chez Boehringer Ingelheim, nous nous passionnons pour la santé animale et nous reconnaissons l’importance critique de répondre aux besoins en matière de santé animale à l’échelle mondiale en
In addition, Boehringer Ingelheim is pleased to partner with a variety of groups and organizations committed to the continued education of the veterinary community, livestock owners and pet owners on a range of topics including animal welfare.

Our commitment extends to our work with industry associations to recognize and support individuals who are making advancements in the area of animal welfare. The Metacam® 20 Bovine Welfare Award recognizes and encourages those who research and practice animal welfare and well-being. The Boehringer Ingelheim Equine Canada Health & Welfare Award recognizes an individual or organization that has contributed directly to the improvement of horse health and welfare in Canada through years of hard work and dedication.

We are also proud to bring together animal health researchers, practitioners and industry professionals from around the world for an annual conference exploring topics related to farm animal well-being. The Boehringer Ingelheim Expert Forum on Farm Animal Well-Being was held in Canada in 2015 and 2016.

Please visit our website (www.boehringer-ingelheim.ca) or talk to your Boehringer Ingelheim territory manager for more information.

2017 SCVMA President's Farewell
Adieux de la présidente 2017 des ÉACMV

I can barely believe another school year has gone by! Reflecting on the whirlwind of the past year, I feel incredibly proud to be a part of this profession and I’m so grateful to all who put in countless hours (often behind the scenes) to enrich the academic experience of Canadian veterinary students.

At our March CVMA Committee Weekend, we talked about the importance of staying inspired amidst the hard work, personal struggles, and professional challenges we all face. For students, I think being involved in the Students of the Canadian Veterinary Medical Association (SCVMA) is one of the best ways to find that inspiration! Whether it’s attending the annual

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 nous concentrant sur la prévention. Nous nous acquittons de cette tâche parce que nous savons que, lorsque les animaux sont en santé, les humains seront aussi en meilleure santé.

Nous contribuons au bien-être animal notamment en développant des produits qui représentent un élément clé dans la prestation de soins vétérinaires adéquats. Nos produits se concentrent dans quatre grands secteurs des soins vétérinaires : prévention des maladies (vaccins), atténuation de la douleur (AINS), parasiticides et antimicrobiens. En contribuant à protéger les animaux contre les maladies, à traiter les affections chroniques, à appuyer la gestion de la douleur et à protéger les animaux contre les parasites, nous leur permettons de mieux pouvoir manifester des comportements normaux.

Nous sommes engagés à développer des solutions à long terme afin d’assurer un avenir durable et en santé pour les animaux et les personnes.

De plus, Boehringer Ingelheim forme des partenariats avec divers groupes et organismes voués à la formation continue de la collectivité vétérinaire, des propriétaires de bétail et des propriétaires d’animaux de compagnie sur un éventail de sujets, dont le bien-être animal.

Notre engagement se poursuit dans notre travail avec les associations de l’industrie afin de reconnaître et d’appuyer les personnes qui réalisent des progrès dans le domaine du bien-être animal. Le Prix pour la promotion du bien-être bovin MétacamMD 20 reconnaît les personnes qui effectuent de la recherche et exercent dans le domaine du bien-être animal. Le Prix Boehringer Ingelheim-Canada Hippique pour la santé et le bien-être du cheval reconnaît une personne ou une organisation qui a contribué directement à l’amélioration de la santé et du bien-être des chevaux au Canada pendant des années de dévouement et de travail ardu.


Veuillez visiter notre site Web (www.boehringer-ingelheim.ca) ou parler à notre gestionnaire de territoire pour obtenir de plus amples renseignements.
SCVMA initiatives would not be possible without the hard work, planning, and organization of each college’s SCVMA committee representatives, so I’d like to take this opportunity to thank our wonderful representatives for all of their amazing work this past year.

I’m so pleased the SCVMA is also engaging Canadian veterinary students studying abroad. This year, we welcomed 108 student affiliate members from 7 new international student affiliate schools. We are thrilled to hear about the great initiatives organized by SCVMA chapters abroad, including poutine nights, hoedowns, and Canadian Thanksgiving dinners!

I’d also like to thank the CVMA Council, Executive, and staff for all their support given to veterinary students, including assisting with our SCVMA Symposium, providing online information and resources, and offering support to new graduates as they move to the next phase of their professional veterinary journey. As we progress through our unique and varied career paths, I encourage you to stay active in our national veterinary organization and take advantage of the incredible opportunities and services provided by the CVMA. If you would like to learn more, please browse the student section of the CVMA website, join the SCVMA Facebook group, or contact your college’s SCVMA Committee representatives — we love hearing from our fellow students.

I am sincerely grateful for the opportunity to have served as your SCVMA president this year. It was an incredible learning experience that impressed upon me the importance of having a strong, unified voice for the Canadian veterinary profession. It was a privilege to be a part of the SCVMA Committee and CVMA Council, and to meet so many caring and committed students, veterinarians, and animal health professionals from across Canada and beyond. With such dedication, I have no doubt that our profession’s future is in great hands. As my time on the SCVMA Committee comes to an end, I’m ecstatic in welcoming our incoming SCVMA president, Kira Moser from the University of Calgary — Faculty of Veterinary Medicine. Kira will lead a dedicated and capable Committee of student representatives from each of Canada’s 5 veterinary colleges, carrying on the proud traditions of the SCVMA. I wish all veterinary students and graduates an excellent year ahead! All the best to you!

(by Elizabeth Hartnett, Ontario Veterinary College Class of 2018, SCVMA President, 2016/2017)
Meet the 2017–2018 Students of the CVMA (SCVMA) Committee Representatives!

Marie-Anne Sirois, SCVMA representative from the University of Montreal’s Faculté de Médecine Vétérinaire (FMV), was born and raised in Montreal, Québec, and recently moved to the countryside, in the wonderful city of Saint-Hyacinthe, to pursue her studies in veterinary medicine. After 1 year of working with a seeing-eye dog, Marie-Anne discovered there are many different types of people other than the classic “dog person” and “cat person,” becoming herself a “rabbit person.” She immediately became passionate about campus life and was elected to FMV’s student association (Association des Étudiants en Médecine Vétérinaire du Québec, or AEMVQ), first as coordinator of Internal Affairs, then as coordinator of Student Life and finally, as vice-president. A fervent animal rights supporter, Marie-Anne is the founder and president of the Vege Club, bringing together all vegan, vegetarians and future-vegetarians from FMV, creating a growing community, and organizing events such as vegan Thanksgivings, among many others. Her passion and ambition always leaves her overflowing with ideas and creating one project after another!

Karie Bryenton, SCVMA Committee representative for the Atlantic Veterinary College (AVC), developed a great love and appreciation for companion animals early in life as an only child who always had pets. Being passionate about animal behavior, she later enrolled in the Neuroscience program at Dalhousie University, during which time she gained interest in laboratory animal welfare. After her undergraduate degree, Karie realized her interests expanded to animals of all sizes, as she truly enjoyed working on farms with animals ranging in size from large animal to poultry. These experiences confirmed veterinary medicine to be Karie’s dream career path, which made her acceptance to AVC’s Class of 2020 truly a dream come true. Karie is proud to be exercising her commitment to borderless learning as an SCVMA Committee representative, and as her class representative for Cat Action, exercising her commitment to reducing disease and increasing the welfare of PEI’s feral cat population. She is especially proud to be planning the 2018 SCVMA Symposium at AVC, as it will showcase her school’s fantastic sense of community and its incredible professors. She looks forward to meeting all the Symposium participants, and wishes everyone a great year!

Katelyn Weaver, SCVMA representative for the Ontario Veterinary College (OVC), has been an aspiring veterinarian since childhood. Whether it was raising orphaned wildlife in her.
Katelyn Weaver

Kira Moser, représentante des ÉACMV de la Faculté de médecine vétérinaire de l’Université de Calgary (UCVM), a grandi à Tottenham, en Ontario, avant de déménager à Calgary, en Alberta, à l’âge de 8 ans. Kira a passé la grande partie de son enfance dans la grange avec son cheval et avant d’entrer à l’université, elle a participé à des concours de saut à cheval, ce qui lui a permis de développer une passion pour tous les animaux. Elle a décidé de suivre sa passion et elle est déménagée vers le nord pour s’inscrire à un diplôme en santé animale à l’Université de l’Alberta à Edmonton. Après avoir passé deux étés excitants à travailler dans une clinique d’urgence pour animaux, Kira a décidé qu’une carrière en médecine vétérinaire était le bon choix pour elle et elle est retournée à Calgary pour se joindre à la promotion 2019 de l’UCVM. Dans ses temps libres, Kira aime faire du ski et jouer à la balle molle en été. En plus de son rôle à titre de représentante au sein du Comité des ÉACMV, Kira siège au sein du Comité de planification du week-end de bien-être et elle est membre de l’exécutif de la Société étudiante de l’UCVM pour la médecine d’urgence et les soins critiques. Kira est excitée à propos de l’occasion de représenter la voix des étudiants en médecine.
addition to her role as an SCVMA Committee representative, Kira is on the Wellness Weekend Planning Committee and an executive member of UCVM’s Student Veterinary Emergency and Critical Care Society. Kira is excited about the opportunity to represent the voice of Canadian veterinary students as the SCVMA president this year and is looking forward to meeting many students at the 2018 SCVMA Symposium at the Atlantic Veterinary College in Prince Edward Island this January!

Shawna Ellis, SCVMA representative for the Western College of Veterinary Medicine (WCVM), was born in Montreal, Quebec then moved to Nova Scotia for high school. After high school, Shawna's family moved to Saskatchewan and she moved to Guelph to complete her undergraduate studies in Wildlife Biology and Conservation at the University of Guelph. While Shawna always loved animals and wildlife, it was her fascination with medicine and solving cases that drew her to a career in veterinary medicine. Shawna spent last summer researching how piglets express pain. Shawna loves working with people and animals and although fascinated by veterinary medicine as a whole, her favorite aspect is the human-animal bond. She also has great interest in understanding Aboriginal and local communities, and the impact of animals within them. Shawna spent time working in remote northern Saskatchewan reserves during her summer jobs, and while in school, she has worked with vulnerably housed Saskatoon residents through spay and neuter programs. During the summer of 2017, Shawna will spend 7 weeks in Africa working with wildlife as well as offering veterinary services to the communities in Tanzania and Madagascar. Shawna is excited to represent the Students of the CVMA at WCVM and wishes everyone in the SCVMA a wonderful year ahead!

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Attention Practitioners

You may not have the time, facilities, or experience to write scientific articles for review by experts. But you have interesting and valuable experiences that are worth sharing. We encourage you to share by submitting articles to Practitioners’ Corner, The Canadian Veterinarian Journal. Simply e-mail your article to Ms. Heather Broughton (hbroughton@cvma-acmv.org). We will edit to ensure the format is correct then we will publish your article in The CVJ.
Announcement: New CEO and Registrar Effective May 1, 2017

The Council of the College of Veterinarians of British Columbia (CVBC) is pleased to announce that the search for a new registrar has concluded.

On January 22, 2017, current registrar and chief executive officer (CEO) Larry Odegard announced his plans to retire, after 4 years with the CVBC. At that time, Council had anticipated a lengthy search and transition period. The selection of an internal candidate has provided an opportunity for Mr. Odegard to move ahead with his retirement plans. We wish him all the best in his future endeavors.

Effective May 1, 2017, Luisa Hlus will assume the role of registrar and CEO, as well as remaining the CVBC’s legal counsel.

Ms. Hlus graduated from the University of Victoria’s Faculty of Law in 1990. She practiced for a number of years in the areas of insurance defence and family law before joining the Law Society of British Columbia as a staff lawyer. At the Law Society of BC, Ms. Hlus investigated professional conduct complaints and special compensation fund claims, administered custodianships and prosecuted lawyers in discipline hearings. More recently, she expanded her focus on the regulation of self-governing professions by assisting the College of Physicians and Surgeons of BC and the College of Dental Surgeons of BC. In November 2015, Ms. Hlus joined the CVBC as the director of Complaints, Registration and Legal Services. As a practicing lawyer, she has provided legal and strategic guidance.

Council is delighted that Ms. Hlus will continue to lead and promote the CVBC as an organization dedicated to regulating the veterinary profession in BC in a fair and transparent manner.

The Practice Owners Economic Survey and Your Provincial Suggested Fee Guide Connection

Le lien entre le Sondage économique auprès des propriétaires de pratique et votre guide tarifaire suggéré provincial

The economics of practicing veterinary medicine in Canada can be divided into 2 eras; one era prior to and the other after the establishment of Provincial Suggested Fee Guides.

The era prior to the establishment of Provincial Suggested Fee Guides consisted of having your receptionist call neighboring practices to find out what they were charging for a spay, being unable to pay staff what they were worth, robbing Peter...
to pay Paul, and as for profitability… what profitability? You get the picture.

Once Provincial Suggested Fee Guides were made available to all practice owners, revenues increased almost immediately. With increased profitability, practice owners were compensated for their worth and able to appropriately pay their hardworking staff. Practices upgraded to modern medical equipment; enhancing patient care and meeting owner expectations. Ultrasound machines, digital radiology, lasers and even CT scans were integrated into Canadian veterinary practices. Veterinary medicine was on the move! It would be taking a step backward if Provincial Suggested Fee Guides were no longer produced and distributed. The fee guides are produced annually based on data submitted by YOU in the Practice Owners Economic Survey. Without your valuable data, a statistically sound and defensible document would not be possible.

Another key puzzle piece is the CVMA’s Business Management Program and its sponsors, Merck Animal Health, Scotiabank, Petsecure, and IDEXX, who contribute financially to assure that we, as practitioners, have an annual fee guide. One of the CVMA’s 3 strategic priorities is helping veterinarians achieve “a successful career and a balanced life.” Although achieving this state of balance may be considered a luxury by many practitioners, it is more easily attainable in profitable practices. When you receive your next survey, consider the fact that without your survey results, and without the support of the CVMA and these generous sponsors, you and all Canadian veterinary practice owners would not have a fee guide! A scary thought!

Let’s end on a “not so scary” note, veterinary medicine has advanced and progressed in so many ways over the past 20 years and with your help, and the continued support of our sponsors, we can all do our bit to ensure a bright future for the Canadian veterinary profession over the next 20 years!

(by Frank Richardson, DVM, MBA)

To access the Provincial Suggested Fee Guides and other veterinary economic reports, visit the CVMA’s Business Management Program section of the CVMA website (www.canadianveterinarians.net/practice-economics/business-management). This section also includes Veterinary Practice Management articles and a Career and Business Toolkit providing veterinarians easy access to pertinent online resources and information on personal financial management, veterinary business management and client management.

One thing is certain: you’re never going to pay Paul, and as for profitability… what profitability? You get the picture.

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Get your Free Monthly Global Digital Edition of Clinician's Brief

Obtenez votre édition mensuelle numérique mondiale gratuite de Clinician’s Brief

The Canadian Veterinary Medical Association (CVMA) works hard to bring you new, relevant and exclusive member benefits, discounts and services. In many instances, the savings enjoyed more than cover the cost of your annual membership fee.

The CVMA has 2 new, exclusive member benefits; Clinician’s Brief, and Plumb’s Veterinary Drugs. Aligned with CVMA’s values, the mission of Clinician’s Brief, and Plumb’s Veterinary Drugs is to provide small animal veterinary teams the tools they need to develop successful practices, build lasting client relationships, and deliver gold-standard patient care.

As part of your CVMA member benefits, you’re entitled to a free monthly Global Digital Edition of Clinician’s Brief or a discounted print edition. Some features and benefits of Clinician’s Brief include:

• Practical, relevant information on the latest veterinary medicine topics.
• Information is in a brief format for busy practitioners.
• Ranked #1 most essential publication by small animal veterinarians for 9 years.
• Access Clinician’s Brief anytime, anywhere — on your desktop, tablet, or mobile.

To request your free subscription, go to the CVMA Member Benefits and Services webpage and click on Clinician’s Brief (member log-in required).

Also, with your CVMA member benefits, you can receive a 30% online subscription discount to Plumb’s Veterinary Drugs™. Some features and benefits of Plumb’s Veterinary Drugs include:

• Easy-to-use, digital resource for accessing veterinary drug information.
• Provides busy veterinarians with streamlined dosing information reflecting the latest evidence-based recommendations combined with clinical expertise.
• Plumb’s mobile app provides instant, offline access to drug dosing information, anywhere, anytime.

Contact the CVMA at 1-800-567-2862 or (admin@cvma-acmv.org) to obtain your CVMA member discount code you will need to provide in order to benefit from the discount.

Plumb’s Veterinary Drugs, and Clinician’s Brief are 2 more of the CVMA benefits that can help position your practice on the forefront of veterinary medicine.

As part of your CVMA member benefits, you can receive a 30% online subscription discount to Plumb’s Veterinary Drugs™. Some features and benefits of Plumb’s Veterinary Drugs include:

• A resource for accessing veterinary drug information.
• Provides busy veterinarians with streamlined dosing information reflecting the latest evidence-based recommendations combined with clinical expertise.
• Plumb’s mobile app provides instant, offline access to drug dosing information, anywhere, anytime.

Contact the CVMA at 1-800-567-2862 or (admin@cvma-acmv.org) to obtain your CVMA member discount code you will need to provide in order to benefit from the discount.

Plumb’s Veterinary Drugs, and Clinician’s Brief are 2 more of the CVMA benefits that can help position your practice on the forefront of veterinary medicine.
INFLUENCE
ADVANCING YOUR ISSUES, YOUR CONCERNS AND YOUR PROFESSIONAL INTERESTS.

The CVMA looks at policy matters in terms of their potential impact on the profession. Our role as an advocate for animal welfare and veterinary medicine at the national level influences your access to critical drugs, contributes to the development of responsible animal welfare policies, mitigates decisions that could adversely affect your delivery of veterinary care, and fosters a wider appreciation of the role of veterinarians in the One Health concept.

As a CVMA member you benefit from…

• Engagement with Government and key stakeholders to influence policy decisions
• International relations to provide the Canadian veterinary perspective
• Media and public relations to provide balanced and trustworthy information and to promote veterinary professionals
• Position statements on animal welfare and national veterinary issues
• Codes of practice for Canadian kennel and cattery operations, and for the care and handling of farm animals
• Member consultations and online discussions on key veterinary issues
• Pan-Canadian Framework for Professional Standards in Veterinary Oversight of Antimicrobial Use
• Therapeutic decision cascade poster
• Sedative, anaesthetic and pain management protocols posters
• Guidelines for the successful employment of new veterinary graduates
• Antimicrobial prudent use guidelines for beef cattle, dairy cattle, poultry and swine
• Compensation report for non-DVM staff
• Compensation report for DVMs outside private practice
• Practice management articles and resources
• Individual practice diagnostic and valuation report
• Practice owner’s economic survey
• Provincial suggested fee guide

KNOWLEDGE
KEEPING YOU CURRENT ON VETERINARY SCIENCE AND PRACTICE, RESEARCH, INNOVATION AND TRENDS TO ENHANCE YOUR CAREER DEVELOPMENT AND LIFELONG LEARNING.

The CVMA provides you with the latest news, information, and clinical and non-clinical continuing professional development. Our role as a knowledge provider enables you to broaden your knowledge and skills and maintain your competence to the highest professional standards.

As a CVMA member you benefit from…

• The Canadian Veterinary Journal
• Canadian Journal of Veterinary Research
• Clinician’s Brief™ (free global digital edition)
• CVMA national convention
• CVMA Veterinary Summit
• CVMA National Issues Forum
• CVMA Emerging Leaders Program
• CVMA Canadian Veterinary Reserve
• Member e-newsletter ‘Online from 339’
• CVMA online continuing education portal
• VetFolio® online educational resources (subscription discount)
• Antimicrobial SmartVet mobile app
• WSAVA World Congress (registration discount)
• WVA Congress (registration discount)
• Petro-Canada SuperPass™ fuel/diesel/car wash discount
• Petro-Canada SuperPass™ fuel/diesel/car wash discount
• National and Enterprise Rent-a-Car discounts
• Staples Advantage™ business products
• GoodLife Fitness Corporate Discount
• Plumb’s Veterinary Drugs™ (subscription discount)
• NEW! GoodLife Fitness Corporate Discount
• NEW! HRdownloads™ discounts
• NEW! HRdownloads™ discounts

RESOURCES
SUPPORTING OUR MEMBERS THROUGH EVERY STAGE OF THEIR CAREER WITH ACCESS TO A RANGE OF EXCLUSIVE PRACTICE TOOLS AND RESOURCES.

The CVMA provides members access to professional resources, veterinary economic reports, practice management solutions, client education resources, and exclusive online content to support you and your practice team in the effective delivery of veterinary services.

As a CVMA member you benefit from…

• MyVetStore.ca™ - CVMA web store solution for clinics
• NEW! Moneris™ preferred payment processing rates
• NEW! CVMA Petcard Program - financing options for your clients
• Practice owner’s economic survey
• Individual practice diagnostic and valuation report
• Provincial suggested fee guide
• Associate compensation and benefits report
• Compensation report for non-DVM staff
• Compensation report for DVMs outside private practice
• Practice management articles and resources
• CVMA group insurance program
• CVMA mentoring program
• CVMA Green Veterinary Practice and self-audit tool
• Antimicrobial SmartVet mobile app
• VetFolio® online educational resources (subscription discount)
• Plumb’s Veterinary Drugs™ (subscription discount)
• WVA Congress (registration discount)
• Petro-Canada SuperPass™ fuel/diesel/car wash discount
• Petro-Canada SuperPass™ fuel/diesel/car wash discount
• National and Enterprise Rent-a-Car discounts
• Staples Advantage™ business products
• GoodLife Fitness Corporate Discount
• Plumb’s Veterinary Drugs™ (subscription discount)
• NEW! GoodLife Fitness Corporate Discount
• NEW! HRdownloads™ discounts

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• GoodLife Fitness Corporate Discount
• Plumb’s Veterinary Drugs™ (subscription discount)
• NEW! GoodLife Fitness Corporate Discount
• NEW! HRdownloads™ discounts

SAVINGS
PUTTING MONEY IN YOUR POCKET AND DELIVERING MORE VALUE TO INCREASE YOUR PROFITABILITY.

The CVMA uses its national purchase power and strategic partnerships so that you can benefit from discount rates and money-saving services.

As a CVMA member you benefit from…

• Hotel discounts worldwide
• National and Enterprise Rent-a-Car discounts
• The Personal Insurance home and auto group savings
• Scotiabank® business banking and lending solutions
• The CVJ classified ads discount
• Staples Advantage™ business products
• Adtell® telephone hold service and digital signage
• Petro-Canada SuperPass™ fuel/diesel/car wash discount
• WVA Congress (registration discount)
• CVMA mentoring program
• CVMA group insurance program
• CVMA Green Veterinary Practice and self-audit tool
• Antimicrobial SmartVet mobile app
• Veterinary health and wellness resources
• Early career DVM web resource hub
• Guidelines for the successful employment of new veterinary graduates
• Sedative, anaesthetic and pain management protocols posters
• Guidelines for the legitimate use of compounded drugs in veterinary practice
• Antimicrobial prudent use guidelines for beef cattle, dairy cattle, poultry and swine
• Therapeutic decision cascade poster
• Animal abuse resources for practitioners faced with this issue
• Preventive healthcare, nutritional assessment and client education tools and resources
• Animal health week annual public awareness campaign

For information about the many benefits and privileges of membership.

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2016 Annual Report of the Canadian Veterinary Medical Association

The CVMA is the national and international voice for Canada’s veterinarians, providing leadership and advocacy for veterinary medicine.

With 7287 members in 2016, the CVMA has reached its highest ever membership number, an increase of over 7% from the previous year. Thank you to all the ongoing and new members for joining the CVMA and maintaining a strong national and international voice for the profession. In addition, the CVMA counts 7397 veterinary technicians and technologists as affiliates. Thank you to the Registered Veterinary Technologists and Technicians of Canada (RVTTC) for the ongoing partnership, which is integral to fostering a successful veterinary team.

The CVMA’s Core Competencies are National & International Issues and Animal Welfare. A number of areas support these core competencies, such as the CVMA’s journals, the Annual Convention and the Student Symposium, Career & Life Balance — including business management tools such as the suggested fee guide, National Examining Board, veterinary college accreditation, and Veterinary Technician Accreditation.

Animal Cruelty legislation: The CVMA has been advocating for the amendment of the Criminal Code to consolidate and modernize various offences against animals for the better part of 20 years. In 2016, the Association supported the private member’s Bill C-246 or Modernizing Animal Protections Act. Through a “grass-roots campaign” during the summer, the CVMA encouraged its members to engage with their respective Members of Parliament. Despite these efforts, the Bill was defeated in the House of Commons with a vote of 198–84. The silver lining is that the federal government committed to review the current Act and engage in broad consultations in the process. The CVMA has liaised with the Liberal animal welfare caucus and will be invited to a stakeholder initiative to discuss a common strategy on how to modernize this outdated legislation.

Antimicrobial resistance: The CVMA has advocated for regulatory and policy changes over many years. In 2016, the federal government started processing the following changes: Removing growth promotion claims from pre-2004 approved medically important antimicrobials (MIAs); increasing veterinary oversight over all MIAs (pre-2004 approved); increasing oversight on importation of veterinary drugs (Own Use Importation) and active pharmaceutical ingredients (APIs); facilitating access to low-risk veterinary health products as additional tools for the maintenance of animal health and welfare; and introducing mandatory reporting of sales volume from manufacturers and importers to support antimicrobial use surveillance. In preparation of the anticipated changes to be implemented in

L’ACMV est la voix nationale et internationale des médecins vétérinaires du Canada et elle assure le leadership et la défense des intérêts de la médecine vétérinaire.

En 2016, l’ACMV comptait 7287 membres, ce qui représente son effectif le plus élevé et une hausse de 7 % par rapport à l’année précédente. Merci à tous les membres actuels et nouveaux pour leur adhésion à l’ACMV et la promotion d’une voix nationale et internationale forte pour la profession. De plus, l’ACMV compte 7397 techniciens et technologues vétérinaires en tant qu’affiliés. Merci à Technologues et techniciens vétérinaires agréés du Canada (TTVAC) pour son partenariat qui fait partie intégrante du succès de l’équipe vétérinaire.

Les compétences fondamentales de l’ACMV sont les Enjeux nationaux et internationaux et le Bien-être animal. Plusieurs domaines appuient ces compétences fondamentales, comme les revues de l’ACMV, le congrès annuel et le Symposium des étudiants, une carrière et une vie équilibrée — incluant des outils de gestion commerciale comme les guides tarifaires suggérés, le Bureau national des examinateurs, l’agrément des écoles de médecine vétérinaire et l’agrément des techniciens vétérinaires.

Loi sur la cruauté envers les animaux: Au cours d’une bonne partie des vingt dernières années, l’ACMV a préconisé la modification du Code criminel afin de consolider et de moderniser les diverses infractions à l’égard des animaux. En 2016, l’Association a appuyé le projet de loi C-246 émanant d’un député intitulé Loi sur la modernisation des mesures de protection des animaux. Dans le cadre d’une campagne « à la base » durant l’été, l’ACMV a encouragé ses membres à contacter leurs députés fédéraux respectifs. Malgré ces efforts, le projet de loi a été défait à la Chambre des communes par un vote de 198 contre 84. Toutefois, le gouvernement fédéral s’est engagé à examiner la Loi actuelle et à mener de vastes consultations dans le cadre de cet exercice. L’ACMV a effectué la liaison avec le caucus sur le bien-être animal du Parti libéral et elle sera invitée à une initiative d’intervenants afin de discuter d’une stratégie commune sur la façon de moderniser cette loi désuète.

Antibiorésistance : L’ACMV préconise des changements à la réglementation et aux politiques depuis de nombreuses années. En 2016, le gouvernement fédéral a entamé la mise en œuvre des modifications suivantes : l’enlèvement des allégations de stimulation de croissance des antimicrobiens importants sur le plan médical (AIM); le resserrement de la surveillance vétérinaire de tous les AIM (approuvés avant 2004); l’accroissement de la surveillance sur l’importation des médicaments vétérinaires (importation pour utilisation personnelle) et des ingrédients pharmaceutiques actifs (IPA); la facilitation de l’accès à des
late 2017/2018, the CVMA, in collaboration with the Canadian Council of Veterinary Registrars (CCVR) and with input from a large group of stakeholders, drafted the document “Veterinary oversight of antimicrobial use — A pan-Canadian framework for professional standards for veterinarians.” The 2016 CVMA Summit, with Dr. Troy Bourque as chair, provided for discussion by all major groups involved. The Framework was finalized at the end of 2016 and now provides a template of professional standards to be used by provincial and territorial veterinary regulatory bodies when developing their own regulations, guidelines, or bylaws relating to veterinarians’ professional responsibilities in providing oversight of use of antimicrobials in all circumstances.

In order to foster Antimicrobial Stewardship further, the CVMA initiated a project to renew the 2008 CVMA Antimicrobial Prudent Use Guidelines, add guidelines for small ruminants and complete the Antimicrobial SmartVet apps for antimicrobial prudent use in small animals. This project is scheduled to be completed at the end of March 2018.

With a financial contribution from the Canadian Food Inspection Agency (CFIA), the CVMA has also initiated a project on antimicrobial use surveillance in order to identify baseline data and potentially later monitor antimicrobial use in large and small animals in an effective and efficient way. This project is in support of fighting antimicrobial resistance and Canada’s related commitments to the World Organisation for Animal Health (OIE) and the international community.

Throughout 2016, the CVMA, in conjunction with the CCVR, rolled out a monthly awareness campaign, alerting veterinarians to the issue of antimicrobial use (AMU) and the upcoming regulatory changes.

Throughout the AMU regulatory process, the CVMA worked on the regulatory side with the CCVR, the Veterinary Drugs Directorate, the CFIA, and the Public Health Agency of Canada.

**Dog Importation:** During its Annual Convention, the CVMA hosted the first National Issues Forum, an event allowing veterinarians to familiarize themselves with a national issue and discuss it. The discussion took place on CVMA’s draft Position Statement on Importation of Dogs into Canada. The resulting Position Statement was approved by Council in November and states: “The CVMA will support the importation of dogs into Canada only once effective controls are in place that mitigate the risk to Canadians and our resident animal populations from infectious disease….” As a next step, the CVMA will consider furthering awareness on this issue with veterinarians and the public, and will lobby the government to take a lead on addressing this matter.

**International relations:** On an international level, the CVMA represents Canada’s veterinarians as part of Canada’s government delegation to the OIE, as a member of the World Veterinary Association (WVA), the World Small Animal Veterinary Association (WSAVA), PANVET, the grouping of Federation of Veterinarians of Europe/American Veterinary Medical Association/CVMA, and as a member of the International Veterinary Officers’ Coalition (IVOC). These collaborations have resulted in joint Position Statements, engaging with the WVA and the WSAVA in urging the United products de santé vétérinaire à faible risque à titre d’outils additionnels pour le maintien de la santé et du bien-être animal; et l’introduction de la déclaration obligatoire des volumes de vente des fabricants et des importateurs afin d’appuyer la surveillance de l’utilisation. En préparation à ces changements dont la mise en œuvre est prévue à la fin 2017–2018, l’ACMV, en collaboration avec le Conseil canadien des registraires vétérinaires (CCVR) et avec la rétrocédion d’un vaste groupe d’intervenants, a rédigé le document intitulé «Surveillance vétérinaire de l’utilisation des antimicrobiens — Un cadre de travail pan-canadien pour les normes professionnelles régissant les médecins vétérinaires».

Le Sommet 2016 de l’ACMV, qui a été présidé par le Dr Troy Bourque, a permis aux groupes importants de participer. Le cadre de travail a été finalisé à la fin de 2016 et il fournit maintenant un modèle de normes professionnelles que pourront utiliser les organismes provinciaux et territoriaux de réglementation de la médecine vétérinaire afin d’élaborer leurs propres règlements ou lignes directrices portant sur les responsabilités professionnelles des médecins vétérinaires pour la préstation de la surveillance de l’utilisation des antimicrobiens dans toutes les circonstances.

Afin de favoriser encore plus l’antibiogouvernance, l’ACMV a lancé un projet pour le renouvellement des Lignes directrices de l’ACMV sur l’administration judicieuse des antimicrobiens de 2008 afin d’ajouter des lignes directrices pour les petits ruminants et terminer les applis IntellIVet pour l’utilisation prudente des antimicrobiens chez les petits animaux. L’achèvement de ce projet est prévu pour la fin de mars 2018.

Grâce à la contribution financière de l’Agence canadienne d’inspection des aliments (ACIA), l’ACMV a aussi entamé un projet pour la surveillance de l’utilisation des antimicrobiens afin d’identifier les données de référence dans le but d’une surveillance efficace éventuelle de l’utilisation des antimicrobiens chez les grands et les petits animaux d’une manière efficace. Ce projet favorise la lutte contre l’antibiorésistance et les engagements connexes du Canada envers l’Organisation mondiale de la santé animale (OIE) et la collectivité internationale.

Au cours de 2016, l’ACMV, de concert avec le CCVR, a mis en œuvre une campagne de sensibilisation mensuelle afin d’alerter les médecins vétérinaires à l’égard de l’enjeu de l’utilisation des antimicrobiens et des modifications réglementaires prochaines.

Pendant le processus réglementaire en lien avec l’utilisation des antimicrobiens, l’ACMV a travaillé avec des spécialistes de la réglementation du CCVR, de la Direction des médicaments vétérinaires, de l’ACIA et de l’Agence de la santé publique du Canada.

**Importation des chiens:** Pendant son congrès annuel, l’ACMV a organisé le premier Forum sur les enjeux nationaux, un événement qui permet aux vétérinaires de se familiariser avec un enjeu national et d’en discuter. La discussion a porté sur l’énoncé de position de l’ACMV sur l’importation des chiens au Canada. L’énoncé de position qui en a découlé a été approuvé par le Conseil en novembre et stipule: «L’ACMV appuiera l’importation des chiens au Canada seulement après la mise en place de contrôles efficaces qui atténuent les risques présentés par les maladies infectieuses pour les Canadiens et les populations résidentes d’animaux...». Comme prochaine étape, l’ACMV considéra une sensibilisation accrue des médecins vétérinaires
Nations not to restrict the availability of ketamine, or tangible benefits to CVMA members such as access to WVA’s more than 900 e-learning sessions, access to the Partners for Healthy Pets’ resource toolbox including tools on effective communication, marketing, etc., access to a template for use in the development of CVMA’s Mentorship Program, and free of charge Clinicians’ Briefs.

**CVMA in its leader and facilitator role**: On behalf of its members, the CVMA is involved in 27 government agencies and interest groups. The saying introduced by a former CVMA president still holds: “If you are not at the table, you may be on the menu.” The CVMA brings stakeholders together as needed to discuss such matters as antimicrobial use (during the 2016 Summit) and engages with interested groups in the development of Position Statements or responses to the government on new regulations, policies or guidelines.

**The CVMA’s Annual Convention** is Canada’s only national, multi-species event providing an opportunity for veterinarians to learn and meet. The Summit, Presidents’ Meeting, Provincial Forum, meetings with deans, registrars, the RVTTC, the Canadian Animal Health Institute, and alumni are held in conjunction with the Convention.

Thank you to the more than 600 volunteers, together with the dedicated staff team, for providing their significant expertise and capacity to address animal health and welfare, and ecosystem issues on behalf of the profession.

The following report provides a summary of the main activities undertaken by the CVMA in 2016.

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Dr./Dre Nicole Gallant  
CVMA President 2015–16  

Dr./D’ Troy Bourque  
CVMA President 2016–17  
Président de l’ACMV 2016–2017
Corporate Partnership Program (CPP)
Programme de commandite par des entreprises (PCE)

The CVMA Corporate Partnership Program (CPP) is a comprehensive sponsorship program that was implemented in 2007 to better recognize a company’s overall financial contribution to the Association. The CPP evolves each year and takes into account the various programs and events that are corporately sponsored, allowing companies that support the CVMA in various aspects to get better recognition for their overall contributions. The 3 levels of sponsorship in 2016 were Platinum (> $80,000), Gold ($48 000–$79 999) and Silver ($27 000–$47 999).

The CVMA would like to extend recognition to the following sponsors for their overall contribution to the Association for 2016:

Gold:
- Merck Animal Health
- Scotiabank
- Virox Animal Health

Silver:
- Hill’s Pet Nutrition Canada Inc.
- IDEXX Laboratories
- Merial Canada Inc.
- Petsecure Pet Health Insurance

 Policy & Advocacy
Politiques et défense des intérêts

National and international leadership efforts that advance the concerns and professional interests of members.

Des efforts de leadership à l’échelle nationale et internationale qui font valoir les préoccupations et avancent les intérêts professionnels des membres.

Animal Welfare
Bien-être animal

The Animal Welfare Committee (AWC) deals with a wide range of issues of concern to Canadian veterinarians and the public with respect to the humane treatment of animals. Committee members include those from companion and food animal practice, animal welfare research, wildlife and zoo animal medicine, and laboratory animal medicine. Ex-officio members include those from the Canadian Food Inspection Agency (CFIA), Canadian Federation of Humane Societies (CFHS), Ontario Veterinary Medical Association (OVMA), the Canadian Association of Laboratory Animal Medicine (CALAM), and the Registered Veterinary Technologists and Technicians of Canada (RVTTC).

The AWC conducts extensive reviews of scientific and ethical dimensions of animal welfare issues of importance to veterinarian-
ians and the public. During 2016, the AWC proposed to CVMA Council revisions to existing Position Statements on: Castration of Piglets; Cutting, Reduction, or Removal of Healthy Teeth in Dogs; Partial Digital Amputation (Onychectomy, Declawing) of Non-Domestic Felids and Other Carnivores Kept in Captivity; Devocalization of Dogs; Disbudding and Dehorning of Cattle; Induced Molting of Poultry; Keeping of Native or Exotic Wild Animals as Pets; Partial Digital Amputation (Onychectomy or Declawing) of the Domestic Felid; Tail Docking of Dairy Cattle, and Use of Thermocautery for the Treatment of Lameness in Horses. The Position Statement of Ownership and Selection of a Pet was rescinded and was replaced by a web information resource for veterinarians and owners.

During 2016 the AWC began work on new Position Statements on Transportation of Dogs and Cats; The Use of Animals in Competitive Sport; The Use of Animals in Entertainment and Recreation; Marketing of Cull Dairy Cows; Veterinary Reporting of Animal Abuse; the Use of Pain Technologies in Animals (to replace Electro-Immobilization). During 2016, the AWC continued work on the revision of Code of Practice for Canadian Kennel Operations in consultation with AWCA members and external stakeholders.

Working with AWC, CVMA communications disseminated information via web news to veterinarians in Canada on the care of compromised cattle. The CVMA convened a meeting of the Ad Hoc committee on compromised cattle during November 2016 to discuss CVMA’s draft Position Statement.

With the support of the AWC, the CVMA lobbied the federal government in support of Private Member Bill C-246 including meeting with stakeholders, members of Parliament and the office of Minister of Agriculture. Letters expressing CVMA support were sent to Members of Parliament, veterinary species and producer groups and CVMA members (requesting that they actively engage their Members of Parliament).

The CVMA was represented on the National Farmed Animal Care Council (NFACC) Executive and Board and continues to provide representation on the NFACC Code and Scientific Committees as well as the Animal Care Assessment Program Committees. Internationally, the CVMA was represented at the Animal Welfare Committee meeting of the American Veterinary Medical Association (AVMA). Likewise the AVMA representative met with the CVMA’s Animal Welfare Committee during the March Committee Weekend.

A number of animal welfare resources continue to be available on the CVMA website including pain management posters; kennel and cattery codes, information on animal abuse and ownership and selection of a pet, and animal welfare news items and articles.

Le CBA réalise des examens des dimensions scientifiques et éthiques des enjeux d’importance liés au bien-être animal qui sont importants pour les vétérinaires et le public. En 2016, le CBA a proposé au Conseil de l’ACMV des révisions aux énoncés de position suivants : Castration des porcelets; Coupe, réduction ou extraction des dents en santé chez les chiens; Amputation partielle des doits (onychectomie, dégriffage) des félidos non domestiques et d’autres carnivores gardés en captivité; Dévocalisation des chiens; Enlèvement des bourgeois et écormage du bétail; Mue induite de la voilaille; Garde d’animaux sauvages ou exotiques comme animaux de compagnie; Amputation partielle des doits (onychectomie ou dégriffage) des félidos domestiques; Amputation de la queue des bovins laitiers et Utilisation de la thermocautérisation pour le traitement de la boiterie chez les chevaux. L’énoncé de position sur la possession et la sélection d’un animal de compagnie a été révoqué et remplacé par une ressource d’information Web à l’intention des vétérinaires et des propriétaires.

Durant 2016, le CBA a entamé des travaux sur de nouveaux énoncés de position : Transport des chiens et des chats; Utilisation des animaux dans les sports compétitifs; Utilisation des animaux dans les spectacles et les loisirs; Commercialisation des vaches laitières de réforme; Déclaration de la violence envers les animaux par les vétérinaires; Utilisation des technologies douloureuses pour les animaux (pour remplacer l’électro-immobilisation). Durant 2016, le CBA a poursuivi son travail pour la révision du Code de pratiques recommandées aux chenils du Canada en consultation avec les membres du CBA et des intervenants externes.

En collaboration avec le CBA, le service des communications de l’ACMV a diffusé de l’information dans les nouvelles Web aux médecins vétérinaires du Canada sur les soins du bétail fragilisé. L’ACMV a convoqué une réunion du Comité ad hoc sur le bétail fragilisé durant novembre 2016 afin de discuter l’énoncé de position de l’ACMV.


L’ACVM a été représentée au sein de l’exécutif et du conseil d’administration du Conseil national pour les soins aux animaux d’élevage (CNSEA) et elle continue d’assurer une représentation au sein des comités des codes et des comités scientifiques ainsi qu’auprès des comités des programmes d’évaluation des soins aux animaux. À l’échelle internationale, l’ACVM a été représentée à la réunion du Comité sur le bien-être animal de l’American Veterinary Medical Association (AVMA). De même, le représentant de l’AVMA a rencontré le Comité sur le bien-être animal de l’ACVM durant la fin de semaine des comités de mars.

Plusieurs ressources sur le bien-être animal continuent d’être disponibles sur le site Web de l’ACVM, y compris des affiches sur la gestion de la douleur, les codes pour les chiens et les chatteries, des renseignements sur la violence envers les animaux et sur la possession et le choix d’un animal de compagnie ainsi que des articles et des nouvelles sur le bien-être animal.
National Issues
Enjeux nationaux

The National Issues Committee (NIC) considers a wide range of issues of concern to the veterinary profession in Canada. During 2016 the NIC developed a new Position Statement on Importation of Dogs into Canada. A review and revision of the Position Statement on Veterinary Dentistry was undertaken with member discussion planned for 2017.

The National Issues Forum was held for the first time in 2016 at the CVMA Convention with the aim of better informing and engaging members in the development and application of CVMA Position Statements for affecting change. The subject of the 2016 Forum was Importation of Dogs into Canada. The event involved presentations from 3 panelists, discussion and live polling, and was attended by 150 veterinarians. A high level of support was expressed for CVMA’s new Position Statement on the issue that was approved by Council in November 2016.

A major focus of NIC deliberations continued to be antimicrobial stewardship and antimicrobial use surveillance given the changes to federal regulations expected during the next several years. NIC drafted a response to the Minister of Health during August 2016 regarding the proposed regulatory changes that would enhance veterinary oversight of antimicrobial use in animals.

The CVMA’s Veterinary Pharmaceutical Stewardship Advisory Group (VPSAG) completed the document “Veterinary oversight of antimicrobial use — A pan-Canadian framework of professional standards for veterinarians,” developed in collaboration with the Canadian Council of Veterinary Registrars (CCVR), and was used by CVMA communications as a basis for monthly messages to veterinarians highlighting the key role veterinarians play in pharmaceutical stewardship. A revised draft document was presented to key stakeholders in late 2016 including the National Farmed Animal Health and Welfare Council (NFAHWC) and the CCVR. The first document serves the veterinary regulatory bodies as a template for professional standards when developing their own regulations, guidelines or bylaws relating to veterinary professional responsibilities in providing oversight in the use of antimicrobials in all circumstances.

In 2016, the CVMA completed an application to Agriculture and Agri-Food Canada (AAFC) for funding under the AAFC Agri-Marketing program to renew and enhance the Prudent Use Guidelines for Food and Companion Animals. The proposed project titled Renewal of CVMA Guidelines for the Prudent Use of Veterinary Anti-Microbial Medications was approved and will be completed in 2018. In a separate initiative, the CVMA received funding from the CFIA to support an initial phase of a project on Antimicrobial Use (AMU) Surveillance in veterinary practices to be completed in early 2017.

The CVMA provided representation at meetings with the Canadian Animal Health Institute (CAHI), the Canadian Animal Health Products Advisory Committee (CAHPAC), Canadian Global Food Animal Residue Avoidance Databank (cGFARAD); Canadian Council of Veterinary Registrars (CCVR); Ad Hoc Committee on Veterinary Anti-Microbial Le Comité sur les enjeux nationaux (CEN) se penche sur un vaste éventail d’enjeux qui préoccupent la profession vétérinaire au Canada. Durant 2016, le CEN a élaboré un nouvel énoncé de position sur l’importation des chiens au Canada. Un examen et une révision de l’énoncé de position sur la dentisterie vétérinaire a été entrepris et une discussion avec les membres est prévue pour 2017.


Le CEN a continué de se pencher en grande partie sur l’antibiogouvernance et la surveillance de l’utilisation des antimicrobiens compte tenu des modifications réglementaires fédérales qui sont attendues au cours des prochaines années. Le CEN a rédigé une réponse à la ministre de la Santé en août 2016 concernant le projet de modification du Règlement qui porte sur le resserrement de la surveillance vétérinaire pour l’utilisation des antimicrobiens chez les animaux.

Le Groupe consultatif sur les produits pharmaceutiques vétérinaires (GCPPV) de l’ACMV a terminé la rédaction du document «Surveillance vétérinaire de l’utilisation des antimicrobiens — Un cadre de travail pancanadien pour les normes professionnelles régissant les médecins vétérinaires», qui a été rédigé en collaboration avec le Conseil canadien des registraires vétérinaires (CCCRV) et a été utilisé par le service des communications de l’ACMV pour communiquer des messages mensuels aux vétérinaires afin de souligner le rôle clé des médecins vétérinaires dans la gouvernance des produits pharmaceutiques. Une ébauche révisée du document a été présentée aux principaux intervenants à la fin de 2016, dont le Conseil national sur la santé et le bien-être des animaux d’élevage (CNSBEAE) et le CCCRV. Le premier document servira de modèle pour les normes professionnelles à l’intention des organismes de réglementation de la médecine vétérinaire lors de l’élaboration de leurs propres règlements ou lignes directrices portant sur les responsabilités professionnelles des médecins vétérinaires dans la surveillance de l’utilisation des antimicrobiens dans toutes les circonstances.

En 2016, l’ACMV a présenté une demande de financement auprès d’Agriculture et d’Agroalimentaire Canada (AAC), en vertu du programme Agri-marketing d’AAC, afin de renouveler et d’améliorer les Lignes directrices sur l’administration judicieuse pour les animaux de compagnie et les animaux destinés à l’alimentation. Le projet proposé, qui s’intitule Renouvellement des lignes directrices de l’ACMV sur l’administration judicieuse des médicaments antimicrobiens vétérinaires, a été approuvé et
Stewardship; National Farmed Animal Health and Welfare Council (NFAHWC); Council of Chief Veterinary Officers (CCVO) Task Force on Dog Importation; and the American Veterinary Medical Association (AVMA).

The CVMA presented at the NFAHWC meeting on CVMA activities that support the National Animal Health Strategy. The NIC continues to monitor the activity of the NFAHWC Council and seeks opportunities to provide input on issues that are important to the veterinary community (e.g. disease surveillance, Codes of Practice incorporation into provincial regulations, and antimicrobial stewardship/resistance).

Communications & Public Relations

The CVMA received 82 media inquiries during 2016. This resulted in a number of interviews, including discussions on CVMA’s Position Statements on tail docking of dogs, marijuana use in pets, and the risks of importing dogs into Canada. The 2016 CVMA Convention in Niagara Falls saw successful media coverage resulting in 3 print publication interviews and one radio interview for the CVMA Summit.

The CVMA continues to increase social media channel activity. By the fall of 2016, the CVMA’s Facebook page hit over 5000 likes and its combined English and French Twitter followers were over 8600. Its YouTube Channel featured the 2016 Animal Health video and testimonials from CVMA members.

Durant 2016, l’ACMV a reçu 82 demandes de renseignements de la part des médias. Ces dernières ont donné lieu à plusieurs entrevues, dont des discussions sur les énoncés de position de l’ACMV sur l’amputation de la queue des chiens, l’utilisation de la marijuana chez les animaux de compagnie et les risques liés à l’importation des chiens au Canada. Le congrès 2016 de l’ACMV à Niagara Falls a obtenu une bonne couverture médiatique qui s’est concrétisée par trois entrevues dans les médias imprimés et une entrevue à la radio pour le Sommet de l’ACMV.

L’ACMV continue d’accroître l’activité dans les réseaux des médias sociaux. À l’automne 2016, la page Facebook de l’ACMV a atteint plus de 5000 J’aime et le nombre combiné de suiveurs de Twitter, en français et en anglais, s’élévait à plus de 8600 personnes. Son canal YouTube a présenté la vidéo de la Santé animale 2016 et des témoignages provenant de membres de l’ACMV.

En 2016, l’ACMV a poursuivi sa campagne de sensibilisation sur Facebook et Twitter afin de promouvoir la valeur des soins vétérinaires auprès du public. Les mots-clics #VétérinairesPartenaires et #VetCareEverywhere ont été utilisés avec la série de messages sur les soins vétérinaires. La campagne de sensibilisation se poursuivra en 2017.

En 2016, l’ACMV, en partenariat avec le Conseil canadien des registraires vétérinaires, a envoyé des messages mensuels à tous les vétérinaires par l’entremise de courriels, des médias sociaux et du site Web de l’ACMV, sous la bannière de Surveillance vétérinaire de l’utilisation des antimicrobiens au Canada : les règles vont changer…
The CVMA continued an awareness campaign in 2016 on Facebook and Twitter to promote the value of veterinary healthcare to the public. The hashtags #VetCareEverywhere and #VétérinairesPartenaires were used with the series of veterinary healthcare statements. The awareness campaign continues into 2017.

In 2016, the CVMA, in partnership with the Canadian Council of Veterinary Registrars, sent out monthly messages to all veterinarians through e-mails, social media and the CVMA website, under the banner of Veterinary Oversight of Antimicrobial Use in Canada: Regulations are Changing...We Want You Prepared. This was in response to the federal government’s announcement that new regulations would require veterinary oversight of the use of antimicrobials administered to food animals, including those administered in feed or water, to be in place by the end of December 2016 (this date has since been extended to the end of 2017). The messages were also shared with the provincial and territorial veterinary associations and regulatory bodies.

The CVMA, in partnership with Merck Animal Health, declared March 2016 the first National Tick Awareness Month. The campaign made available to clinics waiting room posters and ready-to-use, cut-and-paste social media posts. An exclusive live webinar was also held on 2 consecutive days for western and eastern Canada, featuring renowned parasitologist Dr. Michael W. Dryden. The webinar was archived until May 31, 2016.

Animal Health Week (AHW) ran from October 2 to 8, 2016 with the theme, “Animal Health + Human Health + Planet Health = One Health.” Generous support of the campaign was presented by the Principal Sponsor: Petsecure Pet Health Insurance, and Program Sponsors: iFinance (Petcard) and Merial. A national news release was distributed the week prior to Animal Health Week. In addition, targeted media pitches were sent to various outlets across the country, resulting in 4 interviews. The Canadian Food Inspection Agency distributed 160 Animal Health Week posters through departments across Canada and invited the CVMA to provide 2 presentations during AHW. Photos from Animal Health Week events were shared on the CVMA Facebook page and Twitter feed during the campaign period.

Mass e-mail and fax bulletins, social media updates, articles in provincial publications, information on the CVMA’s website, and in the CVMA’s monthly eNewsletter continue to provide members with relevant CVMA program updates and general veterinary news.

Soyez prêts! Cette campagne a été déployée en réponse à l’annonce du gouvernement fédéral que la nouvelle réglementation exigerait la surveillance vétérinaire de l’utilisation des antimicrobiens administrés aux animaux destinés à l’alimentation, y compris ceux administrés dans les aliments ou l’eau, qui devra être mise en place d’ici la fin de décembre 2016 (cette date a depuis été reportée à la fin de 2017). Les messages ont aussi été partagés avec les associations provinciales et territoriales de médecins vétérinaires et les organismes de réglementation.

L’ACMV, en partenariat avec Merck Santé animale, a déclaré le mois de mars 2016 le premier Mois national de la sensibilisation aux tiques. La campagne a distribué des affiches pour la salle d’attente des cliniques ainsi que des messages à couper-coller pour les médias sociaux. Un webinaire exclusif a aussi été présenté en direct par le célèbre parasitologue Dr. Michael W. Dryden pendant deux journées consécutives pour l’Ouest canadien et l’Est du Canada. Le webinaire a été archivé jusqu’au 31 mai 2016.

La Semaine de la vie animale (SVA) s’est déroulée du 2 au 8 octobre 2016 sous le thème « Santé animale + Santé humaine + Santé de la planète = Une seule santé ». Un soutien généreux de la campagne a été fourni par le commanditaire principal : Petsecure assurance maladie pour animaux, et les commanditaires de programme : iFinance (Petcard) et Merial. Un communiqué de presse national a été diffusé la semaine avant la Semaine de la vie animale. De plus, des communications ciblées pour les médias ont aussi été acheminées aux divers réseaux au pays et elles se sont traduites par quatre entrevues. L’Agence canadienne d’inspection des aliments a distribué 160 affiches de la Semaine de la vie animale dans les diverses régions du Canada par l’entremise des ministères et elle a invité l’ACMV à donner deux présentations durant la SVA. Des photos des activités de la Semaine de la vie animale ont été partagées sur la page Facebook de l’ACMV et sur le fil Twitter durant la campagne.

Des bulletins de masse ont été envoyés par courriel et par télécopieur et des nouvelles dans les médias sociaux, des articles dans les publications provinciales, des renseignements sur le site Web de l’ACMV et le cyberbulletin mensuel de l’ACMV ont fourni aux membres des mises à jour sur les programmes pertinents et l’actualité vétérinaire en général.
2016 CVMA Awards

Prix 2016 de l’ACMV

The 2016 CVMA Awards Ceremony honored exceptional individuals of the veterinary community in July. Dr. Ernie Prowse, CVMA Small Animal Practitioner Award (Petsecure Pet Health Insurance); Dr. Melodie Chan, CVMA Industry Award; Dr. Shawn Llewellyn, CVMA Humane Award (Merck Animal Health); Dr. Larry Hammell, Merck Veterinary Award (Merck Animal Health); Animal Care Centre of Strathmore, CVMA Practice of the Year Award (Scotiabank); Dr. Bernhard Pukay, CVMA Life Membership; Ms. Elizabeth J. Knight, CVMA Honorary Membership; and Dr. Sylvie Latour, CVMA President’s Award. The CVMA extends congratulations to Ms. Stacey Huneke who received the 2016 Canadian Registered Animal Health Technologist/Veterinary Technician of the Year Award. The CVMA issued individual news releases on each award recipient, which resulted in 4 media requests for interviews.

En juillet, la Cérémonie de remise des Prix 2016 de l’ACMV a reconnu des personnes exceptionnelles de la collectivité vétérinaire. D’Ernie Prowse, Prix du praticien des petits animaux de l’ACMV (Petsecure assurance maladie pour animaux); D’Melodie Chan, Prix de l’industrie de l’ACMV; D’Shawn Llewellyn, Prix humanitaire de l’ACMV (Merck Santé animale); D’Larry Hammell, Prix vétérinaire Merck (Merck Santé animale); Animal Care Centre of Strathmore, Prix de la pratique de l’année de l’ACMV (Banque Scotia); D’Bernhard Pukay, Titre de membre à vie de l’ACMV; M’Elizabeth J. Knight, Titre de membre honoraire de l’ACMV; et D’Sylvie Latour, Prix du président de l’ACMV. L’ACMV félicite M’Stacey Huneke qui a reçu le Prix du technologue en santé animale/technicien vétérinaire de l’année 2016. L’ACMV a publié des communiqués de presse individuels sur chaque lauréat qui se sont traduits par quatre demandes d’entrevues de la part des médias.

Science and Knowledge

Leading-edge research, education, news and information that enhances the lifelong learning and career development of members.

Science et connaissances

De la recherche, de la formation, des nouvelles et de l’information de pointe qui améliorent l’apprentissage continu et le développement de la carrière des membres.

Journals

Revues

The Canadian Veterinary Journal (The CVJ) and Canadian Journal of Veterinary Research (CJVR) are the only national, general or multi-species, peer-reviewed veterinary journals in Canada. The number of manuscripts submitted to The CVJ in 2016 was 286; the number submitted to the CJVR in 2016 was 86. Successful efforts are ongoing to reduce the backlog of CVJ manuscripts; the time from submission to publication is currently just over 12 months. For CJVR the time for the same progression is 7.8 months. Both journals will continue to promote the relevance of journal articles to practice, and build demand for the knowledge delivered.

A new cover designed in 2016 was launched with the January 2017 issue of CJVR. Also, regarding CJVR, a new associate editor, Dr. Faizal A. Careem, joined the journals team in the summer of 2016.

Both journals have introduced a plagiarism cross-check feature called iThenticate, which is incorporated into the Scholar One online submission system. The CVJ had 2 articles that were compromised last year due to plagiarism so this move was deemed valuable for the future.

The journals department sends an annual letter from the CVMA to the deans of Canadian veterinary schools on behalf of the CVJ / VOL 58 / JULY 2017 677

La Revue vétérinaire canadienne (La RVC) et la Revue canadienne de recherche vétérinaire (RCRV) sont les seules revues vétérinaires nationales, à contenu général ou multi-espèces, évaluées par les pairs au Canada. Le nombre de manuscrits soumis à La RVC en 2016 a été de 286; le nombre de manuscrits soumis à la RCRV en 2016 a été de 86. Des efforts fructueux sont déployés afin de réduire l’arrière des manuscrits de La RVC; le délai entre le moment de la soumission et la publication se situe actuellement à un peu plus de douze mois. Pour la RCRV, le délai pour cette même progression s’établit à 7,8 mois. Les deux revues continueront de promouvoir la pertinence des articles de revue pour la pratique et de miser sur la demande pour les connaissances publiées.

Une nouvelle page couverture conçue en 2016 a été inaugurée avec la publication du numéro de Janvier 2017 de la RCRV. De plus, à propos de la RCRV, un nouveau rédacteur associé, le D’Faizal A. Careem, s’est joint à l’équipe des revues à l’été 2016.

Les deux revues ont introduit une fonction de contre-vérification du plagiat appelée iThenticate, qui est intégrée dans le système de soumission en ligne de Scholar One. La RVC a eu deux articles qui ont été compromis l’an dernier en raison du...
the editors. Editors are recognized by the schools for their work with the journals in determining academic advancement/tenure.

As a benefit to CVMA members, CVMA authors have lower publication fees for The CVJ and lower page charges for CJVR. Advertising revenues, which had been on the decline for the last few years due to the pressures of the economy, have started to rebound. Both journals will continue to strive toward a break-even budget.

Readers and CVMA members are reminded that all issues, except the most recent 6 months, of both The CVJ and CJVR are available to the public on the PubMed Central archive (www.pubmedcentral.com); a link is also available through the CVMA website (www.canadianveterinarians.net). CVMA members can view the most recent 6 months of the journals on the member-only section of the CVMA website.

**Conventions**

**Congrès**

The Canadian Veterinary Medical Association (CVMA) held its 68th Annual Convention July 7–10, 2016 in Niagara Falls, Ontario. This was the first time that the CVMA held its Convention in this destination. Organized in collaboration with the Registered Veterinary Technicians and Technologists of Canada (RVTTC), the annual meeting attracted almost 1000 participants.

With over 35 speakers from Canada and the United States, over 100 continuing education (CE) sessions were offered. For the 2nd year, the CVMA submitted the CE sessions for RACE Approval. As a result, DVMs were able to earn a maximum of 28 CE hours from a selection of 134 RACE-approved hours.

The Convention provided an opportunity for many ancillary groups and organizations to hold meetings onsite including: the RVTTC Board, the Christian Veterinary Missions of Canada, and Pet Secure. Two researchers from the University of Guelph asked the CVMA to promote their study and to ask interested candidates to sign up for onsite interviews. The response was positive and they filled all of the available spots. The Atlantic Veterinary College and the Ontario Veterinary College held offsite alumni receptions.

L’Association canadienne des médecins vétérinaires (ACMV) a tenu son 68e congrès annuel du 7 au 10 juillet 2016 à Niagara Falls, en Ontario. Il s’agissait de la première fois que l’ACMV tenait son congrès à cette destination. Le congrès annuel, qui était organisé en collaboration avec Technologues et techniciens vétérinaires agréés du Canada (TTVAC), a attiré près de 1000 participants.

Grâce à plus de 35 conférenciers provenant du Canada et des États-Unis, plus de 100 ateliers de formation continue ont été offerts. Pour la deuxième année, l’ACMV a présenté une demande pour l’approbation des ateliers de formation continue par RACE. Par conséquent, les médecins vétérinaires pouvaient accumuler un maximum de 28 heures parmi 134 heures de formation continue approuvées par RACE.

Le congrès a fourni l’occasion à de nombreux groupes et organisations auxiliaires de tenir des réunions sur place, dont le conseil d’administration de TTVAC, Christian Veterinary Missions of Canada et Pet Secure. Deux chercheurs de l’Université de Guelph ont demandé à l’ACMV de faire la promotion de leur étude afin de demander à des candidats intéressés de s’inscrire à des entrevues sur place. La réponse a été positive et toutes les
CVMA’s Professional Development Committee chose to support the Niagara Falls Humane Society (NFHS) in recognition of their help coordinating cadavers for the wet labs. They had a table that provided an opportunity to receive cash donations as well as products. The CVMA donated the leftover dog leashes from the convention delegate bags, as well as a cooler on wheels used to transport cadavers to the NFHS. In addition, the Waterloo-Kitchener Humane Society received a gift voucher for their support in securing cadavers as well.

Kruuse donated the supplies for 2 labs and a large stock of supplies were leftover. After consulting with the sponsor, the supplies were donated to Dr. Linda Bolton who works with the Grey Bruce Aboriginal Qimmiq Team. This team of veterinarians, technicians and health care personnel volunteer to provide humane canine population control and community education in remote and semi-remote First Nations communities in northern Ontario.

For the 3rd year, the CVMA Quest game was part of the mobile app to connect participants with each other and with exhibitors/sponsors. In 2015, 40% of registered delegates played the game, whereas in 2016, 46% earned from one to 773 points for app activities. For the first time, the CVMA took advantage of the polling feature within the mobile app during the CVMA Summit and the CVMA National Issues Forum. Both attempts were successful.

The Saturday night “Mardi Gras” social event attracted 210 delegates, and 67 exhibitors. There were diverse food stations with local wine pairings. Entertainment included a magician, 4 psychics, a caricaturist and DJ dance music. In cooperation with the CVMA, Veterinarians without Borders conducted a successful silent and live fundraising auction during the social evening.

The CVMA is grateful to the 45 sponsors of the Convention, especially the 3 Level 1 sponsors: Bayer Inc., Merial and Virox Animal Health. The exhibit hall was filled to capacity with over 100 exhibiting companies.
Canadian Veterinary Reserve (CVR)
Réserve vétérinaire canadienne (RVC)

The mandate of the CVMA’s CVR is to provide veterinary surge capacity resources to first-responders in case of large-scale emergencies involving animals, in order to address animal health and welfare. Typical first responders the CVR would assist are the CFIA for foreign animal disease outbreaks and provincial emergency offices in case of civil emergencies involving animals.

With 288 reservists, the CVR meets the CFIA’s capacity requirements that are at 200. In 2016, the CVR conducted an annual emergency call-up drill to test the timely responsiveness of CVR members and the CVR management and administrative processes and procedure involved in executing a call-up. In total, 213 CVR members were called up and 166 (78%) responded. Of the respondents, 103 reservists (62%) were available to serve.

The CVR was involved with the Public Health Agency of Canada in the Beyond the Border project, coordinating emergency preparedness and response of the USA and Canada, both, for humans and animals. As an outcome of this project, the CVR is now hosting on its Web portal 16 online emergency preparedness modules provided by the US Department of Health and Human Services.

The CVR Advisory Board comprises representatives from the Canadian Food Inspection Agency, Public Health Agency of Canada, Public Safety Canada, provincial registrars, Provincial Chief Veterinary Officers, Canadian Council of Emergency Management Organizations, Canadian veterinary colleges, Canadian Animal Health Institute, Canadian Animal Health Coalition, Veterinarians without Borders, non-governmental organizations, the Canadian Veterinary Medical Association, and the Registered Veterinary Technologists and Technicians of Canada. This structure ensures that key stakeholders are aware of the capacity of the CVR and help facilitate the integration of efforts in case of emergency.

La RVC a pour mandat de fournir des ressources vétérinaires d’appoint aux premiers intervenants dans l’éventualité de situations d’urgence à grande échelle touchant les animaux et afin de gérer les enjeux liés à la santé et au bien-être des animaux. La RVC portait habituellement assistance à des premiers intervenants comme l’ACIA pour les maladies animales exotiques et les bureaux de gestion des urgences provinciaux dans le cas d’urgences civiles touchant les animaux.

Grâce à ses 288 réservistes, la RVC satisfait aux besoins de capacité de l’ACIA qui s’établissent à 200 réservistes. En 2016, la RVC a organisé un exercice de mobilisation d’urgence annuel afin d’évaluer la rapidité de la réponse des membres de la RVC et les processus d’administration et de gestion ainsi que la procédure de la direction de la RVC lors de l’exécution d’une mobilisation. Au total, 213 membres de la RVC ont été mobilisés et 166 (78 %) ont répondu. Parmi les répondants, 103 réservistes (62 %) étaient disponibles à l’affectation.

La RVC a travaillé avec l’Agence de la santé publique du Canada dans le cadre du projet Au-delà des frontières afin de coordonner la préparation aux situations d’urgence et l’intervention aux États-Unis et au Canada, tant pour les humains que pour les animaux. À la suite de ce projet, la RVC hébergera maintenant sur son portail Web 16 modules de préparation aux situations d’urgence fournis par le Département de la santé et des services sociaux des États-Unis.

Le Conseil consultatif de la RVC comprend des représentants de l’Agence canadienne d’inspection des aliments, de l’Agence de la santé publique du Canada, de Sécurité publique Canada, des registraires provinciaux, des médecins vétérinaires en chef des provinces, du Conseil canadien des organisations de gestion des urgences, des collèges de médecine vétérinaire canadiens, de l’Institut canadien de la santé animale, de la Coalition canadienne pour la santé des animaux, de Vétérinaires sans frontières, d’organismes non gouvernementaux, de l’Association canadienne des médecins vétérinaires et de Technologues et techniciens vétérinaires agréés du Canada. Cette structure vise à assurer que les principaux intervenants sont au courant de la capacité de la RVC et aident à faciliter l’intégration des efforts advenant une situation d’urgence.

Practice and Economics
Pratique et finances

Veterinary practice tools and resources that have been developed to support members and their healthcare teams. Des outils et des ressources pour la pratique vétérinaire qui ont été conçus pour appuyer les membres et leurs équipes de soins vétérinaires.

Business Management
Gestion commerciale

In 2016, the CVMA continued its benchmarking program that included valuable economic and practice management tools and resources such as provincial suggested fee guides, compensation and benefits reports for associate veterinarians, and the Registered Veterinary Technologists and Technicians of Canada. This structure ensures that key stakeholders are aware of the capacity of the CVR and help facilitate the integration of efforts in case of emergency.

En 2016, l’ACMV a continué d’offrir son programme d’évaluation comparative du rendement qui comprenait des outils et des ressources utiles pour la gestion des finances et de la pratique, comme les guides tarifaires suggérés provinciaux,
Health and Wellness of Veterinarians
Santé et bien-être des médecins vétérinaires

In September 2016, the CVMA created a new Veterinarian Health and Wellness Resources web section. The CVMA Wellness Advisory Group researched and identified a collection of web-based resources to help veterinarians better understand and manage their health and well-being. These resources are categorized under 3 key areas: Emotional and mental health, Physical health, and Veterinarian wellness. For easy access, a rotating banner pointing directly to the wellness entry page is permanently placed on the CVMA homepage. Resources continue to be added as they are identified.

Under the CVMA Insurance Program, employees enrolled in the group health benefits plan have access to professional referral services and employee assistance services offered as an optional added benefit of the plan.

The CVMA undertook a survey of provincial veterinary associations and regulatory bodies to obtain information about the improvements to the program and its delivery.

In 2016, the CVMA published 6 veterinary practice management articles in The CVJ, which are also posted in the CVMA website’s Business Management Program section.

In Niagara Falls, Ontario, the 2016 CVMA Convention’s Business Management track, “Future Directions in Veterinary Medicine,” consisted of 6 50-minute sessions. Dr. Adam Little discussed how harnessing technological advancements effectively opens up new ways to improve patient care while connecting with pet owners, and Dr. Caleb Frankel introduced the many practical uses of technology in everyday veterinary medicine.

Provincial veterinary medical associations’ representatives attended the annual Economic Forum, held during CVMA’s Convention, and were provided with the scheduling and delivery of annual surveys and reports to all members. Participants obtained national data comparisons and discussed potential improvements to the program and its delivery.

The CVMA and Association des médecins vétérinaires du Québec en pratique des petits animaux (AMVQ) collaborated to deliver the 2016 economic survey of small animal practitioners in Québec.

In 2016, the CVMA undertook a survey of provincial veterinary associations' representatives attending the annual Economic Forum, held during CVMA’s Convention, and were provided with the scheduling and delivery of annual surveys and reports to all members. Participants obtained national data comparisons and discussed potential improvements to the program and its delivery.

In September 2016, the CVMA partnered with AMVQ to collaborate on the annual economic survey of small animal practitioners in Québec. A representative of the CVMA and an AMVQ representative attended the annual Economic Forum, held during CVMA’s Convention, and were provided with the scheduling and delivery of annual surveys and reports to all members. Participants obtained national data comparisons and discussed potential improvements to the program and its delivery.

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L’ACMV a effectué un sondage auprès des associations provinciales de médecins vétérinaires et des organismes de réglementation afin d’obtenir des renseignements à propos des programmes de bien-être des membres provinciaux respectifs, du type de services offerts, du coût de la prestation de ces programmes ainsi que d’obtenir certaines statistiques d’utilisation globales. Les renseignements reçus ont été compilés et communiqués aux répondants. Cette mesure de suivi a découlé des discussions tenues lors du Forum provincial 2016 et cette question a de nouveau été reportée en 2017 afin de tenir de nouvelles discussions.

Un Atelier sur la médecine corps et esprit d’une journée complète, qui a été présenté par le Dr Allen Schoen, a été offert comme atelier complémentaire dans le cadre du programme du congrès 2016 de l’ACMV. L’ACMV a aussi réservé une place au groupe de recherche AWAR2E (Advancement of Wellness and Resilience in Research and Education) de l’Ontario Veterinary College afin de réaliser des entrevues sur place pour mieux comprendre les facteurs affectant le bien-être des vétérinaires dans le but de mettre au point de la formation et d’autres programmes de soutien pour les étudiants en médecine vétérinaire et les vétérinaires praticiens.

**CVMA Web Store Program — “MyVetStore.ca”**

Programme de boutique Web de l’ACMV — «MaVitrineVétérinaire.ca»

In 2016, the CVMA added 16 member clinics to the CVMA Web Store Program. Sales from month to month show a steady increase and some clinics have introduced the wellness plan billing module. Only clients who have registered have access to your web store; the web store is branded to your practice; you control which products are available, pricing, and any/all prescription products and therapeutic diets; prices are automatically updated based on your markup over cost; unlimited training and support are provided to staff. The CVMA Web Store Program is configured to meet the respective provincial veterinary regulations and guidelines and is available to practices owned in whole/in part by CVMA members for whom CVMA has negotiated the most favorable financial terms. MyVetStore.ca is powered by Acumenex.

En 2016, l’ACMV a ajouté 16 cliniques membres au Programme de boutique Web de l’ACMV. Les données mensuelles indiquent une augmentation constante et certaines cliniques ont introduit le module de facturation pour le plan de bien-être. Seulement les clients que vous avez inscrits auront accès à votre boutique Web; la boutique Web affiche le logo de votre pratique; vous contrôlez les produits offerts, les prix ainsi que tous les produits sur ordonnance et les diètes thérapeutiques; les prix sont automatiquement mis à jour en fonction de votre majoration par rapport au coût; et une formation et un soutien illimités sont offerts aux employés. Le Programme de boutique Web de l’ACMV est configuré de manière à satisfaire aux lignes directrices et aux règlements provinciaux respectifs et il est offert aux pratiques appartenant partiellement ou entièrement à des membres de l’ACMV et pour lesquels l’ACMV a négocié les conditions financières les plus favorables. MaVitrineVétérinaire.ca est optimisé par Acumenex.
Group Insurance Program

Professional Liability and Commercial “Protected Self-Insurance” Program (PSIP)
In 2016, 1487 practices were insured, with 106 new policy locations added. The PSIP model is the greatest selling feature and members save an average of 10% when joining. Participants are provided comprehensive policies tailored to their specific business exposures and the proven rate stability differentiates the CVMA program from competing products in the marketplace.

Employee Group Benefits Program (EGBP)
In 2016, participation increased by 15%. The EGBP offers flexible options for health and dental coverage, life insurance, accidental death and dismemberment, and disability. Optional wellness benefits such as professional referral and counseling services for insured members and family members, and business assistance and coaching for the practice are also available. Insured clinics benefit from the rate stability generated by spreading claims over the entire TotalGUARD™/CVMA pool. Other insurance solutions available include: Affinity program, veterinary student & graduate program, personal automobile, home and travel insurance. The CVMA Insurance Program is available exclusively to CVMA members.

Initiatives for Early Career DVMs

The CVMA has developed initiatives to support new veterinarians, help meet their personal and professional needs, and ease their financial burden as they settle in their new profession.

Membership dues reduction
A new fee structure adopted in 2016 provides new graduates with a complimentary membership for the remainder of the year in which they graduated. Individuals who maintain uninterrupted membership after graduation throughout a consecutive 3-year period are eligible for a 75%–50%–25% tiered fee reduction. Members in their first year following graduation also receive a complimentary Convention registration — a great opportunity to enhance their skills and knowledge at the CVMA Convention.

CVMA Mentoring Program
In 2016, 36 mentors and 10 mentees were registered in the program. This program is open to CVMA members. Profiles of volunteer mentors are included in a roster on the CVMA L’ACMV a élaboré des initiatives afin d’appuyer les nouveaux vétérinaires et de répondre à leurs besoins personnels et financiers tandis qu’ils s’installent dans leur nouvelle profession.

Programme de responsabilité professionnelle et d’assurance auto-protégée commerciale
En 2016, 1487 pratiques étaient assurées et 106 nouvelles polices ont été ajoutées. Le modèle de l’assurance auto-protégée est le principal avantage offert et les membres économisent en moyenne 10 % lors de la souscription d’une nouvelle police. On offre aux participants des polices complètes conçues spécifiquement pour répondre aux risques présentés par leur entreprise et c’est la stabilité éprouvée des primes qui distingue le programme de l’ACMV de celui de ses concurrents.

Programme collectif d’avantages sociaux pour les employés
En 2016, la participation a augmenté de 15 %. Ce programme offre des options flexibles en matière de protection d’assurance maladie et dentaire, d’assurance vie, d’assurance en cas de décès et de mutilation par accident et d’assurance invalidité. Des avantages facultatifs relatifs au bien-être, comme les services d’aiguillage professionnel et le counseling pour les membres assurés et les membres de la famille, ainsi qu’une assistance et un encadrement d’affaires pour la pratique sont également offerts. Les cliniques assurées profitent de la stabilité des tarifs assurée par l’étalement des réclamations sur l’ensemble du bassin TotalGUARD™/ACMV.

Les autres solutions d’assurance disponibles incluent : le programme Affinité, le programme d’assurance pour étudiants et diplômés et l’assurance automobile, habitation et voyage. Le Programme d’assurance de l’ACMV est offert exclusivement aux membres de l’ACMV.

FOR PERSONAL USE ONLY
In its 7th year, the 2016 CVMA Emerging Leaders Program welcomed 34 participants from across Canada. The participants included 19 selected ELP candidates sponsored by CVMA/VMAs; 5 students sponsored by CVMA, as well as the program chair, and 8 paid participants. Once again, the program was facilitated by Dr. Rick DeBowes; after the program all participants had lunch with guest speaker, Dr. Jonathan Bloom, who discussed reducing the fear in pets during veterinary visits. The ELP is a highly interactive 8-hour workshop spread across 2.5 days during which participants gain insight into how best to lead themselves as individuals, how to communicate with those around them, and ultimately how this knowledge will better prepare them to lead those around them.

The articles were also posted on the member website in the Mentoring Resources section.

To support early career DVMs and help set them on the path to a successful career, the CVMA created a dedicated website section containing useful information, tools and resources related to financial planning and budgeting, communications and career development. Some examples of these tools and resources include student loan repayment estimators, a budgeting app for mobile devices, guidelines for successful employment, and instructional communications videos. Additional resources were added throughout the year.

In July, the CVMA participated in a meeting to learn about the Western College of Veterinary Medicine’s (WCVM) new Mentee Skills Building Program. The CVMA and WCVM are collaborating to further leverage these 2 programs and strengthen the impact of mentorship efforts to benefit the profession.

A series of articles, written by members of the CVMA Emerging Leaders Network, provide insight into the first years in practice and offer some advice from someone “who’s been there.” Five articles were submitted and published in The CVJ in 2016. The articles were also posted on the member website in the Mentoring Resources section.

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VALUE OF MEMBERSHIP

Membership

As the national professional association, the CVMA is a powerful, unified voice for Canada's veterinarians. Our strength is in sharing veterinary science and knowledge, influencing policy decisions that matter most to the profession, and providing services and resources to help meet the needs of veterinarians. In 2016, 7287 veterinarians and veterinary student members supported the CVMA's work and leadership.

The CVMA is always looking to deliver more value to members to increase their profitability and professional success. Members can take advantage of the broadest suite of benefits available, including practice tools and resources, Position Statements and research, continuing education, powerful advocacy, and a wide array of discounts and savings on important products and services to help support veterinarians and the practice team.

Below are some of the member benefits and services that were introduced in 2016. A full listing of all available member benefits is published in this issue of The CVJ (page 668).

CVMA Online Education Portal: Powered by the World Veterinary Association, this global network of education resources from veterinary experts and top provider institutions from around the world offer over 600 free CE courses and over 450 paid courses to CVMA members.

Veterinarian Health and Wellness Resources: The CVMA created this new section on the CVMA website. There you can find pertinent resources and information from numerous sources to help support the personal well-being of veterinarians and veterinary students, with a focus on education, awareness and prevention.

Early Career DVM Hub: To help recent veterinary graduates on their path to a successful career, the CVMA has created a dedicated section of the website that contains resources compiled specifically to support early career veterinarians in the areas of financial planning and budgeting, communication, and career development.

Career and Business Toolkit: This new web section of the business management program provides veterinarians easy access to pertinent online resources and information on financial and practice management, human resources management, and marketing and communications.

VALUEUR DE L'ADHÉSION

Effectif

À titre d'association professionnelle nationale, l'ACMV est une voix puissante et unie pour les vétérinaires du Canada. Notre force repose sur le partage de la science et des connaissances vétérinaires, la capacité d'influencer les décisions politiques les plus importantes pour la profession ainsi que la prestation de services et de ressources afin d'aider à répondre aux besoins des vétérinaires. En 2016, 7287 vétérinaires et membres étudiants ont appuyé le travail et le leadership de l'ACMV.

L'ACMV recherche toujours de nouvelles façons d'offrir plus de valeur aux membres afin d'accroître leur rentabilité et leur succès professionnel. Les membres peuvent profiter du plus vaste éventail d’avantages offerts, dont des outils et des ressources pour la pratique, des énoncés de position et de la recherche, de la formation continue, une puissante défense des intérêts ainsi qu’une vaste gamme de rabais et de réductions sur des produits et des services importants afin d’aider à appuyer les vétérinaires et l’équipe de la pratique.

Voici quelques-uns des nouveaux avantages et services aux membres qui ont été introduits en 2016. Une liste complète de tous les avantages aux membres est publiée dans le présent numéro de La RVC (page 668).

Portail d’éducation en ligne de l’ACMV : Optimisé par l’Association mondiale vétérinaire, ce réseau mondial de ressources de formation provenant d’experts vétérinaires et d’établissements d’enseignement internationaux de haut calibre offre plus de 600 cours de formation continue gratuits et plus de 450 cours payants aux membres de l’ACMV.

Santé et bien-être des vétérinaires : L’ACMV a créé cette nouvelle section sur le site Web de l’ACMV. Vous pourrez y trouver des ressources et des renseignements pertinents provenant de plusieurs sources permettant de soutenir le bien-être personnel des vétérinaires et des étudiants en médecine vétérinaire tout en insistant sur l’éducation, la sensibilisation et la prévention.

Carrefour des ressources pour les vétérinaires en début de carrière : Afin d’aider les diplômés récents à entamer une carrière prospère, l’ACMV a créé une nouvelle section réservée du site Web qui contient des ressources compilées spécifiquement afin d’appuyer les vétérinaires en début de carrière dans les domaines de la gestion du budget et des finances personnelles, de la communication et de l’évolution de la carrière.

Trouse d’outils pour la carrière et les affaires : Cette nouvelle section du site Web du Programme de gestion commerciale permet aux vétérinaires d’avoir facilement accès à des ressources et à des renseignements en ligne pertinents sur la gestion des finances et de la pratique, la gestion des ressources humaines et le marketing et les communications.
Students of the Canadian Veterinary Medical Association (SCVMA)

The Students of the Canadian Veterinary Medical Association (SCVMA) represents over 1600 DVM students from the 5 Canadian veterinary colleges.

The successful, student-run 2016 SCVMA Symposium, held January 15–16, 2016 at the Ontario Veterinary College in Guelph, had 270 students in attendance.

The SCVMA conducted its annual New Graduate Survey, gathering useful data for future veterinary graduates and the profession. The survey report was published in The CVJ’s March issue and posted in the SCVMA website section.

The SCVMA received the annual VetRap student newsletter, featuring articles from each college, and 2 student e-newsletters. Throughout the year, the SCVMA Facebook group provides information updates.

First-year students received CVMA-branded lab coats and name badges during each college’s welcome ceremony and the CVMA and Teacher of the Year Awards were presented at their awards ceremony.

In the fall at each college, a CVMA Council representative and the SCVMA Committee representative gave the CVMA One Voice presentation, introducing students to the CVMA and led a current animal welfare or national veterinary issue discussion.

In the winter at each college, CVMA’s insurance partner, Western Financial Group Insurance Solutions, presented an overview of career insurance risks students may face and explained available insurance products and coverages.

In 2016, the CVMA continued the international student affiliation program and had 3 participating schools, St. George’s, Collège de médecine vétérinaire de l’Université de Montréal le 12 novembre 2016 et comptait près de 60 participants étudiants. Cet atelier interactif, qui était animé par le Dr Rick DeBowes, s’intitulait : «Programmation du leadership expérimental : La première étape pour tirer le meilleur de nous-mêmes» et a offert des stratégies personnelles pour l’évolution de carrière qui peuvent ne pas être enseignées à l’école.

Les Étudiants de l’Association canadienne des médecins vétérinaires (ACMV) représentent plus de 1600 étudiants en médecine vétérinaire dans les cinq collèges de médecine vétérinaire du Canada.

Le Symposium 2016 des ÉACMV, un événement réussi qui a été organisé par les étudiants, a compté 270 participants étudiants et s’est déroulé les 15 et 16 janvier 2016 à l’Ontario Veterinary College à Guelph.

Les ÉACMV ont réalisé leur sondage annuel auprès des finissants afin de recueillir des renseignements utiles pour les futurs diplômés en médecine vétérinaire et la profession. Les résultats ont été publiés dans le numéro de mars de La RVC et ils ont aussi été affichés dans la section des ÉACMV du site Web de l’ACMV.

Les membres des ÉACMV ont reçu le bulletin étudiant annuel VetRap qui contient des articles provenant de chacun des collèges ainsi que deux cyberbulletins étudiants. Pendant l’année, le groupe Facebook des ÉACMV présentent aussi des mises à jour.

Les étudiants de première année ont reçu leurs sarraus et des insignes d’identité affichant le logo de l’ACMV lors de la cérémonie d’accueil tenue à chacun des collèges et les Prix de l’ACMV et les Prix de l’enseignant de l’année ont aussi été décernés lors d’une cérémonie de remise des prix.

À l’automne, à chaque collège, un représentant du Conseil de l’ACMV et le représentant du Comité des ÉACMV ont donné la présentation Une voix de l’ACMV afin d’introduire les étudiants à l’ACMV et de mener une discussion sur une question de l’heure portant sur le bien-être animal ou les enjeux vétérinaires nationaux.

En hiver, à chaque collège, le partenaire d’assurance de l’ACMV, Western Financial Group Insurance Solutions, a organisé une présentation sur l’assurance afin de donner aux étudiants un aperçu des risques d’assurance auxquels ils pourront faire face durant leur carrière et d’expliquer les divers produits et couvertures d’assurance offerts.

En 2016, l’ACMV a poursuivi son programme d’affiliation des étudiants internationaux et elle comptait trois écoles participantes : École de médecine vétérinaire de l’Université St. George’s, Collège de médecine vétérinaire de Western University of Health Sciences et School of Veterinary and Life Sciences de l’Université Murdoch, pour un total de 58 membres affiliés étudiants en médecine vétérinaire. L’ACMV a introduit ce programme il y a quelques années à la demande du doyen d’un collège vétérinaire international et de ses étudiants canadiens.

Le premier Atelier de leadership étudiant (ALE) des ÉACMV s’est tenu à la Faculté de médecine vétérinaire (FMV) de l’université de Montréal le 12 novembre 2016 et comptait près de 60 participants étudiants. Cet atelier interactif, qui était animé par le Dr Rick DeBowes, s’intitulait : «Programmation du leadership expérimental : La première étape pour tirer le meilleur de nous-mêmes» et a offert des stratégies personnelles pour l’évolution de carrière qui peuvent ne pas être enseignées à l’école.
University, totaling 58 veterinary student affiliate members. The CVMA introduced this program a few years ago at the request of the dean of an international veterinary college and his Canadian students.

The first annual SCVMA Student Leadership Workshop (SLW), held at the University of Montreal's Faculté de médecine vétérinaire (FMV) on November 12, 2016, had almost 60 student participants. This interactive workshop, led by Dr. Rick DeBowes, titled, “Experiential Leadership Programming: The First Step in Being Our Best Selves,” offered personal and career development strategies students may not learn in school.

**Student Liaison Advisory Group**

The CVMA Student Liaison Advisory Group (SLAG) represents the CVMA at each of the 5 Canadian veterinary colleges, strengthening the CVMA and veterinary student link. The SLAG, comprised of one faculty member from each college, guides their college’s SCVMA Committee representative and participates in annual CVMA initiatives including the One Voice presentation, lab coat ceremony, and the SCVMA Symposium.
CVMA-SBCV Chapter

Section de l'ACMV-SBCV

Policy and Advocacy

The CVMA-Society of British Columbia Veterinarians Chapter has expanded its committee structure to include an enhanced Continuing Education (CE) Committee, and enhanced Editorial Committee, and the new Animal Welfare Committee.

The CE Committee delivers excellent CE close to home. We’ve increased the number of members of this committee to also include a non-veterinarian industry person. The Fall Conference, in response to member requests, will increase to provide 15 CE hours, rather than 12, so members can earn their required number of CE hours at one event. The Fall Conference also consulted industry supporters personally in 2016 and as a result will include a larger, better-placed trade show in 2017. We also began planning, in 2016, 2 regional CE sessions, both sponsored and programmed by Cat Healthy. They are scheduled for mid-May 2017 with one in Langley, to service the Metro Vancouver and Fraser Valley veterinary communities, and one in Victoria, to service the Mid-Island and South Island communities.

The Editorial Committee, in 2016, partnered with the University of British Columbia’s (UBC) Animal Welfare program to include a regular column in the chapter’s journal written by UBC faculty. Also included are an RVT-written column and a Wildlife column. We continue to attract excellent contributions expanding veterinarians’ interests and knowledge base.

The Animal Welfare Committee was struck, in principle, in 2016, and issued its call for members (which garnered high support at the Fall Conference). The Committee will set its work plan and focus on topics that do not conflict with the CVMA Animal Welfare Committee activities, but are also not constrained by national issues.

Science and Knowledge

We continue to attract renowned experts at both our Fall Conference and our Delta Equine Seminar. In 2016, Chapter members learned from these speakers: Dr. Marie Kerl on Emergency and Critical Care; Dr. Kenneth Martin on Pet Behavior; Dr. Peter Gordon on Neurology; Dr. Tammy Owens on Pet Nutrition; with concurrent behavioral sessions from Debbie Martin, LVT; and Dr. Tracy Turner and Dr. Joe Bertone on equine lameness and equine internal medicine.

Practice and Economics

The Chapter continues to encourage member participation in salary surveys and other economic reports done through the CVMA, and we promote these as a key benefit of membership.

Politis et défense des intérêts

La Section de l’ACMV-Society of British Columbia Veterinarians a élargi sa structure des comités afin d’inclure un Comité de formation continue amélioré, un Comité de la rédaction amélioré et le nouveau Comité sur le bien-être animal.

Le Comité de la formation continue offre une excellente formation continue dans la région. Nous avons augmenté le nombre de membres de ce comité afin d’inclure une personne non-vétérinaire de l’industrie. Notre Conférence d’automne, en réponse aux demandes des membres, sera élargie afin d’offrir 15 heures de formation continue, au lieu de 12 heures, afin que les membres puissent accumuler le nombre requis d’heures de formation continue à un événement. La Conférence d’automne a aussi consulté personnellement les partenaires de l’industrie en 2016 et, en conséquence, l’édition 2017 présentera un salon des exposants élargi et amélioré. En 2016, nous avons aussi commencé la planification de deux ateliers de formation continue régionaux, qui sont tous deux commandités et élaborés par Cat Healthy. Ils sont prévus pour la mi-mai 2017 et un atelier se tiendra à Langley afin de desservir la région de Vancouver et des collectivités de la vallée du Fraser, et l’autre à Victoria, pour desservir les collectivités dans le centre et le sud de l’île.

En 2016, le Comité de la rédaction a aussi formé un partenariat avec le programme de bien-être animal de l’Université de la Colombie-Britannique (UBC) afin d’inclure une rubrique régulière dans la revue de la Section qui sera rédigée par un professeur de l’université. On inclura aussi une rubrique rédigée par un TVA et un article sur la faune. Nous continuons d’attirer d’excellents articles afin d’élargir les intérêts et les connaissances des vétérinaires.

Le Comité sur le bien-être animal a été formé en principe en 2016, et il a lancé un appel pour recruter des membres (qui a recueilli un niveau de soutien élevé lors de la Conférence d’automne). Le comité s’apprête à rédiger son plan de travail et à se concentrer sur des sujets qui n’entreront pas en conflit avec les activités du Comité sur le bien-être animal de l’ACVM, mais qui ne sont pas aussi limités par des enjeux nationaux.

Science et connaissances

Nous continuons d’attirer des experts reconnus lors de notre Conférence d’automne et de notre Colloque équin de Delta. En 2016, les membres de la Section ont fait l’acquisition de nouvelles connaissances auprès des conférenciers suivants : D’Marie Kerl sur les soins d’urgence et critiques ; D’Kenneth Martin sur le comportement des animaux de compagnie ; D’Peter Gordon sur la neurologie ; D’Tammy Owens sur la nutrition des animaux de compagnie ; ainsi que lors d’ateliers parallèles sur le comportement offerts par Debbie Martin, LVT ; et D’Tracy Turner et D’Joe Bertone sur la boiterie équine et la médecine interne équine.

Pratique et finances

La Section continue d’encourager la participation des membres aux sondages sur les salaires et d’autres rapports économiques réalisés par l’entremise de l’ACVM et nous faisons la promotion de ces programmes en tant que des avantages clés de l’adhésion.
The CVMA’s Animal Health Technologist/Veterinary Technician Program Accreditation Committee (AHTVTPAC) is responsible for accrediting veterinary technician training programs that meet the minimum standards for educating and training qualified personnel who may join the veterinary health care team. Graduates of such accredited programs benefit by having their competence recognized and prospects for employment and mobility enhanced and the veterinary team benefits from well trained technicians and technologists.

The CVMA maintains a reciprocity agreement with the American Veterinary Medical Association that allows for the mutual recognition of our respective accreditation processes. In 2016, site visits to Northern College, Vanier College, Oulton College and Seneca College took place.

The 19 accredited programs in Canada are:

- Algonquin College, Ottawa, Ontario
- Dalhousie University (formerly Nova Scotia Agricultural College), Truro, Nova Scotia
- Douglas College, New Westminster, British Columbia
- Georgian College, Orillia, Ontario
- Grand Prairie Regional College, Fairview Campus, Fairview, Alberta
- Lakeland College, Vermilion, Alberta
- Maritime Business College, Dartmouth, Nova Scotia
- Northern Alberta Institute of Technology, Edmonton, Alberta
- Northern College, Haileyburg, Ontario
- Olds College (on-campus and distance learning), Olds, Alberta
- Oulton College, Moncton, New Brunswick
- Red River College, Winnipeg, Manitoba
- St. Clair College, Windsor, Ontario
- St. Lawrence College, Kingston, Ontario
- Saskatchewan Institute of Science and Technology, Saskatoon, Saskatchewan
- Seneca College, King City, Ontario
- Thompson Rivers University (on-campus and distance learning), Kamloops, British Columbia
- University of Guelph, Ridgetown Campus (on-campus and distance learning), Ridgetown, Ontario
- Vanier College, St-Laurent, Quebec

Le Comité d’agrément des programmes de technologie en santé animale et de techniques vétérinaires (CAPTSATV) est responsable de l’agrément des programmes de formation des techniciens vétérinaires qui satisfont aux normes minimales pour l’éducation et la formation d’un personnel qualifié qui pourra faire partie de l’équipe de soins vétérinaires. Les diplômés de ces programmes agréés profitent du fait que leur compétence est reconnue et que leurs perspectives d’emploi et de mobilité sont améliorées et l’équipe vétérinaire profite de techniciens et de technologues bien formés.

L’ACMV maintient une entente de réciprocité avec l’American Veterinary Medical Association qui permet la reconnaissance mutuelle de nos processus d’agrément respectifs.

In 2016, des inspections ont eu lieu au Northern College, à Vanier College, à Oulton College et à Seneca College.

Les 19 programmes agréés au Canada sont les suivants:

- Algonquin College, Ottawa (Ontario)
- Douglas College, New Westminster (Colombie-Britannique)
- Georgian College, Orillia (Ontario)
- Grand Prairie Regional College, Fairview Campus, Fairview (Alberta)
- Lakeland College, Vermilion (Alberta)
- Maritime Business College, Dartmouth (Nouvelle-Écosse)
- Northern Alberta Institute of Technology, Edmonton (Alberta)
- Northern College, Haileyburg (Ontario)
- Olds College (sur le campus et téléapprentissage), Olds (Alberta)
- Oulton College, Moncton (Nouveau-Brunswick)
- Red River College, Winnipeg (Manitoba)
- St. Clair College, Windsor (Ontario)
- St. Lawrence College, Kingston (Ontario)
- Saskatchewan Institute of Science and Technology, Saskatoon (Saskatchewan)
- Seneca College, King City (Ontario)
- Université Dalhousie (anciennement Nova Scotia Agricultural College), Truro (Nouvelle-Écosse)
- Université de Guelph, Campus Ridgetown (sur le campus et téléapprentissage), Ridgetown (Ontario)
- Université Thompson Rivers (sur le campus et téléapprentissage), Kamloops (Colombie-Britannique)
- Vanier College, Saint-Laurent (Québec)
The National Examining Board (NEB) is the first point of contact for foreign-trained veterinarians wishing to practice veterinary medicine in Canada. Passing the NEB exams and obtaining a Certificate of Qualification (CQ) allows them to apply for a license in any Canadian province.

The NEB works closely with its counterparts in the United States, namely the Educational Commission for Foreign Veterinary Graduates (ECFVG) and International Council of Voluntary Agencies (ICVA), to ensure that the examination process is fair and relevant.

NEB Examination Process

The NEB started administering the Preliminary Surgical Assessment (PSA) for the Clinical Proficiency Exam (CPE) in 2016. This new step in the examination process is a mandatory step for all candidates taking the CPE after January 1, 2017. It has been developed to ensure candidates can demonstrate basic surgical techniques as a prerequisite for CPE registration. The first regular PSA sessions were offered at WCVM Saskatoon in June and September and AVC in Charlottetown in October and 21 NEB candidates took this new assessment in 2016.

In 2016 the NEB accepted applications from 258 new candidates and issued 471 certificates of qualification (CQs) (338 Canadian students, 52 graduates from AVMA-accredited veterinary schools, 81 graduates of non-accredited veterinary schools).

National Exams

Examens nationaux

Le Bureau national des examinateurs (BNE) est le premier point de contact pour les vétérinaires formés à l’étranger qui désirent exercer la médecine vétérinaire au Canada. La réussite des examens du BNE et l’obtention du Certificat de compétence (CC) leur permet de présenter une demande de permis dans une province canadienne.

Le BNE travaille en étroite collaboration avec ses homologues aux États-Unis, notamment l’Educational Commission for Foreign Veterinary Graduates (ECFVG) et l’International Council of Voluntary Agencies (ICVA), afin de veiller à ce que le processus d’examen soit juste et pertinent.

Processus d’examen du BNE


En 2016, le BNE a accepté des demandes provenant de 258 nouveaux candidats et a émis 471 certificats de compétence (CC) (338 à des étudiants canadiens, 52 à des diplômés des écoles de médecine vétérinaire agréées par l’AVMA, 81 à des diplômés d’écoles de médecine vétérinaire non agréées).
The CVMA, in collaboration with the American Veterinary Medical Association — Council on Education, is accrediting university programs designed to educate students to become veterinarians. All Canadian veterinary colleges are AVMA/CVMA-COE accredited.

In 2016 AVMA/CVMA-COE site visits were conducted at:

• University of Arizona
• Tuskegee University
• Murdoch University (Perth, Australia)
• University of Pennsylvania

L’ACMV, en collaboration avec l’American Veterinary Medical Association — Council on Education, procède à l’agrément des programmes universitaires conçus pour enseigner la médecine vétérinaire aux étudiants. Tous les collèges de médecine vétérinaire canadiens sont agréés par l’AVMA/ACMV-COE.

En 2016, des inspections de l’AVMA/ACMV-COE ont été réalisées dans les établissements suivants :

• Université d’Arizona
• Université Tuskegee
• Université Murdoch (Perth, Australie)
• Université de Pennsylvanie


d Partner for CANCERS

A PROGRAM OF THE CANADIAN VETERINARY MEDICAL ASSOCIATION

The Canadian Veterinary Reserve (CVR), a national body of Canadian veterinarians, provides veterinary surge capacity to first responders in large scale animal disease emergencies and other disasters affecting animal health and welfare. CVR members choose where and when they serve and are fairly remunerated for their service.

Go to bit.ly/JoinCVR and add your name to the roster of over 200 members.

Questions? reserve@cvma-acmv.org
INDEPENDENT AUDITORS’ REPORT

To the Members,
Canadian Veterinary Medical Association:

We have audited the accompanying financial statements of the Canadian Veterinary Medical Association, which comprise the statements of financial position as at December 31, 2016, and the statement of changes in net assets, operations and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management’s responsibility for the financial statements
Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors’ responsibility
Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor’s judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the preparation of financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity’s internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion
In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Canadian Veterinary Medical Association as at December 31, 2016, and the results of its operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

OSELEY HANVEY CLIPSHAM DEEP LLP
Licensed Public Accountants

Ottawa, Ontario
April 13, 2017

RAPPORT DES AUDITEURS INDÉPENDANTS

Aux membres de
L’Association canadienne des médecins vétérinaires:


Responsabilité de la direction pour les états financiers
La direction est responsable de la préparation et de la présentation fidèle de ces états financiers conformément aux normes comptables canadiennes pour les organismes sans but lucratif, ainsi que du contrôle interne qu’elle considère comme nécessaire pour permettre la préparation d’états financiers exempts d’anomalies significatives, que celles-ci résultent de fraudes ou d’erreurs.

Responsabilité de l’auditeur
Notre responsabilité consiste à formuler une opinion sur les états financiers. Nous avons effectué notre audit en conformité avec les normes de base de notre audit. Nous avons effectué notre audit en conformité avec les normes comptables canadiennes pour les organismes sans but lucratif. Ces normes requièrent que nous conformions aux règles de déontologie et que nous planifions et réalisions l’audit de façon à obtenir l’assurance raisonnable que les états financiers ne comportent pas d’anomalies significatives.


Nous estimons que les éléments probants que nous avons obtenus sont suffisants et appropriés pour fonder notre opinion d’audit.

Opinion
À notre avis, les états financiers donnent, dans tous leurs aspects significatifs, une image fidèle de la situation financière de L’Association canadienne des médecins vétérinaires au 31 décembre 2016, ainsi que de sa performance financière et de sa flux de trésorerie pour l’exercice terminé à cette date, conformément aux normes comptables canadiennes pour les organismes sans but lucratif.

OSELEY HANVEY CLIPSHAM DEEP LLP
Experts-comptables autorisés

### STATEMENT OF FINANCIAL POSITION

**AS AT DECEMBER 31, 2016**

<table>
<thead>
<tr>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CURRENT ASSETS</strong></td>
<td><strong>ACTIF À COURT TERME</strong></td>
</tr>
<tr>
<td>Cash</td>
<td>$300,430</td>
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<tr>
<td>Accounts receivable</td>
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<tr>
<td>Interest receivable</td>
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<td>Prepaid expenses</td>
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<td>568,184</td>
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<td><strong>INVESTMENTS</strong></td>
<td><strong>PLACEMENTS</strong></td>
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<tr>
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<td>$2,419,267</td>
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<tr>
<td><strong>CAPITAL ASSETS</strong></td>
<td><strong>IMMOBILISATIONS</strong></td>
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<td></td>
<td>$598,067</td>
</tr>
<tr>
<td></td>
<td>$3,585,518</td>
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<tr>
<td><strong>CURRENT LIABILITIES</strong></td>
<td><strong>PASSIF À COURT TERME</strong></td>
</tr>
<tr>
<td>Accounts payable and accrued liabilities</td>
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<tr>
<td>Government remittances payable</td>
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<td>Deferred revenue</td>
<td>515,074</td>
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<tr>
<td></td>
<td>717,013</td>
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<td><strong>NET ASSETS</strong></td>
<td><strong>ACTIF NET</strong></td>
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<tr>
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<td>Internally restricted net assets</td>
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<td>Unrestricted</td>
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<td>2,868,505</td>
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<tr>
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<td>$3,585,518</td>
</tr>
</tbody>
</table>

Approved on behalf of the Board

**President**

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**L'ASSOCIATION CANADIENNE DES MÉDECINS VÉTÉRINAIRES**

**ÉTAT DE LA SITUATION FINANCIÈRE**

**AU 31 DÉCEMBRE 2016**

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**FOR PERSONAL USE ONLY**
# Statement of Operations

**For the Year Ended December 31, 2016**

## Revenue

<table>
<thead>
<tr>
<th>Service</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications Program</td>
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<td>$58,962</td>
</tr>
<tr>
<td>Professional development</td>
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<td>458,130</td>
</tr>
<tr>
<td>Journal – CJVR</td>
<td>87,391</td>
<td>86,603</td>
</tr>
<tr>
<td>Journal – CVJ</td>
<td>677,380</td>
<td>646,685</td>
</tr>
<tr>
<td>Membership services</td>
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<tr>
<td>National Examination Board</td>
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<tr>
<td>Canadian Veterinary Reserve</td>
<td>79,003</td>
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</tr>
<tr>
<td>AHTVTP Accreditation</td>
<td>42,750</td>
<td>40,500</td>
</tr>
<tr>
<td>Secretariat</td>
<td>469,132</td>
<td>407,210</td>
</tr>
<tr>
<td>Students Program</td>
<td>76,308</td>
<td>71,328</td>
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<tr>
<td>Special projects</td>
<td>155,966</td>
<td>111,135</td>
</tr>
<tr>
<td>Interest</td>
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<td>43,130</td>
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</table>

**Net Revenue**

$101,818

## Expenses

<table>
<thead>
<tr>
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<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
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<tr>
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<td>Council and committees</td>
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<td>328,978</td>
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<tr>
<td>Journal – CJVR</td>
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<td>Journal – CVJ</td>
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<td>Canadian Veterinary Reserve</td>
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<tr>
<td>AHTVTP Accreditation</td>
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<tr>
<td>Secretariat</td>
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<tr>
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<tr>
<td>Special projects</td>
<td>197,978</td>
<td>164,871</td>
</tr>
</tbody>
</table>

**Net Expense**

$(69,826)

**Net Revenue (Expense) for the Year**

$101,818

---

**L'Association canadienne des médecins vétérinaires**

**État des résultats**

**Pour l'exercice terminé le 31 décembre 2016**

---

**Tableau de résultats**

<table>
<thead>
<tr>
<th>Service</th>
<th>2015</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications Program</td>
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<td>Professional development</td>
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<td>Journal – RCV</td>
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<td>Journal – CVR</td>
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<tr>
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<td>AHTVTP Accreditation</td>
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<tr>
<td>Secretariat</td>
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</tr>
<tr>
<td>Students Program</td>
<td>125,977</td>
<td></td>
</tr>
<tr>
<td>Special projects</td>
<td>164,871</td>
<td></td>
</tr>
</tbody>
</table>

**Net Revenue (Expense)**

$(69,826)
Management of a tracheal intussusception in a dog

Manureva Lebreton, Eric Bomassi, Sebastien Etchepareborde

Abstract — A 5-year-old Belgian Malinois dog was presented for evaluation of dyspnea of 1-month duration. Tracheal intussusception was diagnosed by tracheoscopy. Treatment consisted of surgical resection of the invaginated tracheal ring and the immediate cranial and caudal tracheal rings. The dog recovered uneventfully; complications included temporary emphysema after surgery. Seven months after surgery, the dog was still clinically normal. To the authors’ knowledge, this is the first report of a tracheal intussusception treated surgically in a dog.

Résumé — Gestion d’une intussusception trachéale chez un chien. Un chien Malinois âgé de 5 ans a été présenté pour l’évaluation d’une dyspnée d’une durée de 1 mois. L’intussusception trachéale a été diagnostiquée par trachéoscopie. Le traitement instauré consistait en la résection chirurgicale de l’anneau trachéal et des anneaux trachéaux crâniens et caudaux immédiats. Le chien s’est rétabli sans incident; les complications ont inclus un emphysème temporaire après la chirurgie. Sept mois après la chirurgie, le chien était toujours cliniquement normal. À la connaissance des auteurs, il s’agit du premier rapport d’une intussusception trachéale traitée par chirurgie chez un chien.

The causes of tracheal obstruction most commonly reported in veterinary medicine include collapse, tumors, and tracheal foreign bodies. External trauma, complications relating to tracheostomy tubes and tracheal intubation can cause intraluminal stricture due to excessive granulation tissue (1,2). Tracheal intussusception is a rare condition in dogs and cats and there is only 1 report describing conservative treatment in a dog (3). The present study reports the diagnosis and treatment of a tracheal intussusception in a dog.

Case description

A 5-year-old Belgian Malinois dog was presented for evaluation of chronic dyspnea. Clinical signs, which had been present for 1 mo prior to presentation, included decreased exercise tolerance with increased respiratory effort and episodes of cyanosis. At rest, the dog was asymptomatic. Before the onset of clinical signs the patient had been in an altercation with another dog. At the time of the altercation, the owners reported no external signs of trauma such as bleeding, hematoma, or wounds.

Upon presentation, physical examination revealed a severe inspiratory dyspnea. Respiratory distress including tachypnea and cyanosis seemed to have been exacerbated by handling during the clinical examination. Stridor was audible. A focal 3 cm × 1 cm area of alopecia, without any wound or scar, was noted on the ventral aspect of the neck. The clinical examination was highly suggestive of an extra-thoracic airway dysfunction. Initial differential diagnosis consisted of laryngeal disease including laryngeal paralysis; inflammatory disease or neoplastic disease; tracheitis; extraluminal mass compressing the pharynx.
larynx or trachea; foreign body; nasopharyngeal polyp; abscess or hematoma of the pharynx, larynx or trachea.

A direct laryngeal examination was performed under a light plane of anesthesia to assess laryngeal function. The dog was induced with midazolam (Midazolam; Aguettant, Lyon, France), 0.2 mg/kg body weight (BW), IV and propofol (Propovet; Axience, Pantin, France) IV to effect. The examination of the larynx was unremarkable. Thoracic and neck radiographs were performed under anesthesia. Thoracic radiographs were unremarkable. Neck radiographs revealed a 4-mm soft tissue opacity in the lumen of the trachea at the level of the 6th cervical vertebra (Figure 1).

Upper respiratory endoscopy with a 5-mm flexible endoscope was then performed to further explore the lesion in the trachea. Examination of the trachea revealed severe stenosis in its cervical portion, located 20 cm caudally to the laryngeal inlet (Figure 2). The tracheal lumen was restricted to a vertical slot of 3 mm diameter surrounded by 2 cartilaginous pillars. Approximately 75% of the normal diameter of the tracheal lumen was constricted. It was possible to pass a 5-mm endoscope beyond the lesion, demonstrating a normal tracheal diameter and appearance immediately caudal to the lesion. No other abnormalities were identified such as tracheal rupture, pseudotrachea, or pseudotracheal membrane. Based on these images, an intussusception of a tracheal ring was suspected, without excluding a stricture due to excessive granulation tissue or an annular mass compressing the trachea. In the event that there was an intussusception, the invaginated tracheal ring would likely have been damaged since tracheal rings are rigid and C-shaped cartilage and tracheoscopy do not show a fornix as expected.

Due to the severity of the clinical signs, the location and the extent of the lesion, surgical management was recommended. General anesthesia was maintained with isoflurane (Isoflo 100%; Axience) in oxygen. Tracheal resection of the lesion including 1 ring cranial and 1 ring caudal to the lesion was performed by an end-to-end method as previously described (4–7). Briefly, a ventral approach was taken (Figure 3). The lesion was located by a narrow space between 2 tracheal rings suggesting that the distal ring was invaginated into the proximal ring. Reduction of the intussusception was not attempted due to the deformation of the invaginated tracheal ring revealed by tracheoscopy. The trachea was incised caudal to the lesion in order to allow intubation in the caudal aspect of the trachea with a sterile endotracheal tube (Figure 4). The lesion was then excised. The sterile endotracheal tube was removed and tracheal anastomosis was performed with simple interrupted sutures (3-0 monofilament absorbable) encircling the cartilage rings in order to minimize risk of postoperative stenosis (4,8,9). Three vertical interrupted mattress sutures were added around adjacent tracheal rings to relieve tension (Figure 5) (10).

The dog's recovery from surgery was uneventful. Postoperative treatment included oxygen, 3 L/min, by nasal tube. Weaning was possible within a few hours. Postoperative analgesia included morphine (Morphine; Lavoisier, Paris, France), 0.2 mg/kg BW, SC, q4h and carprofen (Carprieve; Bayer, Lyon, France), 4 mg/kg BW, IV, q24h. Amoxicillin (Clamoxyl; Pfizer, Paris, France), 20 mg/kg BW, IV, q8h was administered for 48 h after surgery. Upon discharge, medical treatment included carprofen (Carprieve; Bayer), 4 mg/kg BW, PO, q24h for 10 d and cefalexine (Rilexine; Virbac, Carros, France), 15 mg/kg BW, PO q12h for 7 d.

Twenty-four hours after surgery, a mild emphysema in the ventral cervical region was palpable, without any associated clinical signs. Five days after surgery, emphysema was completely resolved. Seven months after surgery, the owners reported that the dog had regained a normal life and they did not agree to an endoscopic examination.

**Discussion**

External tracheal injuries are most often secondary to bite injury or road traffic accidents (2,11). The altercation with another dog shortly before the onset of symptoms strongly suggests a traumatic cause, although it could not be proven. One case of trauma-induced tracheal stenosis was recently described in a horse (1). The stenosis was associated with extensive scar tissue and deformation of 1 tracheal ring, without intussusception.
Other causes were sought to explain tracheal intussusception as a congenital abnormality. Mawby et al (12) described a case of local tracheal narrowing due to segmental tracheal dysplasia in a mixed breed dog. The diameter of the intrathoracic aspect of the trachea was reduced to half the size of the cervical part. The tracheal narrowing was due to marked abnormal overlapping of the tracheal cartilage at the level of the trachealis muscle, causing a winding of the tracheal ring to itself (12). In our case, the resected tracheal rings were sent for histology to assess the possibility of congenital structural or cellular abnormality or signs of trauma. A “modified target sign” was present on histology images including 2 layers of cartilage corresponding to the invaginated portion surrounded by a C-shaped external tracheal ring (Figure 6). Histology confirmed the intussusception. There was no abnormality to explain this intussusception. Histological findings revealed non-specific signs of tracheitis with submucosal neutrophilic, lymphocytic and histiocytic infiltrates, and multifocal areas of fibrous tissue as can be found in other inflammatory processes like tracheal collapse (13,14).

It is difficult to understand the physiopathology of tracheal intussusception, which is a rare condition. To the authors’ knowledge, only 1 case describing a similar lesion has been published (3). That case involved an 18-year-old male miniature poodle. The cause of the intussusception was unknown and no history of trauma was suspected. The patient had a cough during the latter years of its life and diagnosis was made by tracheoscopy and computed tomography (CT). A 3-D reconstruction CT showed that a segment of trachea at the level of the 6th cervical vertebra was displaced cranially and had invaginated. Computed tomography would have helped to determine if tracheal intussusception was present. However, CT was not performed due to organizational constraints and the patient going into respiratory distress after recovery from anesthesia following tracheoscopy. So, immediate surgical management was recommended. Tracheoscopy showed that the miniature poodle appeared to have had much less significant reduction in the airway diameter than the case presented here. Surgical resection and anastomosis of the abnormal tracheal segment was considered but was not performed due to the age of the dog and because the intussusception was well-tolerated. The dog
was managed medically with amoxicillin and clavulanate potassium, prednisolone, and theophylline for 4 wk, and recovered partially with an intermittent dry cough (3). It is interesting that the intussusception affected tracheal rings at the level of the 6th cervical vertebra in those 2 cases; an area where the trachea is less accessible to external trauma as muscles, sternum and ribs protect the trachea (15). The cartilage of the tracheal rings is thinner at the thoracic inlet, which may create a mechanical weakness zone (15). Also, the direction of the intussusception is the same in both cases: the distal ring was invaginated into the proximal ring. As the diameter of tracheal rings decreases progressively from cranial to caudal at the level of the thoracic inlet, the direction of the intussusception seems logical (15).

Tracheal intussusception has not been described in the medical literature for humans. Prolapse of the epiglottis into the trachea is reported in children who have a concomitant swallowing dysfunction and gastroesophageal reflux disease (16,17).

Nasopharyngolaryngoscopy is used to diagnose the prolapse. As the direction of the intussusception is different from tracheal intussusception described herein, the tracheoscopic images are completely different. A grading system is used depending on the degree of epiglottic and base-of-tongue prolapse. The severity can range from normal to complete obstruction of the pharynx by the base of tongue with no epiglottis visible (16,17).

In conclusion, this report describes an unusual case of inspiratory dyspnea in a dog, due to tracheal intussusception with a suspected traumatic cause. This case was managed surgically due to the severity of the clinical symptoms but medical management for a less severe case has also been described. The dog had a good clinical outcome and surgical resection of the affected trachea should be considered if clinical signs are severe enough to warrant this.

References

Case Report Rapport de cas

Fluoroscopic and endoscopic diagnosis of a lower esophageal ring causing foreign body impaction in a dog

Hakyoung Yoon, Yeunhea Lee, Kidong Eom, Jaehwan Kim

Abstract — A dog was presented because of regurgitation over a 3-day period. Radiographic examination revealed a bean-shaped filling defect and an annular narrowing at the level of the gastroesophageal sphincter. The contractile ring-like structure was sharply demarcated, and its appearance varied according to gastroesophageal distension. Endoscopic findings revealed lower esophageal ring and foreign body impaction.

Résumé — Diagnostic fluoroscopique et endoscopique d’un anneau œsophagien inférieur causant la surcharge d’un corps étranger chez un chien. Un chien a été présenté en raison de régurgitation pendant une période de 3 jours. L’examen radiographique a révélé un défaut en forme de haricot et un rétrécissement annulaire au niveau du sphincter gastro-œsophagien. La structure contractile en forme d’anneau présentait une délimitation marquée et son apparence variait selon la distension gastro-œsophagienne. Les résultats de l’endoscopie ont révélé un anneau œsophagien inférieur et la surcharge d’un corps étranger.

Benign esophageal stricture is a relatively uncommon but well-documented disease in dogs. The causative factors of benign esophageal stricture are highly variable, with the main one being esophagitis that usually occurs during surgery. Other causes include chemicals, trauma, infectious agents, esophageal foreign bodies, and gastroesophageal reflux (1,2). Acquired benign esophageal strictures, particularly those associated with ovariectomy, have been the main focus of study in the veterinary field for several decades (2,3), and variations of esophageal strictures, such as esophageal ring and web, have only been reported in human medicine (4).

Esophageal ring is a condition that involves circumferential narrowing of the esophagus, especially around the gastroesophageal junction (5). Three types of esophageal rings, namely muscular (A-ring), mucosal (B-ring), and diaphragmatic (C-ring), have been documented. Muscular and diaphragmatic rings are thought to be caused by normal smooth muscle contraction or diaphragmatic crural pressure around the gastroesophageal sphincter. In contrast, mucosal rings, usually referred to as Schatzki’s rings in humans, are the most common esophagographic findings and can be definitively identified at the gastroesophageal sphincter based on the appearance of a thin mucosal surface (4). While several diseases such as hiatal hernia, intussusception, masses, and strictures have been described at the gastroesophageal junction (1,6), esophageal ring has not been reported in dogs. This is in contrast to human medicine, in which it is one of the most common benign esophageal diseases, with well-documented imaging characteristics, diagnostic procedures, and treatment options.

This report aimed to describe the fluoroscopic and endoscopic features of esophageal ring that vary in appearance according to the degree of gastroesophageal distension and to enrich our current knowledge regarding the diagnosis of esophageal ring that can cause foreign body impaction in dogs.

Case description

A 9-year-old intact male Pomeranian dog, weighing 2.1 kg, was presented with a history of foamy regurgitation over a 3-day duration. Physical examination revealed only mild gingivitis, without any other abnormalities. The dog was alert, and its respiratory rate and body temperature were 30 breaths/min and 37.9°C, respectively. Complete blood (cell) count (CBC) and serum biochemical findings revealed no abnormalities. The dog had no history of surgery, and the owners had not noticed previous problems such as vomiting or regurgitation. The owner reported that the dog had been regurgitating and vomiting repeatedly after having eaten beans spilled on the floor 3 d before presentation.

Thoracic radiographs were obtained (Titan 2000; Comed Medical System, Seoul, Korea) using a routine procedure to evaluate the upper gastrointestinal tract. A lateral-view image...
showed an oval increased soft-tissue opacity, 14 mm in diameter, around the caudal mediastinal region at the level of the 10th thoracic vertebra (Figure 1).

Esophagography with fluoroscopic examination was carried out using a fluoroscopic system (LISTEM diagnostic table; LISTEM, Inchon, Korea) to identify the esophageal foreign body. With the dog in right lateral recumbency, a feeding tube was placed though a mouth gag. Ten milliliters of a 50:50 mixture of non-ionic iodinated contrast medium (Omnihexol 300; Korea United Pharmaceutical, Seoul, Korea) was slowly injected through a 7-French feeding tube (JMS Feeding tube; Korea United Pharmaceutical) with fluoroscopic guidance. Esophageal motility, luminal diameter, and lower esophageal sphincter were observed (Figure 2). The presence of a filling defect was also noted. The esophagus was contracted well and had smooth mucosal surfaces. At the level of the gastroesophageal sphincter, a movable bean-shaped filling defect was identified, which was suspected to be a foreign body. Just caudal to the filling defect, a well-demarcated circumferential narrowing of the lower esophageal sphincter causing stagnation of the contrast medium was observed. The appearance of this feature varied according to the degree of gastroesophageal distension and esophageal contraction. The small volume of contrast agent localized between the lower esophageal sphincter and diaphragmatic hiatus was identified as a hiatal hernia upon endoscopy. Note that the variable appearance of the ring is due to variations in position of the foreign body and degree of esophagogastric distension and esophageal contraction. f — foreign body; St — stomach.

An endoscopy (FUJINON EVE 200; Fujinon, Tokyo, Japan) was done to remove the foreign body and identify the lower esophageal stricture (Figure 3). Anesthesia was induced with propofol (Provive; Myungmoon Pharmaceutical, Seoul, Korea), 6 mg/kg body weight (BW), IV, and maintained with 1.5% isoflurane (Foran solution; Choongwae Pharma Corporation, Seoul, Korea) in 100% oxygen administered by endotracheal intubation. The impacted foreign body, identified to be a bean, was observed to be obstructing the residual esophageal lumen. It was removed using endoscopic snare forceps (Polypectomy Snare; TeleMed Systems, Hudson, Massachusetts, USA). Further endoscopic evaluation revealed a collapsed lower esophageal sphincter, with a diameter that allowed passage of the tip of the endoscope into the stomach. As the stomach distended with gas, the lower esophageal ring became gradually visible, with a thin white-pink mucosal surface. The ring, approximately 1 mm in thickness and 5 mm in diameter, was eccentrically located at the ventral aspect of the caudal end of the esophagus. Parts of the foreign body were lodged on the mucosal surface, with no evidence of inflammation. The cardia and fundus of the stomach were directly visible through the ring, which implied that the ring was located at the level of the lower esophageal sphincter (Supplementary file 2).

The dog examined herein was diagnosed with a lower esophageal ring with a small hiatal hernia and foreign body impaction based on fluoroscopic and endoscopic findings. The owner refused balloon dilation because the dog had never previously exhibited clinical signs of esophageal stricture and wanted to maintain the dog on a liquid diet during the postoperative period. The dog recovered well, and the clinical signs had resolved at the follow-up 1 wk after endoscopic foreign body removal.

Discussion

In humans, a lower esophageal ring is the most common cause of dysphagia even though most rings are asymptomatic; it is observed in up to 14% of routine barium examinations in human medicine (7). Although it is a relatively common disease, its pathogenesis and etiology are not well-known and the causes and exact location of lower esophageal rings are still discussed.
A hiatal hernia inducing folding of the redundant esophageal mucosa is considered a significant factor affecting the occurrence of lower esophageal rings (7,8). This hypothesis is supported by the findings of a previous study (8), which reported a 97% incidence of hiatal hernia among human patients with lower esophageal ring included in that study. There is also a developmental theory that argues that the disease could be caused by a congenital remnant of the mucosal ridge, which is not very likely because most symptomatic patients reported in human medicine were over the 40 y of age (5,7). There is also an inflammation theory that describes gastroesophageal reflux as the main cause of esophagitis and esophageal ring. However, a previous study (8) reported that only 28% of patients with lower esophageal ring had esophagitis. In the present case, similar to the findings in human patients, a small hiatal hernia was identified with no evidence of esophagitis, upon endoscopic and fluoroscopic evaluation. These findings, in combination with old age, are similar to those in humans with esophageal rings. Therefore, this case suggests that the causes of esophageal rings in dogs and humans might be similar.

In human medicine, clinical signs including regurgitation, reflux esophagitis, heartburn, and dysphagia occurred in cases in which the diameter of the esophageal ring was less than 20 mm (4). These clinical signs worsen significantly in cases in which the ring diameter is less than 13 mm (4). In the present case, although the ring diameter was only 5 mm, the dog showed no clinical signs until it swallowed the foreign body. This could have been because the dog was a toy breed accustomed to consuming small-sized food. Moreover, the ring was located eccentrically at the ventral portion of the esophagus, which might have decreased its chances of causing food impaction. Further studies are required to determine the clinical significance of esophageal ring and the effect of ring diameter on the onset of clinical signs in dogs.

Differential diagnoses for esophageal ring include peptic stricture caused by gastroesophageal reflux disease and esophageal web. Esophageal peptic stricture is generally observed at the gastroesophageal junction, and usually exhibits an irregular, thick, hemorrhagic mucosa, unlike the esophageal ring in the present case, in which there was a smooth mucosal surface with a thickness of only 1 to 2 mm and no evidence of inflammatory changes (4,5). Although esophageal web exhibits a few similarities with the esophageal ring, it is usually more eccentric, less annular-shaped, and limited to the cranial esophagus (9). Although, in the present case, the ring was more eccentrically located than that reported in the human literature (5,10), we established the definitive diagnosis of esophageal ring and a tentative diagnosis of a mucosal ring based on its shape, location, presence of thin mucosal surface, and fixed ring size observed upon endoscopic and fluoroscopic evaluation.

Regardless of its type, diagnosis of lower esophageal ring is challenging because of esophageal peristalsis as well as variable appearance of the ring, which depends on esophagogastric distension. Esophageal rings in dogs might be missed because ideal radiographic and endoscopic visualization require proper distension of both the esophagus and stomach (5). In the present case, the esophageal ring collapsed when only the esophagus was inflated, and it appeared to be a stenosis until the stomach was fully distended. Even in human medicine, the accurate diagnosis of esophageal rings is challenging, because the diagnostic accuracy and reproducibility of barium imaging with routine radiographs are much lower compared to those of real-time fluoroscopic evaluation (10). In our opinion, real-time fluoroscopy with proper dilation should be performed in dogs with a suspected lower esophageal ring to obtain a definitive diagnosis. Furthermore, in order to establish a standard protocol and determine the proper imaging position for esophagography, large population studies are required to increase the detection rate of esophageal rings in dogs.

In conclusion, we have described a lower esophageal ring causing foreign body impaction in a dog. Endoscopy and fluoroscopic examination with proper dilation of the esophagogastric junction were effective in detection and diagnosis of the ring. Lower esophageal ring should be considered as a differential diagnosis in cases in which dogs exhibit thin, circumferential narrowing of the gastroesophageal junction on fluoroscopic images.

References
Avian Medicine and Surgery in Practice: Companion and Aviary Birds, 2nd edition


Over the past decade there have been numerous texts published on avian medicine and surgery, each with varying degrees of depth of information and ease of use. The 2nd edition of *Avian Medicine and Surgery in Practice: Companion and Aviary Birds* is an excellent blend of both features; readers can quickly access relevant and practical information, with additional references listed at the end of each chapter which direct the reader to more detailed information on the subject matters. The second edition comes only 6 years after the initial edition; however, given the continuously rapid expansion of information in avian medicine, its release is timely. The author's extensive experience in clinical avian medicine of companion birds is evident as one reads through the various chapters.

The book is well-organized into 30 chapters that range from clinical anatomy and physiology, physical examination, clinical techniques, supportive therapy, and differential diagnoses based on clinical signs and age, to chapters that outline diseases and disorders of the various organ systems. The last few chapters include incubation of eggs, pediatric medicine, analgesia and anesthesia, and surgery. The behavioral problems chapter is a very good overview to approaching behavior in parrots. There were several important additional chapters added to this second edition including husbandry and nutrition, diagnostic imaging, endoscopy, and oncology. The author also has included a glossary of abbreviations, and several appendices that encompass a robust formulary, reference intervals for commonly kept companion birds, and biological values for common companion bird species.

In addition to readily retrievable information, the chapters are complemented by numerous practical color photographs, drawings, radiographs, and photomicrographs of cytologic smears. These serve to further enhance the clinical descriptions. The information is presented in a succinct and logical manner in each chapter.

This textbook would be a valuable quick reference guide for veterinary staff seeing predominately parrots in their clinical practice, as the information presented is very psittacine focused. Details on other companion bird species is not as in-depth. It is not designed to be a comprehensive avian medicine textbook; if a wide variety of avian patients are seen then other avian medicine textbooks may be more appropriate. For more in-depth information on diseases or disorders, the clinician will need to explore other resources; however, the author has numerous suggested references at the end of each chapter. Veterinary students will find the text to be a useful addition to complement their learning.

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Case Report  

Hemoabdomen secondary to high grade lymphoma

Carolina Azevedo, Stephanie Schleis Lindley, Annette Smith, Kellye Joiner, Peter Christopherson

Abstract — A 10-year-old castrated male Labrador retriever dog was presented for evaluation of a right elbow mass. Mandibular lymphadenopathy was noted on physical examination. Following sudden death after discharge, a necropsy was performed. Cause of death was determined to be due to hemoabdomen secondary to high grade lymphoma.

Résumé — Hémoabdomen secondaire à un lymphome de haut grade. Un chien mâle Labrador retriever castré âgé de 10 ans a été présenté pour l’évaluation d’une masse au coude droit. Une lymphadénopathie mandibulaire a été observée à l’examen physique. Après une mort soudaine consécutive au congé, une nécropsie a été réalisée. La cause de la mort a été déterminée comme étant un hémoabdomen secondaire à un lymphome de haut grade.

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Hemoabdomen is characterized by the presence of free blood within the peritoneal cavity, the cause of which can be classified as traumatic or non-traumatic. In cases of non-traumatic hemoabdomen, possible causes include intra-abdominal neoplasia, coagulopathies, and intra-abdominal organ torsion (1). Neoplastic conditions that have been reported as a cause of hemoperitoneum in canine patients include splenic hemangiosarcoma, splenic hemangioma, hepatocellular carcinoma, carcinomatosis (anaplastic adenocarcinoma of the abdomen), splenic marginal zone lymphoma, as well as renal and adrenal malignancies (1–7). However, hemoabdomen secondary to high grade lymphoma has not been previously reported in the veterinary literature.

Case description

A 10-year-old castrated male yellow Labrador retriever dog was presented for evaluation of right forelimb lameness. He had an approximately 1.5-year history of a subtle limp on his front right limb due to severe osteoarthritis which was treated with meloxicam, tramadol, chondroitin, glucosamine, and fish oil supplements. One month before presentation his limp increased significantly, leading to great difficulty with ambulation. The owners noted a large mass in the region of the right elbow 3 wk prior to presentation. Radiographs of the forelimbs were taken by the referring veterinarian and revealed an osteolytic process involving the right elbow with severe degenerative changes noted in the opposite elbow joint. In addition, there were degenerative changes in the scapulohumeral joints bilaterally.

Physical examination findings included an 8-cm swelling of the right elbow which encompassed the distal humerus and proximal radius and ulna. Marked right forelimb lameness was noted. The dog’s body condition score was 9/9. His mandibular lymph nodes were mildly enlarged bilaterally and his mucous membranes were pink and moist with a capillary refill time of less than 2 s. The abdomen was soft and non-painful on palpation with no palpable organomegaly or intraabdominal masses. The remainder of the physical examination was unremarkable.

Chest radiographs revealed a mild diffuse interstitial pattern and small mineralized opacities at the periphery of the lungs, consistent with pulmonary osteomas. There was no evidence of gross metastatic disease. A complete blood (cell) count (CBC) revealed a mild normocytic normochromic anemia [HCT 36.4%; reference interval (RI): 38.7% to 59.2%]. Abnormal biochemical findings included hyperproteinemia (79 g/L; RI: 5.5 to 77 g/L), hypoalbuminemia (28 g/L; RI: 30 to 48 g/L), hyperglobulinemia (51 g/L; RI: 20 to 43 g/L), and hypocholesterolemia (3.0 mmol/L; RI: 3.42 to 8.68 mmol/L). Urinalysis revealed mild proteinuria, trace bilirubinuria, and minimally concentrated urine with a urine specific gravity of 1.014.

Fine-needle aspirates of the right mandibular lymph node, left mandibular lymph node, right prescapular lymph node, and the right elbow mass were taken by the referring veterinarian and revealed an osteolytic process involving the right elbow with severe degenerative changes noted in the opposite elbow joint. In addition, there were degenerative changes in the scapulohumeral joints bilaterally.

A sample of bone marrow was aspirated from the left humerus and submitted for cytologic analysis. Biopsies of the right elbow mass were taken with a Jamshidi needle and were submitted for cytologic and histopathologic examination. A sample of bone marrow was aspirated from the left humerus and submitted for cytologic analysis to evaluate for presence of multiple myeloma due to the elevation in serum globulin levels. While awaiting the results of the cytology and bone biopsy, the patient was discharged with a Fentanyl 100-µg transdermal patch (Apotex, Weston, Florida,
USA) and a scheduled re-evaluation. The following day, the patient was discovered dead by the owners at home.

Cytology of the left submandibular lymph node was consistent with lymphoid hyperplasia; with a population of mostly intermediate-sized lymphocytes. An intermediate cell lymphoma would be another consideration with these findings. Cytologic analysis of the right submandibular lymph node revealed lymphoid hyperplasia with increased numbers of mast cells. Evaluation of the right prescapular lymph node was consistent with probable lymphoid hyperplasia with a predominance of intermediate sized lymphocytes in some areas; however, intermediate cell lymphoma could not be ruled out. Fine-needle aspiration of the right elbow mass and smears prepared from the biopsy sample revealed similar findings of a spindle cell population which exhibited moderate anisocytosis and anisokaryosis with large, variably sized nuclei, and prominent nuclei. The cytologic appearance of these cells led to a probable diagnosis of mesenchymal neoplasia. Cytologic analysis of the bone marrow aspirate showed mild evidence of antigenic stimulation with possible mild erythroid hyperplasia.

Biopsy tissue contained an infiltrating, circumscribed, non-encapsulated mass of neoplastic polygonal or spindle-shaped cells embedded in fibrocollagenous stroma. Immunohistochemically, the neoplastic cells stained strongly positive with vimentin antibody. Vimentin is present in cells of mesenchymal origin and in mesenchymal-derived tumors such as sarcomas, lymphoma, and melanoma. The neoplastic cells also variably stained with CD18 antibody. CD18 is used as an immunohistochemical stain in joint tumors to identify possible histiocytic sarcoma. It is highly expressed in neoplasms of histiocytic origin, and CD18 may also be identified in other hematopoietic neoplasms. The neoplastic cells did not stain immunohistochemically with MSA (muscle specific actin) antibody. Actin is used in joint tumors to differentiate malignant fibrous histiocytoma. These staining characteristics led to a histopathologic diagnosis of soft tissue sarcoma.

A complete necropsy examination was conducted. On gross examination, an irregular, multilobulated, infiltrative, pale tan, firm mass involving the proximal radius and ulna and surrounding musculature was observed which abutted the elbow joint without crossing into the articular space. Hemoabdomen was observed upon entrance into the abdominal cavity. A single, 11.0 cm diameter, multinodular to round, red-black, friable blood-filled mass was present in the right limb of the spleen, engulfed and adhered to the surrounding omentum. Similar 0.5 cm up to 1.5 cm red-black masses were randomly dispersed throughout the remainder of the spleen and the hepatic parenchyma.

Tissue samples collected from the spleen, mesenteric lymph node, mandibular lymph node, prescapular lymph node, popliteal lymph node, liver, and right elbow mass were fixed in 10% neutral buffered formalin and processed routinely. Sections (5 μm) were stained with haematoxylin and eosin (H&E). Immunohistochemistry (IHC) was performed for identification of CD79a, CD3, CD18, and cytokeratin.

Histopathology of the right elbow mass revealed a neoplastic population of spindle cells. These neoplastic spindle cells did not react with CD18 antibodies and were slightly immunoreactive with cytokeratin, leading to a diagnosis of synovial cell sarcoma. Histopathologic examination of the spleen revealed sparse lymphoid follicles and periarteriolar sheaths. The remaining lymphoid follicles were moderately depleted with a reduction of up to 60% of lymphocytes, exposing the underlying reticular matrix and reticuloendothelial sheaths. Cells were fairly uniform, averaging 12 μm in diameter with a nuclear to cytoplasmic ratio of 8:1. Cells had a sparse rim of pale basophilic, often inconspicuous cytoplasm and distinct cell borders. Nuclei were round to oval to frequently indented with evenly dispersed, dense chromatin and 1 to 2 indistinct nucleoli. Ten mitoses were observed in...
10 contiguous 400× microscopic fields and bizarre forms were evident. Confluent areas of necrosis and many apoptotic cells were scattered among the neoplastic proliferation. Neoplastic lymphocytes exhibited strong, stippled to diffuse immunoreactivity with CD79a (Figure 1). The CD3 immunoreactive T-cells and CD18 immunoreactive macrophages were interspersed throughout the spleen. Microscopic evaluation of a mesenteric lymph node revealed that 90% of the normal lymph node parenchyma had been replaced by a population of neoplastic lymphocytes, similar to that described in the spleen. Neoplastic lymphocytes breached the capsule and extended out into the surrounding perinodal adipose tissue. The neoplastic lymphocytes exhibited strong, stippled to diffuse immunoreactivity with CD79a and did not maintain normal follicular arrangement (Figure 2). The CD3 immunoreactive T-cells and CD18 immunoreactive macrophages were found interspersed throughout the lymph node, arranged with normal tissue distribution. The appearance and topography of the observed neoplastic lesions was not consistent with marginal zone lymphoma. Microscopically, examination of the mandibular, prescapular, and popliteal lymph nodes did not reveal evidence of a neoplastic population of lymphocytes. The histopathologic diagnosis of the spleen and mesenteric lymph node was diffuse large B-cell lymphoma. Histopathologic analysis of the liver was consistent with hepatic congestion.

**Discussion**

Lymphoma is a common form of neoplasia encountered in veterinary medicine; it constitutes 7% to 24% of all canine neoplasms and 83% of all canine hematopoietic malignancies (8,9). The classification of lymphoma in canine patients is based on anatomic location, histopathologic criteria, immunophenotypic characteristics, stage, and substage (10). Anatomic locations include multicentric, gastrointestinal, mediastinal, cutaneous, ocular, hepatosplenic, renal, nasal, central nervous system, and intravascular lymphoma. Several histopathologic schemes have been developed for the characterization of animal lymphoid neoplasms based on morphologic, immunophenotypic, and genotypic criteria. Most recently, the World Health Organization (WHO) published the Revised European American Lymphoma (REAL) of domestic animals classification scheme, which is the most generally accepted classification method. The REAL system classifies hematopoietic malignancies into unique disease entities irrespective of organ of origin based on cellular morphology, cell lineage, architecture, and general biology which provides some degree of prognostic indication (11–13). Lymphoma is subsequently staged based on degree of nodal or organ involvement and presence of concurrent clinical signs. In this case, histopathologic findings were consistent with high grade diffuse large B-cell lymphoma with neoplastic lymphocytes infiltrating the spleen and a mesenteric lymph node. This classification of high grade is particularly important when considering the splenic rupture and secondary hemoabdomen noted in this case.

The cause of death in this patient was determined to be most likely secondary to acute hemoabdomen. In previous literature, hemoabdomen has been associated with both traumatic and non-traumatic causes (1). In regard to non-traumatic causes, differential diagnoses include intra-abdominal neoplasia, coagulopathies, and intra-abdominal organ torsion. In this patient, the most likely primary cause was intra-abdominal neoplasia; however, the possible contribution of a concurrent disease process such as a coagulopathy cannot be ruled out as a coagulogram was not performed.

There are several previously reported primary neoplastic causes of acute hemoabdomen. Amongst the most common neoplastic causes of hemoabdomen is hemangiosarcoma. Hepatocellular carcinoma, carcinomatosis, renal and adrenal malignancies, and low grade indolent lymphoma (specifically splenic marginal zone lymphoma) have also been reported as neoplastic causes of hemoabdomen in canine patients (1–7). In human medicine, non-Hodgkin lymphoma is recognized as a common cause of atraumatic pathologic splenic rupture (14). In veterinary medicine, however, high grade large cell lymphoma has not previously been reported as a cause of non-traumatic splenic rupture. Findings of this case report indicate non-traumatic splenic rupture can also occur secondary to high grade lymphoma.

Another contributing factor to sudden death may have been application of the transdermal fentanyl patch. Fentanyl is a mu opiate agonist used for control of pain. With transdermal application, there is rapid dermal absorption with sequestration of fentanyl in the stratum corneum. The fentanyl is subsequently slowly released from the stratum corneum into systemic circulation. Adverse effects associated with the transdermal patch include gastrointestinal upset, hypothermia, respiratory depression, circulatory depression, and central nervous system depression. Severe adverse side effects are unlikely to occur at the appropriate dose (15,16). However, prehension of the transdermal patch with oral or transmucosal absorption can result in acute overdose (17). There was no evidence of transdermal patch ingestion in this case.

There are several limitations to this case report due to its retrospective nature and the lack of extensive diagnostic tests prior to sudden death of the patient. Other differential diagnoses cannot be ruled out as causes of the patient’s sudden death or hemoabdomen. Specifically, an abdominal ultrasound, a coagulation profile, and thromboelastometry would have proved useful for more definitive evidence of the cause of death. Without more extensive diagnostics and previous evaluation of the splenic parenchyma and peritoneal cavity, we cannot be absolutely certain that the high grade lymphoid malignancy observed in the spleen was responsible for the patient’s sudden demise.

In conclusion, this report describes a case of hemoabdomen most likely secondary to splenic rupture secondary to high grade diffuse large B-cell lymphoma with splenic involvement. Only low grade indolent lymphomas affecting the splenic parenchyma had previously been identified as a cause of non-traumatic hemoabdomen in the veterinary literature. However, although splenic rupture secondary to a high grade lymphoid neoplasm had not been previously reported, this finding is not surprising as hemoabdomen has previously been known to occur secondary to an array of benign and malignant etiologies. Due to the findings in this case, high grade lymphoma should also be considered as a differential diagnosis for hemoabdomen.
References
17. Schmiedt CW, Bjorling DE. Accidental prehension and suspected transmucosal or oral absorption of fentanyl from a transdermal patch in a dog. Vet Anaesth Analg 2007;34:70–73.
Case Report  
Rapport de cas

Retro-orbital and disseminated B-cell lymphoma in a yellow-collared macaw (*Primolius auricollis*)


Abstract — A yellow-collared macaw was presented with unilateral left exophthalmia. The complete blood cell count and biochemistry revealed a heterophilic leukocytosis and elevation in liver parameters, respectively. A computed tomography scan showed a contrast-enhancing retrobulbar mass and hepatomegaly. Cytology of the liver was consistent with a round cell tumor, most likely lymphoma. The bird died after 2 months of palliative care. Postmortem examination confirmed a retro-orbital and disseminated B-cell lymphoma.

Résumé — Lymphome B rétro-orbital et disséminé chez un ara à collier jaune (*Primolius auricollis*). Un ara à collier jaune a été présenté avec de l’exophtalmie unilatérale gauche. La formule sanguine complète et la biochimie ont révélé une leucocytose hétérophile et une élévation des paramètres hépatiques, respectivement. La tomodensitométrie à l’aide d’une injection de milieu de contraste a montré une masse rétrobulbaire et une hépatomégalie. La cytologie du foie était conforme à une tumeur à cellules rondes, le plus probablement un lymphome. L’oiseau est mort après 2 mois de soins palliatifs. L’examen postmortem a confirmé un lymphome B rétro-orbital et disséminé.

(Traduit par Isabelle Vallières)

Case description

A 20-year-old female yellow-collared macaw (*Primolius auricollis*) was presented to the Ontario Veterinary College Health Sciences Centre for an acute onset of left ocular swelling. The owners reported that the bird had a decreased appetite for 3 days prior to presentation. There was no sneezing, discharge, or irritation in the head region noted by the owners. The bird had no prior relevant medical history. The macaw was fed a complete pelleted diet, supplemented with fruits and vegetables.

On physical examination, the bird weighed 223 g and had a body condition score of 3/5. There was evidence of feather damaging behavior throughout the plumage. There was left exophthalmia and associated peri-ocular swelling. Dazzle and palpebral reflexes were present and the fundic examination was unremarkable. No abnormalities were detected in the right eye.

Oropharyngeal examination revealed a small white plaque deep within the choanal slit dorsal to the boney roof of the fossa choanalis, and the bird’s beak was found to be unexpectedly brittle when held open with a speculum. Hepatomegaly was suspected on coelomic palpation and visual examination. A blood sample was taken from the right jugular vein and placed into EDTA and heparin tubes, which were submitted for a complete blood (cell) count (CBC) and plasma biochemistry analysis, respectively.

Hematology revealed a moderate heterophilic leukocytosis ([WBC 35.1 \( \times 10^9\)/L, heterophils 28.4 \( \times 10^9\)/L; reference interval (RI) for *Ara* spp., no reference intervals available for *P. auricollis*: WBC: 7 to 22 \( \times 10^9\)/L] (1), and evidence of a left shift (band heterophils 3.86 \( \times 10^9\)/L). A mild anemia (41%; RI: 47 to 55%) (1) with evidence of mild polychromasia [(5 to 10 per high power field (HPF)] was present. These findings were interpreted as indicative of inflammation and mild regenerative anemia. Plasma biochemistry showed mild hypoproteineminaemia (30 g/L; RI: 34 to 42 g/L) (1). Also present were marked elevations in activity of aspartate aminotransferase (AST; 1936 U/L; RI: 124 to 378 U/L) (1), creatine kinase (3202 U/L; RI: 35 to 355 U/L) (1), glutamate dehydrogenase (GLDH; 27 U/L; RI: 
< 8 U/L) (1), and a mild elevation in bile acids (85 μmol/L; RI: < 71 μmol/L) (1). The GLDH elevation was consistent with hepatic necrosis and the mild bile acid elevation was consistent with mild liver dysfunction or post-prandial elevation. The specific source of the elevation in AST could not be determined as there was evidence of both muscle (CK) and hepatocyte (GLDH) injury.

Computed tomography (CT) examination of the whole body was performed using a 16-slice helical scanner (GE Bright Speed; General Electric Healthcare, Milwaukee, Wisconsin, USA). The bird was sedated with midazolam (Versed; Roche Labs, Basel, Switzerland), 0.5 mg/kg body weight (BW) intranasally, mask-induced with isoflurane at 5% delivered with oxygen, and intubated with a 3 mm uncuffed endotracheal tube. Anesthesia was monitored with a Doppler unit placed on the superficial ulnar artery and with a capnograph. A 26 G intravenous catheter was placed in the right medial metatarsal vein to facilitate the administration of iopamidol, a non-ionic contrast agent (Isovue-300; Bracco Diagnostics, Monroe Township, New Jersey, USA), 2 mL/kg BW, IV, for contrast CT, which was taken approximately 3 to 5 s after completion of the injection.

Findings on the CT examination included a retrobulbar mass of uniform density that occupied the infraorbital sinus and caused distortion of the medial aspect of the left globe as well as exophthalmia (Figures 1A, 1B). Mild heterogeneous contrast enhancement of the mass was noted. The liver was markedly enlarged with multifocal, rounded, irregularly margined hypoattenuating nodules that had mild, non-uniform contrast

**Figure 1.** Contrast CT-scan images of the head and body of a yellow-collared macaw (Primolius auricollis) with multi-organ B-cell lymphoma. Coronal (A) and transverse (B) sections of the head with a retrobulbar mass visible medial to the eye on the right side of the image (left side of the bird). Coronal (C), transverse (D), and sagittal (E) sections of the body illustrating hepatomegaly and multifocal, rounded, irregularly margined hypoattenuating nodules with mild, non-uniform contrast enhancement. Scale bars depict size and boundaries of hepatic outline.

**Figure 2.** A — Gross necropsy image of a yellow-collared macaw (Primolius auricollis) with multi-organ B-cell lymphoma showing exophthalmia due to retrobulbar neoplastic infiltration. B — Gross necropsy image of a yellow-collared macaw (Primolius auricollis) with multi-organ B-cell lymphoma showing hepatomegaly with rounded hepatic borders, mottling, and pallor of the hepatic surface, and irregular thickening of the hepatic capsule and adjacent mesentery. Compare to Figure 1.
enhancement (Figures 1C to 1E). These nodules distorted the liver margins and displaced the ventriculus, proventriculus, and spleen caudolaterally to the left and the intestines caudally. While under anesthesia, a bradyarrhythmia with regular occasional skipped beats was identified. Two doses of glycopyrrolate (Robinul; Baxter Healthcare, Deerfield, Illinois, USA), 0.02 mg/kg BW, IV, had no effect on cardiac rate or rhythm. Anesthesia was therefore terminated prior to other diagnostic procedures being carried out.

The bird was re-anesthetized in the same manner on the following day in order to obtain fine-needle aspirates of the retrobulbar and hepatic masses. The left and right liver lobes were sampled percutaneously by direct visualization under the skin; aspiration of the right liver lobe produced 3 mL of fluid, whereas aspiration of the left liver lobe resulted in only a cellular parenchymal aspirate. The retrobulbar mass could not be safely sampled due to the small size of the bird and the location of the mass dorsal to the palatine bone and medial to the jugal arch.

The bradyarrhythmia occurred again, this time on recovery, and was again unresponsive to an anti-cholinergic agent, atropine. An electrocardiogram tracing was obtained but did not capture an appropriate sequence of bradyarrhythmia.

On cytology of the cytospin from the fluid obtained from the right liver lobe, there were numerous large individual cells with a round to angular shape exhibiting 4- to 5-fold anisocytosis, moderate anisokaryosis and with basophilic cytoplasm. Many cells were binucleate or trinucleate, and nuclei tended to be indented, bilobed, or angular with clumped chromatin. Occasionally, satellite nuclei and nuclear molding were observed. Additionally, there were frequent large vacuolated macrophages, erythrocytes, and heterophils. Occasional mitotic figures were noted. These findings were compatible with round cell neoplasia and mixed inflammation. Similar cell populations were noted on the sample from the left liver lobe, but the large cells appeared rounder, and had more deeply basophilic cytoplasm and a distinct perinuclear Golgi zone. There was moderate anisocytosis.
and anisokaryosis with similar varied and atypical nuclear shapes (Figure 2A). Some cells had prominent nucleoli. These findings were similarly interpreted as round cell neoplasia.

The owner elected palliative out-patient care, declining radiotherapy for the ocular component of the disease and chemotherapeutics. The bird was initially sent home on tramadol (Novopharm, Toronto, Ontario), 10 mg/kg BW, PO, q12h; and meloxicam (Metacam, Boehringer Ingelheim Vetmedica. Sr. Joseph, Missouri, USA), 0.5 mg/kg BW, PO, q24h, to provide pain relief. The meloxicam was discontinued and prednisolone acetate (Rafter 8 Products, Calgary, Alberta), 0.2 mg/kg BW, PO, q24h, was administered once the cytological diagnosis was received. The bird continued to have a good quality of life, showing no clinical signs of illness, until 2 mo later when it died acutely at home. The body was submitted for necropsy.

On external postmortem examination, pronounced exophthalmos of the left globe and mild periocular swelling were noted (Figure 2A). On internal examination, the left retrobulbar region contained a 7-mm diameter soft, homogenous tan mass. There was diffuse pallor of multiple organs (liver, thyroid glands, and kidneys) and marked hepatomegaly with rounded borders and an irregular mottled pattern (Figure 2B). Approximately 6 mL of clear yellow fluid was present in the coelomic cavity along with fibrinous adhesions between the coelomic viscera and air sacs. Representative samples were fixed in 10% neutral buffered formalin, paraffin embedded, and sections stained with hematoxylin and eosin. The entire head, after removal of the brain, was placed in formalin to be sectioned after fixation and decalcification.

On microscopic examination, there was an infiltrative round cell neoplasm present within multiple organs. Infiltrating neoplastic cells had morphologic features of lymphoma, including distinct cell margins, abundant eosinophilic cytoplasm, round central to eccentric nuclei, clumped chromatin and prominent nucleoli. Many neoplastic cells had prominent perinuclear clearing, consistent with a Golgi zone. Neoplastic cells replaced approximately 90% of the hepatic parenchyma (Figure 3B) and were present in the kidney, spleen, ovary, gastrointestinal serosa, cloacal submucosa, air-sac membranes, adrenal gland, and bone marrow. Bone marrow from the tibiotarsus was 100% cellular, with erythroid and granulocytic lineages admixed with large cells resembling those described above. The distribution of the abnormal cells was patchy, encompassing 5% to 25% of the bone marrow, depending on the field of view. Of the normal resident marrow cells, the population was approximately 70% erythroid. Maturation of resident marrow cells appeared synchronous. Vascular invasion was not identified in the sections examined. The left retro-bulbar mass (Figure 3C) was composed of neoplastic cells similar to those described previously and did not appear to invade the globe or enter the cranial vault. Incidental findings included type-III atherosclerosis in the great vessels and carotid and brachial arteries (2), a schwannoma in the pectoral muscle and mild multifocal hemorrhage within the koilin layer of the ventriculus. The heart showed no histological evidence of disease.

Immunohistochemistry was performed to further identify the neoplastic cells. Strong positive nuclear and weaker cytoplasmic staining with MUM1 (monoclonal mouse anti-human MUM1 protein, clone MUM1p; Dako, Burlington, Ontario) was present in over 80% of the infiltrative cells in the liver and mesentery, as well as in scattered cells within the lamina propria of the small intestine and spleen, used as the species control tissue (Figure 3D). Additional tissue blocks from a macaw (species not provided) and a Congo African grey parrot containing bursa, spleen, and thymus were subjected to the same IHC staining protocol for MUM1 antigen and appropriate positive staining was observed in lymphoid tissue in each case. There was no CD3 (rabbit polyclonal raised against the human antigen; Dako) immunoreactivity of the neoplastic cells; however, scattered lymphocytes within the renal interstitium showed strong cytoplasmic immunoreactivity to CD3, acting as a species-specific positive control for this stain. MHC II (clone TAL.1B5, mouse monoclonal raised against the human antigen; Dako) staining was also performed, but there was no reaction with lymphocytes in the species control tissue or with the neoplastic cells. Based on the histologic and cytologic appearance of the neoplastic cells, and the positive MUM1 and negative CD3 staining, a diagnosis of B-cell lymphoma was made.

Discussion

This case describes the clinical, advanced imaging, cytological, and histological findings associated with a retrobulbar and systemic B-cell lymphoma in a yellow-collared macaw. It highlights the importance of a complete and thorough medical diagnostic work-up and how the utilization of advanced imaging and fine-needle aspiration of the liver may provide a method of obtaining a diagnosis in a non-invasive manner in an unstable patient. The infiltrative and extensive nature of the disease was defined through contrast CT. This superior imaging modality, as compared to radiography, enabled appropriate planning and staging of diagnostics in this patient.

Ultrasound is a simple and non-invasive way to obtain immediate assessment of the globe and its associated orbital structures in mammals. The anatomical re-enforcement of the avian globe by the scleral ossicles diminishes the value of ultrasound to diagnose and characterize retrobulbar diseases, though it can be useful in identifying diseases of the posterior eye segment (3). Exophthalmos is more prevalent in birds than buphthalmos and indicates a retrobulbar space occupying lesion or an extension of a malignant ocular neoplasia (4,5). Due to the complexity of the anatomy of the structures of the head, advanced imaging is more effective in delineating the topography of such lesions than are radiographs and ultrasound. While CT was the imaging modality of choice in this case, MRI could have been performed instead. While MRI has a superior soft-tissue resolution, CT was selected in this case as the scanning time is much shorter than for MRI, it does not require specific monitoring equipment that is MRI-compatible, and the MRI resolution may be low for small birds using a conventional 1.5 T MRI. An additional advantage of the rapid scanning rate of the CT is that a whole-body scan can often be performed, allowing identification of lesions in other organ systems as was seen in our case (6–8).

Lymphoma is commonly observed in avian species and typically involves the liver, spleen, and kidneys (9–11), although
infiltration of the globe and adnexal tissue (5,12–15), skin (16), and intestines (17,18) has also been identified. It is notable that many cases of retrobulbar neoplasia, including the case presented herein, are associated with lesions in other organ systems with either metastasis to the globe or periocular areas (lymphoma, carcinoma, round cell tumor) or compression of the central nervous system (teratoma) (4,5,19,20). This emphasizes the need to perform a thorough diagnostic work-up, especially when the retrobulbar mass is challenging to access and sample. Computed tomography was useful in assessing the extent of lesions in the case described here, as well as in a similar case of retrobulbar round cell tumor reported in a macaroni penguin (15). Our case differs from that in the penguin in that the macaw's tumor was disseminated rather than localized, and diagnosis was achieved using in vivo hepatic cytology rather than at necropsy. Differential diagnoses for a retro-orbital mass, in addition to neoplasia, include retrobulbar granuloma (e.g., aspergillosis, mycobacteriosis, avian chlamydiosis, foreign body, and other bacterial or fungal granulomatous inflammation), hematomata, and trauma causing soft tissue swelling. Definitive diagnosis requires additional testing including cytology or histopathology; however, imaging can be used to direct sampling.

The presentation of birds with hepatic disease can be non-specific and highly variable, thus confirming a diagnosis often requires a multi-modal diagnostic approach (21,22). Hepatomegaly may be identified on palpation, or visualized directly through the transparent abdominal wall if the liver extends beyond the keel or suspected based on generalized coelomic distension (22,23). Alterations in biochemical parameters and/or radiographic changes suggestive of liver disease need to be followed by liver biopsy or fine-needle aspiration to definitively diagnose and characterize hepatic disease (22,23).

Humoral hypercalcemia of malignancy, more specifically, elevated ionized calcium levels in association with lymphoma, has been well-described in cats and dogs (24,25). This association has not been established in avian species; however, total hypercalcemia was reported in 2 Amazon parrots (Amazona amazonica and Amazona aestiva) diagnosed with malignant lymphoma (17). As ionized calcium was not measured, the presence of hypercalcemia of malignancy could not be confirmed. Total blood calcium levels were normal in the macaw described in the current report.

Coelioscopic examination and guided biopsy techniques under general anesthesia are well-described in the literature. This particular individual was deemed to be a poor surgical candidate due to elevated hepatic enzymes, previously identified arrhythmias, prolonged anesthetic recovery, and the presence of a marked hepatomegaly causing a coelomic mass-effect. As well, the owner was reluctant to pursue more invasive procedures. Consequently, fine-needle aspiration of the liver was performed. Ultrasound guidance was not necessary as the liver was readily visible under the skin just caudal to the sternum, and the CT had provided an excellent overview of hepatic size and shape. Aspiration cytology can vary in sample yield and diagnostic accuracy but in this case, with financial constraints and a poor surgical candidate, the technique allowed confirmation of diagnosis without the need to perform more invasive biopsy procedures. The cause of sudden death in this case was likely multifactorial, with hepatic neoplasia and ascites both contributing. The causes of ascites may include liver failure (clinical hypoproteinemia and elevated liver enzymes), portal hypertension, chronic passive congestion, or a secondary effect of neoplasia. Gastric hemorrhage may have resulted in the anemia identified on initial evaluation. The schwannoma noted in the pectoral musculature and the mild atherosclerosis are considered incidental findings. The heart histologically showed no evidence of disease, suggesting that the arrhythmia was due to a metabolic disturbance and or structural damage to the cardiac conduction system that was not evident histologically. As the bird died at home, examination of peripheral blood was not undertaken in order to determine whether the bird was leukemic terminally.

In the case described here, the cytologic and histologic appearances of the neoplastic cells were most consistent with a B-cell lymphoma with plasmacytoid differentiation. Immunohistochemistry is frequently used in domestic small mammal medicine to confirm and or identify the precise nature of lymphoid malignancies (26). Limitation exists when applying mammalian IHC regimens to the evaluation of tissue from pet avian species as no antibodies have been created specifically for immune-labelling of psittacine lymphocytes, and cross-reactivity may be poor. It is thus essential to include a positive control tissue, ideally from the same animal or at least from the same species, as well as positive and negative controls in a species for which the antibodies have been validated. While CD3 appears immunoreactive with a range of avian species (11,15,17,27), antibodies used routinely as B-cell markers on mammalian tissue; i.e., CD20 (rabbit polyclonal; Thermo Scientific, Burlington, Ontario), and CD79α (clone HM57, mouse monoclonal raised against the human antigen; Dako), do not react with avian lymphocytes in our experience. Hence, B-cell lymphoma has rarely been reported in the avian literature in comparison to cases confirmed as being of T-cell origin (18,27–29). One case report in an umbrella cockatoo (Cacatua alba) describes a cutaneous lymphoma of B-cell origin based on immunoreactivity with a rabbit monoclonal BLA36 antibody (30). To the authors’ knowledge staining of avian lymphocytes with this antibody has not been consistent or reliable, and thus was not attempted in this case. The use of MUM1 antibody for the identification of late phase B-lineage lymphocytes and plasma cells in avian species has not been reported to our knowledge, but in this case provided strong nuclear staining in neoplastic and control tissues. MUM1 staining was present in tissues from 3 species of psittacine birds, suggesting that this antibody may prove useful in differentiating lymphocytes in various members of the family Psittacidae.

Chemotherapy and/or palliative radiation has been reported as a treatment for neoplasia, especially for lymphoma, in birds (10,31). The umbrella cockatoo diagnosed with B-cell lymphoma was successfully treated with vincristine and chlorambucil (30). Due to the poor prognosis in the case reported here, as well as the reluctance of the owner to pursue intensive medical treatments, chemotherapy or radiation therapy was not attempted.

In conclusion, CT and fine-needle aspiration were used to investigate a retrobulbar mass and associated hepatic disease in a
yellow-collared macaw. This case illustrates how useful advanced imaging can be for defining retrobulbar lesions, which are difficult to assess using more traditional diagnostic methods, and shows that retrobulbar masses can be associated with disease in other organ systems; thus emphasizing the importance of a thorough and systemic diagnostic work-up regardless of presenting complaint.

References
Case Report  Rapport de cas

Syndrome of inappropriate antidiuretic hormone secretion in a dog with a histiocytic sarcoma

Anne-Charlotte Barrot, Agathe Bédard, Marilyn Dunn

Abstract – A 7-year-old female neutered Bernese mountain dog was presented in a semi-comatose state. Based on serum hypo-osmolality with inappropriate urine hyper-osmolality and urine sodium excretion, the dog was diagnosed with a syndrome of inappropriate antidiuretic hormone secretion secondary to a histiocytic sarcoma. This report describes the first case of this syndrome in a dog with histiocytic sarcoma.

Résumé – Syndrome de sécrétion inappropriée d’hormone antidiurétique chez un chien avec un sarcome histiocytaire. Une chienne stérilisée de 7 ans, Bouvier bernois, est présentée dans un état semi-comateux. Basé sur une hypo-osmolalité sérique associée à une hyper-osmolalité urinaire et une excrétion sodique urinaire toutes deux inappropriées, un diagnostic de syndrome de sécrétion inappropriée d’hormone antidiurétique secondaire à un sarcome histiocytaire est posé. Ce cas est le premier cas de ce syndrome chez un chien avec un sarcome histiocytaire.

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Antidiuretic hormone (ADH), also known as vasopressin, is normally secreted in response to an increase in osmolality or decrease in arterial pressure or intravascular volume. However, ADH secretion is considerably more sensitive to small changes in osmolality than to similar changes in blood volume. If the extracellular fluid becomes too dilute (hypo-osmotic), ADH secretion is inhibited. Vasopressin increases the reabsorption of water in the collecting ducts of the kidneys and increases the permeability of the medullary collecting ducts to urea.

Syndrome of inappropriate ADH (SIADH) secretion is defined as vasopressin secretion independent of plasma osmolality. The SIADH is characterized by hypotonic hyponatremia and urinary hyper-osmolality in a normovolemic patient with normal thyroid, renal, and adrenal functions.

In this article, the authors present a case of SIADH secondary to disseminated histiocytic sarcoma.

Case description

A 7-year-old female neutered Bernese mountain dog was presented in a semi-comatose state with a history of septic arthritis of her right stifle. The patient was up-to-date on vaccinations, not routinely dewormed, and had no travel history outside of Quebec, Canada. The dog was evaluated for a non-weight-bearing lameness of the right hind limb and a joint aspirate of the right stifle revealed a large amount of purulent material. Culture of the synovial fluid identified growth of Staphylococcus aureus susceptible to amoxicillin/clavulanic acid. Following a diagnosis of septic arthritis of the right stifle, the dog was treated with amoxicillin/clavulanic acid (Clavaseptin; Vétoquinol, Lavaltrie, Quebec) and meloxicam (Metacam; Boehringer Ingelheim, Burlington, Ontario) per os.

The dog’s owners reported marked weakness at initial presentation, but further investigations were declined due to financial concerns. Following discharge, the dog became weaker and increasingly lethargic.

One week after initial presentation, the dog developed muscle twitches and became semi-comatose. She was brought to her family veterinarian and received intravenous fluids for 2 d: 3 L of isotonic fluid (Lactated Ringer’s Solution; Baxter, Mississauga, Ontario) and 500 mL of 5% dextrose with 0.9% NaCl, IV.

Physical examination revealed the dog to be thin and in a semi-comatose state but well hydrated. Her right knee had significant fibrosis and mild joint effusion. A joint tap revealed normal synovial fluid. Systolic blood pressure was normal at 120 mmHg. A neurologic examination revealed an altered mental state.

Prior to IV fluid therapy, complete blood (cell) count (CBC), serum biochemistry, urine and serum osmolalities, urinary...
Table 1. Results of complete blood (cell) count (CBC), serum biochemistry, and urine specific gravity on days 1 and 2

<table>
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<th>Day 2 (am)</th>
<th>Day 2 (pm)</th>
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</table>

sodium excretion, thyroid level, and an ACTH stimulation test were conducted. The results of these tests are summarized in Table 1. Mild normocytic, normochromic anemia, lymphopenia, and eosinophilia were present. A severe hyponatremia with normokalemia was observed. Measured serum osmolality was hypo-osmolar.

Fluid therapy was initiated, half maintenance rate [1 mL/kg body weight (BW) per hour] was administered as isotonic fluid (Lactated Ringer’s Solution) the other half with hypotonic fluid (5% dextrose with 0.9% NaCl), in order to slowly increase natremia. Hyponatremia and hypochloremia improved with fluid therapy, but the dog remained semi-comatose.

Magnetic resonance imaging (MRI) of the head and neck revealed a large bilobed mass at the base of the brain that occupied 100% of the pituitary fossa and measured 2.1 cm in length × 2.2 cm in height, and × 2.2. cm in width (Figure 1). Following administration of gadolinium by the IV route, the mass showed immediate homogeneous enhancement that remained homogenous but became more moderate within the solid portion of the mass. Enhancement became more concentrated within the cystic portions of the mass and peripherally at the subarachnoid level (which confirmed the extra-axial location of the mass). This extra-axial mass caused marked compression of the adjacent cerebral structures, particularly both lobes of the thalamus. Vasogenic edema was also noted.

Based on serum hypo-osmolality with inappropriate urine hyper-osmolality and urine sodium secretion, excessive ADH secretion from the pituitary mass was most likely responsible for the dog’s severe electrolyte abnormalities. Given the poor prognosis, the owners opted for euthanasia and a necropsy was conducted.

Upon gross examination, a poorly delineated, mottled mass of approximately 1.5 cm diameter was noted below the left thalamus, displacing it upwards and to the left, resulting in an asymmetry between both hemispheres. The right middle lung lobe and tracheobronchial lymph nodes were enlarged, irregular (nodular), and had a white discoloration. Significant fibrosis was noted around the right stifle joint.

Upon microscopic examination, an invasive, poorly encapsulated, necro-hemorrhagic, densely cellular mass was noted next to the adenohypophysis (unaffected); it infiltrated the pars nervosa, extended into the meninges, white matter, and Virchow-Robin’s spaces, and dorsally displaced the hypothalamus and thalamus. Edema was noted in the white matter. Cellular features (reiform nuclei and multinucleate giant cells) were suggestive of a histiocytic sarcoma. As a similar mass replaced the parenchyma of the right middle lung lobe and the tracheobronchial lymph nodes, disseminated histiocytic sarcoma was the final diagnosis.
Discussion

Causes of hyponatremia with low plasma osmolality and normovolemia are SIADH, myxedema coma associated with severe hypothyroidism, antiuretic drug administration, hypotonic fluid infusion, or psychogenic polydipsia (1). Although this dog received fluids, it is unlikely that this small amount of hypotonic fluid in a 33-kg dog resulted in the hyponatremia, especially given the comatose state already present. The last 3 causes were excluded by the dog’s history. The decrease in thyroxine (T4) was most likely secondary to a euthyroid sick syndrome. Hypoadrenocorticism was excluded by an adrenocorticotropic hormone (ACTH) stimulation test. Given the electrolyte abnormalities and the serum and urine osmolalities, SIADH was strongly suspected.

The syndrome of inappropriate antidiuretic hormone secretion is characterized by the autonomous secretion of ADH without any volume or osmotic stimuli, and by the unique finding of impaired water excretion with a normal sodium excretion (2–4). The diagnosis of SIADH requires that the following criteria be met: hyponatremia and hypo-osmolality, urinary hyperosmolality (> 150 mOsm/kg of water, urine sodium concentration > 20 mEq/L, normovolemia, normal renal, adrenal, and thyroid function, and normal acid-base and potassium balance (2). An abnormally high serum ADH concentration does not need to be confirmed (2,5,6).

In humans, SIADH is the most frequent cause of hyponatremia. It has been reported in association with neoplasia, central nervous system disorders, administration of certain drugs, and even pulmonary disease (1–3). To our knowledge, SIADH has only been reported in 8 dogs prior to this report (5,7–12). These cases have been attributed to neurologic disorders (1 dog with amoebic meningoencephalitis, 1 dog with hydrocephalus, and 1 dog with hypothalamic tumors), to heartworm infection (1 dog), to liver disease (1 dog), to aspiration pneumonia and also classified as idiopathic (2 dogs) (5,7–12). To our knowledge, this is the first report of SIADH in animals due to a pituitary tumor.

Treatment of SIADH needs to address the underlying cause. Until this can be done, supportive treatment using intravenous fluids with the goal of correcting the hyponatremia is initiated. The semi-comatose state observed in this patient was likely explained by the severe hyponatremia; therefore, fluid therapy was initiated. As hyponatremia had probably been present for more than 48 h, care was taken to prevent central pontine myelinolysis (2,13). Natremia should not increase with treatment by more than 10 mmol/L, q24h (14). For that reason, half isotonic and half hypotonic fluids were administered at a maintenance rate and the serum sodium along with electrolytes were closely monitored.

The prognosis for patients with SIADH depends on the ability to resolve the underlying cause. In this case, the prognosis was poor, as it was secondary to metastatic neoplasia.

This case report has some limitations. Ideally, a thyroid panel should have been done to conclude that the dog suffered from euthyroid sick syndrome. The mechanism of inappropriate ADH secretion in this patient is unknown. Serum ADH concentration was not measured due to cost. Intracranial disease may directly stimulate the supraoptic or paraventricular nuclei to secrete ADH or it may alter the osmoreceptors to inappropriately stimulate ADH secretion. Ectopic production of ADH by the tumor is also possible (15). In our patient, the most likely mechanism is that the tumor stimulated the supraoptic or paraventricular nuclei to secrete ADH.

This report describes a new finding of SIADH in a dog with disseminated histiocytic sarcoma with pituitary involvement.

References

Western Financial Insurance Company renamed Petline Insurance Company

Economical Mutual Insurance Company, one of Canada’s leading property and casualty insurance companies, today announced the completion of its previously-announced acquisition of Western Financial Insurance Company (WFIC) and its flagship brand Petsecure from Desjardins Group.

Concurrent with the acquisition, WFIC changed its legal name to Petline Insurance Company (Petline). The brand name Petsecure remains the same.

Bringing the market leader in the growing Canadian pet insurance industry into the Economical family of companies is consistent with the strategy of Economical and its focus on profitable growth, both organic and by acquisition. With net written premiums exceeding $50 million in 2015, Petline provides Canadian pet owners with comprehensive, veterinarian-recommended coverage for dogs and cats.

Petline will remain headquartered in Winnipeg, ensuring consistency of service in maintaining its industry-leading products, sales force, customer experience and relationships with veterinarians, shelters and breeders.

“This transaction is a step in our growth plan, which includes increasing scale and diversification through acquisitions,” said Rowan Saunders, President and CEO of Economical Insurance.

Contact: Petsecure Pet Health Insurance, 300–600 Empress Street, Winnipeg, MB R3G 0R5; Phone: 204-942-2999; website: www.petsecure.com

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Equine recurrent uveitis in western Canadian prairie provinces: A retrospective study (2002–2015)

Lynne S. Sandmeyer, Bianca S. Bauer, Cindy Xin Feng, Bruce H. Grahn

Abstract — The objectives of this study were to determine the demographics of horses with equine recurrent uveitis (ERU) presenting to the Western College of Veterinary Medicine and to describe and compare the prognosis of ERU in the Appaloosa with that in other breeds. Horses diagnosed with ERU by a veterinary ophthalmologist between 2002 and 2015 were included. Eye lesions were classified as mild, moderate, or severe based on clinical manifestations. Breed, age, severity, blindness, and final outcome were evaluated. Thirty-two horses fit the inclusion criteria; 62.5% were Appaloosas. Mean age at presentation was 12.13 ± 4.6 years. Equine recurrent uveitis was bilateral in 93.6% of horses and was severe in 59.4% of eyes at presentation. Bilateral blindness was present in 59.4% of horses at last follow-up. Of 27 horses available for follow-up, 63% were euthanized due to ERU. No significant differences in age, severity, blindness, or rate of euthanasia were noted between Appaloosas and other breeds. The Appaloosa is at increased risk for ERU, which is a devastating ocular disease.

Introduction

Equine recurrent uveitis (ERU) is a common condition with worldwide distribution, high prevalence, and is the leading cause of blindness in horses (1). It is characterized by chronic insidious or recurring bouts of inflammation of the uveal tissue which leads to secondary changes ultimately resulting in blindness (1). Three clinical forms of ERU have been described: classic, insidious, and posterior (1). Classic ERU is the most common form and is characterized by active inflammatory episodes followed by periods of minimal observable ocular inflammation. Insidious ERU is characterized by constant and subtle intraocular inflammation that does not typically manifest as outwardly painful episodes. The clinical impression is that the insidious form is most commonly seen in the Appaloosa and draft breeds (1). In posterior uveitis the inflammation is predominantly in the posterior segment, and this syndrome is most common in Warmbloods, draft breeds, and horses imported from Europe to the USA (1).

The pathophysiology of ERU is complex and not completely determined. It is known to be an autoimmune disease; however, the mechanisms of the inciting cause and recurrence of inflammatory episodes are not completely understood. The association of Leptospira spp. with ERU is well-known but not fully understood (2–12). It is theorized that for at least some horses,
infection with *Leptospira* spp. may be the inciting cause of uveitis (2–5,12,13). The cells infiltrating the uvea of horses with ERU are predominantly CD4+ T-cells and a T-helper type 1 (Th1)-mediated disease process is implicated (14–17). As ERU has an immune-mediated pathogenesis, it is possible that the genetic make-up of the individual plays an important role in determining the susceptibility to potential inciting infections, as well as the development and severity of subsequent uveitis episodes. Genetic associations for ERU have been confirmed in both the Appaloosa and the German Warmblood horse breeds and remain under investigation (18–20).

The frequency of ERU in the Appaloosa horse is reportedly much higher than in the general population and uveitis is thought to be more severe and more likely to cause blindness in this breed (2,11,21). Although the overall prognosis for ERU is thought to be poor, objective data are limited to few retrospective studies reporting the long-term visual prognosis for the disease (2,11,22). These studies originate in the northeastern and southeastern United States and there are no objective data originating in Canada. The objectives of this study were to determine the demographics of horses with ERU presenting to a referral center in western Canada, and to describe and compare the prognosis of ERU in the Appaloosa horse with that in other breeds.

### Materials and methods

A search of the medical records of the Western College of Veterinary Medicine (WCVM) at the University of Saskatchewan was completed to identify all horses with a confirmed diagnosis of ERU between the period of 2002 and 2015. Diagnosis of ERU required complete ocular examination performed by a Diplomate of the American College of Veterinary Ophthalmologists (DACVO). Ocular examination in all horses included neuro-ophthalmic examination, followed by sedation with IV xylazine hydrochloride (Rompun; Bayer, Toronto, Ontario), 0.5 to 1.0 mg/kg body weight (BW) and auriculopalpebral nerve blocks performed using 2 mL of a 2% lidocaine hydrochloride injectable solution (Bimeda-MTC Animal Health, Cambridge, Ontario). Schirmer tear test (Schirmer Tear-Test Strips; Alcon Canada, Mississauga, Ontario), rebound (Tonvet; Tiolat, Helsinki, Finland) or applanation tonometry (Tonopen XL; Biorad Ophthalmic Division, Santa Clara, California, USA), and fluorescein staining (Fluorets; Bausch & Lomb Canada, Markham, Ontario) were completed on all horses. Direct transilluminator, biomicroscopic (Ostram 64222; Carl Zeiss Canada, Don Mills, Ontario or SL-14, Kowa, Tokyo Japan) and indirect ophthalmoscopic (Heine Omega 200; Heine Instruments Canada, Kitchener, Ontario) examinations were completed following mydriasis with tropicamide 1% solution (Mydriacyl; Alcon Canada, Mississauga, Ontario).

Equine recurrent uveitis was confirmed if there was presence of active uveitis in addition to historical or clinical evidence of previous episodes or continuous uveal inflammation. Eyes were classified as having mild, moderate, or severe ERU based on recorded clinical manifestations. Eyes with conjunctival hyperemia, aqueous flare, miosis, and ocular hypotony (defined as ≤ 10 mmHg or 10 mmHg difference between eyes) were considered to have mild ERU. Eyes with signs of mild ERU and 1 or more of posterior synechia, cataract, vitritis, or uveal pigmentation changes (depigmentation or hyperpigmentation) were considered to have moderate ERU. Eyes with secondary glaucoma, phthisis bulbi, retinal detachment, and/or blindness due to sequelae of ERU were considered to have severe ERU. Breed, age, severity, final outcome, and causes of blindness were evaluated. If final outcome was not recorded in the medical record, owners were contacted to arrange for re-evaluation, if possible, or to determine if the horse had been euthanized due to ERU.

Statistical analysis was completed using SAS Version 9.3 software (StataCorp, College Station, Texas, USA). Outcomes for Appaloosa horses were compared to the combined outcomes of other breeds due to low numbers in the latter group. Median age was compared using the Kruskal-Wallis test. The Fisher exact test was used to compare the stage of ERU at presentation, the probability of having 1 or 2 eyes with blinding ERU at presentation and at final outcome, and to evaluate the probability of euthanasia due to the diagnosis of ERU. The number of Appaloosa horses diagnosed with ERU was compared to non-Appaloosa horses with ERU within the total equine hospital population at risk, and for each breed presenting with ERU using the Fisher exact test. Relative risk of Appaloosa horses versus non-Appaloosa horses having ERU was calculated for the at-risk population examined by the ophthalmology service. The “at-risk” population was designated as horses ≥ 4 y of age as this was the youngest age of horse diagnosed with ERU.

### Results

Thirty-two horses fit the criteria of the study; 20 (62.5%) Appaloosa horses, and 12 (37.5%) other breeds consisting of 4 Quarter Horse (QH)/QH-cross, 3 Thoroughbred (TB)/TB-cross, 2 Pony of the Americas (POA), 1 miniature horse, 1 Percheron, and 1 Hanoverian. For the Appaloosa, 13 were castrated males and 7 were female. In other breeds 7 were castrated males and 4 were female. Age at presentation ranged from 4 to 23 y. Mean age at presentation was 12.13 ± 6.7 y. Median age at presentation was not significantly different between Appaloosa horses (12 y) and other breeds (11.5 y).

For horses that were not euthanized immediately after diagnosis, clinical follow-up ranged from 1 to 9 y (mean: 3.81 ± 2.97 y). Information on final outcome with respect to euthanasia was available for 27 horses; 3 Appaloosas, and 2 other breeds were lost to follow-up. Serological testing for leptospirosis was completed on 3 horses; 1 Appaloosa for which the result was negative and 2 non-Appaloosa horses for which there was a positive leptospirosis titer (≥ 1:400).

During the period under study, 145 Appaloosa horses were presented to the WCVM for all reasons of a total 5091 equine consultations, accounting for 2.8% of the clinic population. Within the Appaloosa breed, horses presenting with ERU represented 20 of 145 (13.8%) total Appaloosa consultation examinations performed in the hospital. Twelve of the 4946 non-Appaloosa horses presented to the WCVM with ERU (0.24%). The odds ratio (OR) for an Appaloosa horse presenting to the hospital for ERU compared to the total non-Appaloosa
Blindness was most commonly associated with cataract (26 Appaloosa eyes; 11 other breed eyes), phthisis bulbi (13 Appaloosa eyes; 4 other breed eyes), and glaucoma (11 Appaloosa eyes; 4 other breed eyes) (Figure 1). Other noted sequelae of ERU included lens luxation (5 Appaloosa eyes; 4 other breed eyes), posterior synchiae (13 Appaloosa eyes; 8 other breed eyes), and retinal detachment as diagnosed by indirect ophthalmoscopy (4 other breed eyes). All blind eyes had more than 1 sequela of ERU.

A variety of treatments were employed including topical (diclofenac, flurbiprofen) and systemic (flunixin meglumine, phenylbutazone, aspirin) non-steroidal anti-inflammatory medications, topical corticosteroids (prednisolone acetate, dexamethasone), topical atropine, and topical antiglaucoma medications when indicated (dorzolamide, dorzolamide/timolol).

Three Appaloosa horses and 1 non-Appaloosa horse had 1 eye enucleated due to severe ERU. Euthanasia due to ERU was the final outcome in 17/27 (63%) (9 Appaloosa; 8 other breed) horses. Nine horses were euthanized at the time of initial diagnosis. Median time to euthanasia for other horses was 3.5 y (0.5 to 8 y). One Appaloosa was euthanized for reasons other than ERU but was bilaterally blind at the time. No significant differences existed in rate of euthanasia due to ERU between Appaloosas and other breeds.

Of the 6 Appaloosa horses known to be alive to date, 2 are bilaterally blind and 4 remain visual in both eyes; these horses have been followed clinically for 6 mo to 2 y.

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3 non-Appaloosa horses known to be alive to date, 2 are unilaterally blind, the other visual in both eyes. These horses have both been followed clinically for 2 to 8 y.

**Discussion**

The prevalence of ERU in our hospital population was much higher in the Appaloosa horse (13.8%) compared to other breeds (0.24%) and the OR for the Appaloosa presenting for ERU was very high compared to the general hospital population. These numbers must be interpreted with caution as ophthalmic examinations were not completed on all horses presenting to the hospital and it is likely that ERU was present and undiagnosed in some horses in the general population. The relative risk for a diagnosis of ERU in the Appalosas examined by the ophthalmology service was 9.74, demonstrating ERU was much more likely to be diagnosed in the Appaloosa than in other breeds examined. Of the 32 horses with confirmed ERU, the Appalosas represented 62.5% of the ERU population which is much higher than 24% and 25% reported in previous retrospective studies (2,11).

Our study found a higher overall frequency of bilateral disease (93.5%) compared to a recent retrospective (67.5%) (11). A higher proportion overall of blind eyes at presentation (56.2% compared to 28.4%) as well as bilateral blindness on follow-up (59.4% compared to 28.9%) was also noted in our study. Similar to previous reports, blindness was most commonly associated with cataract, phthisis bulbi, and secondary glaucoma (2,11). At last follow-up 87.5% of horses (85% Appaloosa and 91.6% non-Appaloosa horses) were blind in at least 1 eye. This is higher than previous studies which reported 43.8% and 63.4% of horses blind in one or both eyes (2,11). Bilateral blindness occurred in 50% of Appaloosa horses and 75% of non-Appaloosa horses examined. The proportion of bilaterally blind Appaloosa horses in our study falls within the range of 39% to 58% reported previously (2,11). However, we report a much higher frequency of bilateral blindness in non-Appaloosa horses compared to the 35.7% and 8.3% reported previously (2,11).

The retrospective nature of this study did not allow us to objectively and assuredly assign a diagnosis of insidious, classic, or posterior uveitis. Most horses presented with moderate to severe forms of the disease and some had never been treated for ERU prior to referral. The resulting clinical manifestations may represent insidious uveitis, or a classic form which was undiagnosed and untreated. Additionally, posterior uveitis may not have been recognized due to the severity of anterior segment
disease. Diagnosis of the form of uveitis would have required earlier referral, and long-term management which was not possible in many of our cases.

There may be many reasons for the noted disparities in our study compared to previous reports. The age at presentation was virtually identical to previous reports; therefore, this is unlikely to have played a role (2,11). However, geographic location, horse population, and hospital case load are potential factors that may have impacted our results. The number of horses in our study is smaller compared to previous reports; however, our study employed strict inclusion criteria for ERU. The study by Dwyer et al (2) investigated the association of leptospirosis seroreactivity and breed with uveitis and blindness. The inclusion criteria were not limited to cases with confirmed recurrent or continuous uveitis. Thus, it is possible that a number of horses, which may not have had ERU as we have defined it, were included in that study and direct comparisons of visual outcome may not be possible. In the report by Gerding et al (11) 46.2% of horses with ERU received cyclosporine implants as a therapy for ERU (11). This therapy has been reported to reduce recurrence of uveitis episodes and improve long-term maintenance of vision in horses with ERU (23). These devices are recommended for horses with vision and lacking significant ocular conditions suggestive of advanced ERU and are not recommended for horses with active, inflamed eyes that cannot be controlled with topical or systemic anti-inflammatory medications (23). Cyclosporine implants were not available at the WCVM until the later years of our study; however, most horses in our study would not have fit the criteria for implantation due to severity as 59.4% of eyes presented in the severe stage of disease. Additionally, the insidious nature of the disease seen commonly in the Appaloosa may limit the utility of this therapy in the breed. Although we were unable to apply an ERU classification, Appaloosa horses accounted for 62.5% of ERU cases in this series and it is possible many of these horses had the insidious form of the disease.

The association of Leptospira spp. with ERU is well-known, particularly Leptospira interrogans serotype Pomona; however, this association is not completely understood. It is theorized that for at least some horses, infection with Leptospira spp. is the inciting cause of uveitis (2,4,5,12,13). Its role in chronic recurrences of the disease is debated, but likely involves interaction with the immune system (16,17,24–28). Previous studies have reported an increased incidence of vision loss in seropositive horses, particularly in Appaloosas (2,11). Leptospira interrogans serotype Pomona was reported to be enzootic in the equine population in Saskatchewan in 1979; however, recent surveys are lacking (29). Testing for leptospirosis was minimal at our practice and thus, conclusions regarding the potential role for this agent in ERU in our equine population cannot be made.

Equine recurrent uveitis has been shown to have significant personal, occupational, and economic impact (11). Unfortunately, euthanasia was the most common final outcome for most horses in this study. This was higher (63%) than in a previous report (14.9%) and may be related to smaller numbers of horses, increased incidence of blindness, and differences in economic status and decisions made by owners in different regions (11). Poor outcomes for this population may also indicate a lack of early recognition of the condition, delayed referral, and therefore diminished therapeutic options and success.

Although our study shows that ERU is more common in the Appaloosa, we could not retrospectively make objective conclusions regarding the number and breed of horses with insidious versus classic ERU. The clinical impression is that the insidious form of ERU is more common in the Appaloosa than in other breeds. The reasons for this difference are unknown but may reflect different pathogeneses. Recent investigations using a candidate gene approach identified 3 genetic markers significantly associated with insidious ERU in Appaloosa horses (18). These included a single nucleotide polymorphism (SNP) within intron 11 of the TRPM1 gene on ECA1, an MHC class I microsatellite (472-260), and an MHC class II microsatellite (eqMHC1) both located in intron 1 of the DRA gene on ECA20 (18). The relative risk of ERU was 2 to 3 times higher with each allele for the TRPM1 SNP (18). The TRPM1 gene is responsible for the Leopard complex (LP) spotting patterns for which the Appaloosa has been selected (30,31). Expression of this gene is reduced in the retina and skin of Appaloosa horses (30,31). Reduced expression in the retina of LP/LP horses is the cause of congenital stationary night blindness (CSNB); however, its role in pigmentation is not understood (30–32). The TRPM1 gene may play a role in immune function as it is also known to be expressed in human B- and T-lymphocytes, monocytes, and hematopoietic cell lines (33,34); however, these potential roles have yet to be investigated in the equine species.

Although overall numbers of POAs within the hospital population were low (6), our data suggest that the POA may also be overrepresented for ERU. The POA is a breed developed in the United States with a foundation stallion that was an Arabian/Appaloosa/Shetland pony cross; POAs have characteristic LP spotting patterns. Other breeds with LP spotting include the Knabstrupper, Noriker, American miniature, and British spotted pony. Increased risk of ERU has not been reported in these breeds; however, it may be worth investigating along with the potential role of TRPM1 in ERU. Anecdotally, there is a suggested association between severity of ERU and extent of roaning in Appaloosa horses. Unfortunately, phenotype with respect to spotting patterns and roaning was not available for most horses in this study and thus, a relationship of phenotype and ERU could not be determined.

Our data also suggest over-representation of the Hanoverian breed for ERU. This warmblood horse breed, which originates in Germany, is known to have a high frequency of ERU in which heredity has been shown to play a role (19,20,35). There is an association between ERU and equine MHC class I haplotypes in the Hanoverian (35). In addition, genome wide association studies (GWAS) have identified a significant SNP on ECA20 located close to the candidate genes IL-17A, and IL-17F. The IL-17 cytokine is pro-inflammatory and is associated with cell damage during autoimmune disease including uveitis (15,36).

This study demonstrates that ERU in western Canadian Prairie Provinces is a devastating ocular disease that is most commonly bilateral, frequently results in bilateral blindness, and that euthanasia is a common final outcome. Most horses present to veterinary ophthalmologists at middle-age with
advanced stages of disease which may limit therapeutic options and effectiveness. Thus, early recognition of the disease and referral may improve outcomes. The Appaloosa, and possibly the POA and Hanoverian are over-represented for ERU in western Canada. Future investigation of the association of ERU with LP as well as genes involved in immune system function may improve our understanding of the pathogenesis of this disease in the Appaloosa horse.

Acknowledgments

The authors acknowledge Drs. Laura Field and Vanessa Holly for their contributions to data collection and analysis.

References


Expected consequences of convenience euthanasia perceived by veterinarians in Quebec

Dominick Rathwell-Deault, Béatrice Godard, Diane Frank, Béatrice Doizé

Abstract — In companion animal practice, convenience euthanasia (euthanasia of a physically and psychologically healthy animal) is recognized as one of the most difficult situations. There is little published on veterinary perceptions of the consequences of convenience euthanasia. A qualitative study on the subject based on interviews with 14 veterinarians was undertaken. The animal’s interests in the dilemma of convenience euthanasia was taken into consideration, strictly from the point of view of the physical suffering and stress related to the procedure. The veterinarian’s goal was to respect the animal’s interests by controlling physical pain. Most often, veterinarians made their own interests and those of the owners a priority when considering the consequences of their decision to perform or refuse convenience euthanasia.

Résumé — Conséquences attendues de l’euthanasie de commodité selon les perceptions des médecins vétérinaires au Québec. En pratique des animaux de compagnie, l’euthanasie de commodité (l’euthanasie d’un animal en bonne santé physique et psychologique) est reconnue comme l’une des situations les plus difficiles. Il y a eu peu de travaux publiés sur les perceptions vétérinaires des conséquences de l’euthanasie de commodité. Une étude qualitative sur le sujet basée sur des entrevues auprès de 14 médecins vétérinaires a été entreprise. Les intérêts de l’animal dans le dilemme de l’euthanasie de commodité ont été pris en considération, strictement du point de vue de souffrances physiques et du stress lié à l’intervention. Le but du médecin vétérinaire consistait à respecter les intérêts de l’animal en contrôlant la douleur physique. Le plus souvent, les médecins vétérinaires jugeaient leurs propres intérêts et ceux des propriétaires comme étant prioritaires lors de la considération des conséquences de leur décision de réaliser ou de refuser l’euthanasie de commodité.

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Introduction

Decisions on euthanasia are known to be ethically challenging in both human and veterinary medicine (1–3). Similar to physicians, veterinarians are trained to examine patients, diagnose diseases, and develop treatment plans. When animals are in the final stages of disease, discussion between veterinarians and owners about euthanasia is recognized as the next step (4). If discussion and request for euthanasia are raised for healthy animals (convenience euthanasia), differences in the veterinarian’s perception of the animal are seen with regard to their decision (accepting versus refusing to perform the procedure).

These perceptions were the basis for a previous study on the animal’s status in veterinary medicine as well as the moral duties of veterinarians toward animals (5). The role and consideration of each major stakeholder (veterinarian, owner, animal) in decisions to accept or refuse convenience euthanasia were identified as core elements leading to a better understanding of the convenience euthanasia dilemma. In 2013, the American Veterinary Medical Association (AVMA) (6) published euthanasia guidelines including an algorithm to help address the morality of the decision. Despite this publication, moral duties of veterinarians concerning convenience euthanasia are still not clearly defined within the profession.

Consequences resulting from either performing or refusing to perform convenience euthanasia could shed light on elements that veterinarians consider important for their choice. For example, which stakeholder (veterinarian, owner, or animal) would be considered? This type of approach is based on a method of professional dilemma analysis (7). The veterinarian
would think about convenience euthanasia, taking into consideration the consequences of the procedure. The goal of this study, therefore, was to describe the veterinarian’s opinion on expected consequences of convenience euthanasia.

**Materials and methods**

**Methodological approach**

In order to obtain maximal data, an inductive approach previously described was used (5). Perceived consequences of convenience euthanasia were obtained via semi-structured interviews consisting of open-ended questions on perceived consequences of accepting or refusing convenience euthanasia. The interview ended with a scheduled period of discussion on the topic. This inductive approach allowed an understanding and knowledge of the various responses (8). The interview guide available from the corresponding author was pretested and modifications were deemed unnecessary. The research ethical committee of the Faculty of Medicine at the University of Montreal approved this study.

**Consequences of convenience euthanasia**

Analysis of perceived consequences following convenience euthanasia was chosen to describe the dilemma. This method is known to help professionals analyze problematic situations (9). This type of assessment is a frequent tool used to understand dilemmas in terms of different potential outcomes (7). More specifically, this approach assesses which stakeholders (veterinarian, owner, or animal) and stakeholder interests were taken into consideration, in this case by the veterinarian.

**Population studied and sampling**

The population of veterinarians for this research was limited to those in the province of Quebec. General practitioners and specialized veterinarians were both included in the sample to achieve data saturation. Saturation establishes when to stop data collection in order to avoid a waste of time and money and allows generalization of results for a given population (10).

Veterinarians who practiced convenience euthanasia and veterinarians who refused to practice convenience euthanasia for ethical reasons were recruited. Participating veterinarians were familiar with the topic of convenience euthanasia in their practice.

In order to target a specific population of veterinarians, a non-probabilistic sampling method was elected. Choosing the participants would likely result in a more efficient collection of in-depth information about the consequences related to the decision of accepting or refusing convenience euthanasia.

Participants were recruited using a snowball method as described in other publications (5,9). Veterinarians not practicing convenience euthanasia were initially recruited followed by veterinarians practicing convenience euthanasia.

As recommended for qualitative research, no initial limit on number of participants was established. Recruiting and interviews were discontinued when data analysis indicated saturation of information. Data analysis was performed throughout the period of data collection. Fourteen participants were interviewed for 30 to 45 min. Although the number of participants may seem low, the sample size matched information in the published literature on the average number of interviews required for saturation of information in non-probabilistic studies (11).

**Data analysis**

The primary researcher audio recorded all interviews and then transcribed the data using a word processing system (MSWord; Microsoft, Redmond, Washington, USA). A manual coding of verbatim established the preliminary list of codes (10,12). The researcher created codes to represent the main ideas of the discourse sections. Similar ideas from different participants were then grouped together. The first 4 interviews allowed completion of the manual coding. Next, a software analysis program (QDA MINER; Provalis Research, Montréal, Québec) was used to complete coding of all interviews. The coding list was continuously adjusted to reflect any new idea identified throughout the data analysis process. Internal validity and accuracy of the coding technique were assessed using counter-coding and inverse coding procedures (5,10). First, coding done by an independent research assistant was compared to the researcher’s coding (counter-coding). Consistency level (percentage on agreement) was 89% (10,12). Next, inverse coding was performed to ensure that all interview excerpts represented by a code were appropriately categorized. Coding results were shown to be accurate. Analysis of the results was then undertaken.

**Results**

**Veterinarians’ evaluation of expected consequences of convenience euthanasia**

Veterinarians were invited by direct questioning to describe their perceived consequences of convenience euthanasia. Veterinarians

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**Table 1. Perceptions of veterinarians who agree or refuse to proceed with convenience euthanasia**

<table>
<thead>
<tr>
<th>Perception</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive perceptions when veterinarians agree to proceed with convenience euthanasia</td>
<td></td>
</tr>
<tr>
<td>Profitability for veterinary business</td>
<td>(n = 6)</td>
</tr>
<tr>
<td>Control of the situation by veterinarians</td>
<td>(n = 3)</td>
</tr>
<tr>
<td>Good relationship with the owner/trust</td>
<td>(n = 3)</td>
</tr>
<tr>
<td>Negative perceptions when veterinarians refuse to proceed with convenience euthanasia</td>
<td></td>
</tr>
<tr>
<td>Does not change the end result for the animal</td>
<td>(n = 13)</td>
</tr>
<tr>
<td>Judgment and lack of respect from the owner</td>
<td>(n = 6)</td>
</tr>
<tr>
<td>Contributes to the animal overpopulation</td>
<td>(n = 4)</td>
</tr>
<tr>
<td>Uncertainty about the future of the animal</td>
<td>(n = 3)</td>
</tr>
<tr>
<td>Transfers the problem to other sources</td>
<td>(n = 3)</td>
</tr>
<tr>
<td>Pressure related to the profitability of veterinary business</td>
<td>(n = 3)</td>
</tr>
<tr>
<td>Positive perceptions when veterinarians refuse to proceed with convenience euthanasia</td>
<td></td>
</tr>
<tr>
<td>Influence on the public and social education</td>
<td>(n = 7)</td>
</tr>
<tr>
<td>Influence during the choice of employment</td>
<td>(n = 5)</td>
</tr>
</tbody>
</table>

*The number in brackets indicates the number of veterinarians with that perception. Categories were not mutually exclusive.*
were asked about both the possibility of accepting and refusing convenience euthanasia regardless of their choice in private practice. Veterinarians identified 3 major stakeholders: the animal, the owner, and the veterinarian. Their perceptions were classified in different categories depending on whether they resulted in positive (desirable) or negative (undesirable) consequences. Categories were not mutually exclusive. All 14 veterinarians answered. The results are shown in Table 1.

**Impact of convenience euthanasia decisions on animal overpopulation**

Most veterinarians \( n = 13 \) thought that their decision on convenience euthanasia in private practice did not change the end result for the animal (Table 1). An owner faced with refusal of convenience euthanasia would find the service at another facility or could arrange for the death of the animal in some other way.

“I am thinking about what would happen if we refused to euthanize the animal. What will the owner do? The owner will go to the SPCA and the animal will stay there. He will not be adopted by another family and we as veterinarians think that we saved the animal’s life.”

Three veterinarians shared this opinion and considered not only that the end result for the animal would not change, but that the refusal to proceed with convenience euthanasia would also transfer the dilemma to another facility (category “Transfers the problem to other sources” in Table 1).

Opinions were divided concerning the impact of the refusal to proceed with convenience euthanasia on pet overpopulation. Four veterinarians thought that refusal would contribute to increase the overpopulation in animal shelters (Table 1). For others, decisions of convenience euthanasia made in private practice would have no impact on the overpopulation problem in shelters.

“Here we participate in the spaying program for stray animals of our town. It has been proven that when a town traps and kills every stray animal in its territory, the population of stray animals just comes back to what it was in a short period of time.”

**Financial impact of clinical decisions with regard to convenience euthanasia**

Some veterinarians \( n = 6 \) reported that euthanasia was a profitable activity for veterinary enterprises (Table 1). When veterinarians agree to perform convenience euthanasia, it creates a substantial income for their veterinary clinic:

“The owners are business men. They are very good veterinarians, but they also are business men. Their philosophy about convenience euthanasia is if we do not perform it here, the client will go somewhere else and he will pay elsewhere, so it is better if he pays here.”

During the interviews, 3 veterinarians declared being pressured by their employer to accept every request for convenience euthanasia (category “Pressure related to the profitability of veterinary enterprises” in Table 1). These 3 veterinarians believed that they did not have a choice, even if they did not share the position of their facility on the subject:

“(…) I didn’t think that I would be obliged to do an act that I didn’t agree with. I didn’t think that they would impose this on me. I think that now, the only thing that I do control in those situations is to insist that every animal be adequately sedated before euthanasia, so that the animals do not feel the stress related to the act. But aside from the sedation, my boss does not let me refuse euthanasia of a patient…. They want consistency of decisions made within their clinic. They even met with me once because I had been asking clients questions about the reason why they wanted their animal euthanized and I was offering other solutions.”

Some veterinary facilities have a policy in place declining all cases of convenience euthanasia. Five veterinarians interviewed chose to work in those facilities partly because of the existence of such a policy (category “Influence during the choice of employment” in Table 1). Those veterinarians liked the fact that they would not be pressured from their employer to proceed with convenience euthanasia. Responses showed that a practice policy of consistently refusing requests of convenience euthanasia was very important for some veterinarians when choosing a workplace.

**Psychological impact of clinical decisions on convenience euthanasia**

Eight veterinarians reported on the negative psychological impact of the decision to proceed with convenience euthanasia (Table 1).

Some veterinarians \( n = 3 \) proceeded with convenience euthanasia because they stayed in control of the situation, particularly on the outcome for the animals (Table 1). These veterinarians would therefore not feel the discomfort associated with abandonment or cruel killing of the animal elsewhere. One veterinarian performed euthanasia to ensure that the animal would be put down humanely. Three veterinarians described their discomfort with the uncertainty of the animal’s safety if convenience euthanasia was refused (Table 1). Refusing convenience euthanasia could have consequences for the animal (potential tragic outcome elsewhere) and the veterinarian’s psychological health (guilt as a result of potential tragic outcome elsewhere for the animal). These veterinarians felt that if they proceeded with convenience euthanasia, they were able to control the situation and the future of these animals. From that perspective, convenience euthanasia was partly beneficial for the veterinarian’s psychological health.

**Concept of shirking responsibilities**

Four veterinarians stated that they were in a vicious cycle created by convenience euthanasia (Table 1). These veterinarians thought that the practice of convenience euthanasia did not include any element that would discourage current or future use of this service by the animal’s owner. The ease of access for convenience euthanasia could even lead owners to repeat the experience every time they chose to get rid of an undesirable animal.
The indirect influence of convenience euthanasia on the veterinarian’s perception of moral responsibility was also highlighted. In fact, some veterinarians felt that when they proceeded with convenience euthanasia, they encouraged owners to consider euthanasia as an acceptable method to get rid of their animal. These veterinarians also made a link between convenience euthanasia and the fact that owners were transferring responsibility for their animals to the professional. They believed that owners were not aware of the amount and importance of responsibilities associated with adopting a companion animal. Veterinarians felt that owners asking for convenience euthanasia were choosing the least complicated option to “get rid of the animal” and associated responsibilities. They did not research other options to resolve the problem.

“Euthanasia shows a degree of cowardice because the owner asks someone else to take responsibility for the healthy animal. It is the only method that he has found.”

Some veterinarians took charge of the animal even when they refused to euthanize. In other words, refusal of convenience euthanasia did not force the owner to take any responsibility. Therefore, in both situations, there was a shift of responsibility for the animal from the owner to the veterinarian.

“(…) I remember one case; it was a couple with a young child. They decided to adopt a great Dane puppy. Before adopting the dog, they should have gotten information about great Danes. It is a big dog and he will grow faster than the child. They came for convenience euthanasia when the dog was 6 months old, because he was playing too roughly with the child…. A great Dane is not just great, he is going to eat a lot and he will need to play a lot also. It is not a delicate breed; he will wag his tail and whip everything around. We did find a new home for this puppy, because I refused to euthanize him. But once again, who was stuck with the problem? We were! This is what pisses me off and in the long-term it is burdensome. People do not take their responsibilities. They unload their responsibilities onto someone else.”

Education of the owner and relationship between the owner and the veterinarian

Seven veterinarians believed that their decision to refuse convenience euthanasia made a difference in the way owners saw the dilemma even if ultimately the animal would be put down one way or another (category “Influence on the public and social education” in Table 1). By refusing euthanasia, these veterinarians were creating an opportunity to talk with the owner about the dilemma and to explain the situation as experienced by the veterinarian. The owner was then more aware of the dilemma and this discussion brought about a reflection related to the issue. However, other veterinarians (n = 6) did not share this opinion about provoking a discussion with the owner on convenience euthanasia. They believed that by doing so, the veterinarian was showing judgment and a lack of respect for the owner’s moral values (Table 1). The only respectful decision for them was to accept convenience euthanasia. This decision was the only one that respected the owner’s autonomy. It did not judge the depth of the owner’s reflection nor the quality of motivations related to the demand. Agreeing to euthanasia was the only option if they wanted to maintain a good relationship with their clients. Three veterinarians saw their decision to agree to convenience euthanasia as an opportunity to create trust and a strong relationship with their clients (Table 1). They could not conceive of a situation in which the owner would show up at the practice and ask for convenience euthanasia without having previously analyzed the situation. They also saw this situation as an opportunity to create a good reputation with regard to the quality of service.

Discussion

Each consequence listed by interviewed veterinarians was classified to represent the defended interest (Table 1). In a utilitarian approach the assessment of the morality of an action is done by evaluating consequences for all stakeholders. An action is deemed moral if the outcomes are more positive than negative for all stakeholders (13). The minor role and consideration given to the animal in the convenience euthanasia dilemma (5) made some veterinarians consider the procedure as a service that is not necessarily contrary to the animal’s interest. In fact, management of the animal’s suffering for the [Ordre des médecins vétérinaires du Québec (OMVQ), Quebec veterinary licensing body] is an essential criterion of good veterinary practice.

Veterinarians are expected to take all possible measures to reduce an animal’s physical suffering (the only regulated aspect of the dilemma). The OMVQ does not recognize convenience euthanasia as an action against the best interest of healthy animals. Death is not a welfare factor taken into consideration (trustee of the OMVQ, personal communication, February 4th, 2010). Yeates (11) disagrees and states that welfare assessment of an animal takes into consideration all of the animal’s interests. Presence and absence of positive and negative elements and their repercussions in the animal’s life are necessary for welfare assessment. Death of an animal removes positive elements from the animal’s life and should therefore be considered when assessing animal welfare (11). Lack of discussion on recognition of the animal’s inherent value of life in the veterinary profession was noted during this analysis. Veterinarians interviewed raised concerns about physical suffering and stress related to the euthanasia procedure but did not discuss any other concern regarding the animal’s interests. For most veterinarians, an evaluation of animal welfare that would take into consideration the animal’s interests other than those related to physical suffering was difficult. As reported by Fraser (14), there is no accepted scale for animal welfare. Many criteria could be judged as essential by one evaluator and not by another. The animal’s welfare could therefore be judged as poor by one person and good by another. Even if the evaluators are members of the same profession, evaluation could differ greatly from one to another. It is therefore conceivable that veterinarians were less inclined to evaluate other aspects of the animal’s interest due to a lack of guidelines. The interests of all major stakeholders (veterinarian, owner, or animal) were considered at the time of decision. Convenience euthanasia
seemed the best solution for the majority of veterinarians interviewed.

It is important to highlight that even if this vision of convenience euthanasia is shared by most of the veterinarians interviewed, cases of convenience euthanasia are still considered difficult situations to manage mostly as a result of the discrepancy between personal and professional perceptions of the animal. Because veterinarians are pet owners themselves, they may be uncomfortable with convenience euthanasia which may arise from the value they perceive of animals in general (4). The discomfort also seemed to lead veterinarians to question themselves about the dilemma. Veterinarians showed a willingness to change their way to evaluate the animal’s interest within the profession.

Evaluation of the convenience euthanasia dilemma revealed the importance of multiple allegiances for veterinarians. On one hand, the importance of the owner’s motivations to justify their request of convenience euthanasia was raised (5). Veterinarians during their education learn to analyze and choose the treatment to obtain the best outcome for animals. It is thus understandable that veterinarians for different reasons will agree to euthanize the animal rather than refuse in a particular medical situation (15). However, by definition, cases of convenience euthanasia are unique in that the best interests of the animal are not taken into consideration. At first glance, the decision concerning convenience euthanasia creates a situation in which the animal’s interests are not respected. This fact creates a stressful situation and a negative psychological impact on veterinarians.

The second component deals with psychological stress within the field of veterinary medicine. Publications show that the act of euthanasia is not an element causing stress for veterinarians (16,17). The origin of the psychological stress surrounding the convenience euthanasia dilemma seems to arise from the conflict between the prioritization of the animal’s interests and the willingness to satisfy the owner (18). Results from our study confirm this evaluation of the psychological impact of convenience euthanasia. Stress surrounding the decision was also amplified by the pressure of profitability coming from the owner of the veterinary facility (19).

The evaluation of negative and positive perceptions of accepting or refusing to perform convenience euthanasia adds another perspective. Many outlined consequences were emotional states experienced by veterinarians such as psychological stress, importance to feel in control of the situation, and discomfort regarding the animal’s future. Those emotional states would be interpreted as favorable to the veterinarian’s interests. The negative psychological impact also suggested that veterinarians worried about the animal’s interests (absence of physical suffering). Owner interests prevailed when evaluating the financial aspect and the data concerning the client-veterinarian relationship. Little information was collected on the animal’s interests except for stress control during euthanasia and appropriate pain management for physical suffering. No one talked about the healthy animal’s interests to live. The animal’s welfare presented in this analysis of consequences did not include any aspect other than those related to stress, and physical pain and suffering. All others (e.g., the animal’s desire to live) were missing from their evaluation of consequences. These results are partly in accordance with Yeates’ and Main’s publication on the topic (20). They concluded that the veterinarian’s opinions on refusing euthanasia were based mainly on justifications related to the animal. In other words, veterinarians who were refusing euthanasia justified their decisions on animal-based reasons primarily. The concerns related to owners were also important, but they were taken into consideration secondarily. In this study most veterinarians interviewed were practicing convenience euthanasia, so the main decision scheme was reversed.

For some veterinarians, convenience euthanasia is a humane method to stabilize the situation of companion animal over-abundance. In this study, description of the veterinarian’s moral responsibility toward animals was only possible in terms of management of the animal’s physical suffering and stress control during the procedure. Veterinarians were thus respecting their oath and commitment toward animals when they performed convenience euthanasia. As concluded in the previous article related to this study (5), veterinarians decided about convenience euthanasia based on their analysis of the owner-animal bond. As most owner-animal bonds seen in private practice were from the anthropocentric point of view, the animal’s interests were barely taken into consideration. From that perspective, most veterinarians believed that they were not active participants in the dilemma of convenience euthanasia. In fact, with their pain management, they felt that their ethical duties toward animals were met.

This study provides a description of the consequences of convenience euthanasia, but does not assess the prevalence of the reported facts within the entire population of veterinarians in Quebec. Fourteen Quebec veterinarians expressed their opinions and therefore these cannot be extrapolated to the entire Quebec veterinary population or any other veterinary population in Canada. Information on similarities and differences within Canadian veterinary practices is lacking. Evaluation of expected convenience euthanasia consequences on a larger scale in Quebec requires a quantitative evaluation of the concepts described in this article. A quantitative study is currently underway.

The goal of this study was to describe the veterinarian’s perception of consequences related to the decision of accepting or refusing convenience euthanasia, as experienced in their day-to-day practice. Analysis of the veterinarians’ responses brought to light many components of the dilemma and led to a better understanding of this issue. Decisions on convenience euthanasia in practice are taken by evaluating the consequences and interests of the veterinarian and the client/owner. The animal’s interests are evaluated strictly from a physical suffering point of view. Therefore, veterinarians are accomplishing their duty toward animals with regards to convenience euthanasia.

Acknowledgments

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Saunders Handbook of Veterinary Drugs: Small and Large Animals, 4th edition


The newest edition of this book has some notable features compared with the previous version. The addition of a few new drugs, more in-depth information on drug mechanism of action, indications and clinical use will please the reader who is looking for more knowledge besides a dosing regimen. Precautionary information, including Adverse Reactions and Side Effects, Contraindications, Precautions and Drug Interactions remains an emphasized section with supplementary information included in most drug categories. The inclusion of human medicines in which veterinary uses may or may not have been identified is also considerably useful, specifically material located in Precautionary Information which emphasizes what the veterinarian needs to look for when owners self-diagnose and medicate. Additional appendices (information for pharmacists) and brand names added to the Listing of Drugs According to Functional and Therapeutic Classification table is definitely a highlight worth noting. Familiar alphabetical organization by drug name and other aspects from the 3rd edition that are carried over into the 4th edition, particularly important conversion information, compatibility charts, and drug and brand name indices are recapped but in this version easier to peruse. I like how the book doesn’t separate into small and large animal specific drugs but rather incorporates the differences in pharmacokinetics, pharmacodynamics, and dosing variations with respect to certain species captured under one umbrella.

Although the book is compact and easy to navigate, it lacks specific drug dosing references and does not represent a species comprehensive veterinary pharmacology source. As stated in the preface the handbook is geared toward the veterinary student, technician, and busy general mixed animal practitioner, and with that in mind the handbook is a welcome guide. However, after critically evaluating the subtle nuances between the editions, this author’s point of view doesn’t necessitate an immediate purchase if the 3rd edition is sitting on your shelf.

Reviewed by Monica Rosati, BSc, DVM, DVSc, Dip ACVAA, Staff Anesthesiologist at Mississauga Oakville Veterinary Emergency Hospital and Referral Services, Oakville, Ontario.
Cardiovascular effects of constant rate infusions of lidocaine, lidocaine and dexmedetomidine, and dexmedetomidine in dogs anesthetized at equipotent doses of sevoflurane


Abstract — This study evaluated the cardiovascular effects of a constant rate infusion (CRI) of lidocaine, lidocaine and dexmedetomidine, and dexmedetomidine in dogs anesthetized with sevoflurane at equipotent doses. Treatments consisted of T1-Lidocaine [loading dose 2 mg/kg body weight (BW), IV, and CRI of 100 µg/kg BW per min] at 1.4% end-tidal of sevoflurane (FE SEV); T2-Dexmedetomidine (loading dose 2 µg/kg BW, IV, and CRI of 2 µg/kg BW per hour) and FE SEV 1.1%; and T3-Lidocaine-Dexmedetomidine using the same doses of T1 and T2 and FE SEV 0.8%. Constant rate infusion of lidocaine did not induce any cardiovascular changes; lidocaine and dexmedetomidine resulted in cardiovascular effects similar to dexmedetomidine alone. These effects were characterized by a significant (P < 0.001) decrease in heart rate, cardiac output, cardiac index, oxygen delivery, and pulmonary vascular resistance index, and a significant (P < 0.001) increase in mean and diastolic arterial pressure, systemic vascular resistance index, pulmonary arterial occlusion pressure and oxygen extraction ratio, compared with baseline values. In conclusion, a CRI of lidocaine combined with dexmedetomidine produces significant cardiovascular changes similar to those observed with dexmedetomidine alone.

Résumé — Effets cardiovasculaires des infusions constante de taux de lidocaïne, lidocaïne et dexamétdéomidine, et dexamétdéomidine chez chiens anesthésiés à équipotent doses de sevoflurane. L'objet de cette etude a été la evaluation des effets cardio-vasculaires de la perfusion à debit continue (CRI) de lidocaïne, lidocaïene et dexamétdéomidine en chiens anesthésiés avec sevoflurane dans équipotentiel dose. Les traitemets consistèrent à T1-Lidocaïne [dose de charge de 2 mg/kg, IV, et perfusion à debit continue (CRI) de 100 µg/kg/min] en 1,4 % en fin d’expiration du sévoflurane (FE SEV); T2-Déxmédétomidine (dose de charge de 2 µg/kg, IV, et perfusion à debit continue (CRI) de 2 µg/kg/h) et FE SEV 1,1 % et T3-Lidocaïne-Dexmedetomidine en utilisant la même dose de T1 et T2 et FE SEV 0,8 %. Perfusion à debit continue (CRI) de lidocaïne ne induit pas aucun échange cardio-vasculaire; lidocaïne et dexamétdéomidine resulta dans effets cardio-vasculaires similaires a dexamétdéomidine seule. Ces effets caracterises par significative décroissance (P < 0.001) en fréquence cardiaque, le débit cardiaque, index cardiaque, la libération de l’oxygène, pulmonaire indice de résistance vasculaire, et significative accroissement de la moyenne a la pression artérielle diastolique (P < 0.001), indice de résistance vasculaire systemique, et l’extraction d’oxygène. En somme, la perfusion à debit continue (CRI) de lidocaïne produit significative échange cardio-vasculaire similaire à ceux observe en utilisant seulement dexamétdéomidine.

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Introduction

Maintenance of general anesthesia with inhalational anesthetics allows for adequate control of anesthetic depth and a fast recovery. However, a major concern is the dose-dependent cardiopulmonary depression that occurs with higher concentrations of inhalational anesthetics. The inclusion of an injectable analgesic and/or sedative and/or anesthetic drug allows a more balanced technique and may result in a sparing effect on the minimum alveolar concentration (MAC) of the inhalational anesthetic with a potential reduction in the dose-dependent adverse effects (1–4).

Alpha 2-adrenergic agonists, such as dexmedetomidine and medetomidine, have been included as part of balanced anesthetic techniques in dogs and other species, due to their analgesic and inhalational anesthetic sparing effects (2,4–11). Their profound effects on the cardiovascular system at doses used commonly in veterinary practice include a decrease in cardiac output, heart rate, sympathetic tone, and an increase in afterload from increases in systemic vascular resistance, which may result in an increase in systemic and occasionally pulmonary pressures (11–18). These effects can be minimized and shortened when low doses are administered in humans and dogs (2,5,7,10,14,18–21).

Lidocaine has been used intravenously as an analgesic during surgery and for its MAC sparing properties with minimal cardiovascular effects in dogs and horses (3,4,22–27). The cardiorespiratory effects of a combination of lidocaine and medetomidine as a constant rate infusion (CRI) for balanced anesthesia have been determined in horses and included higher blood pressure, less isotropic support, lower inhalational anesthetic requirements, and similar cardiac index when compared to a control group (6,28). The MAC sparing effects for isoflurane and sevoflurane of a combination of CRIs of lidocaine and dexmedetomidine have been determined in dogs (29,30), but not the cardiopulmonary effects of these CRIs with sevoflurane. The purpose of this study was to investigate if the benefits observed in other species from CRIs of lidocaine and/or dexmedetomidine combined with inhalational anesthetics are also present in dogs anesthetized with sevoflurane at equipotent doses. Our hypothesis was that in sevoflurane-anesthetized dogs, a CRI of dexmedetomidine with or without lidocaine is characterized by dexmedetomidine cardiovascular effects, compared with a CRI of lidocaine alone.

Materials and methods

Animals

Three male and 3 female adult mixed breed neutered dogs, 3.4 ± 0.8 y old (mean ± SD), weighing 18.4 ± 5 kg were included in a prospective randomized crossover experiment with a 2-week washout period between treatments. Dogs were healthy based on medical history, physical examination, complete blood (cell) count (CBC), and serum biochemical analysis. The Animal Research Ethics Committee of the Universidad Autónoma de Mexico approved this study (protocol # DCARM-1412).

Anesthetic procedure and instrumentation

Food but not water was withheld for 8 h prior to each anesthetic procedure. A 20-gauge catheter (BD; Becton Dickinson and Company, New Jersey, USA) was aseptically placed into the cephalic vein. Anesthesia was induced via facemask using a vaporizer setting of 8% of sevoflurane (Sevorane; Abbott Laboratories, Bogotá, Colombia) and a fresh gas flow of 4 L/min. Dogs were orotracheally intubated and attached to a circle anesthetic rebreathing system (Fabius; Dräger Medical GmbH 23542, Lübeck, Germany), placed in lateral recumbency and mechanically ventilated with intermittent positive-pressure ventilation (IPPV) to maintain eucapnia (35 to 40 mmHg end tidal CO₂). Monitoring included end-tidal sevoflurane and CO₂ concentrations using a side-stream infrared gas analyzer (Dräger Vamos; Dräger Medical GmbH) with the sampling port attached between the endotracheal tube and the breathing system. The anesthesia monitor was calibrated each morning using a calibration gas specifically designed for this purpose (DOT-34 NRC 300/375M1014; Datex-Ohmeda Division, Helsinki, Finland). Anesthesia was maintained with sevoflurane vaporized in 100% oxygen with a flow rate of 2 L/min and the end-tidal concentration (FE₅₀) maintained at 2.8% while the instrumentation was completed.

An isotonic fluid solution (Hartman Solution, HT, Pisa Agropecuaria, Mexico) was administered at a flow rate of 3 mL/kg body weight (BW) per hour through the cephalic catheter by use of an infusion pump (Colleague; Baxter Healthcare Corporation, Deerfield, Illinois, USA). An electrocardiogram (lead II) for heart rate (HR) and rhythm was continuously monitored by placing electrodes at the level of the elbows and left patella, and a pulse oximeter probe attached to the dog’s tongue (BeneView T8; Shenzhen Mindray Bio-Medical Electronics, Shenzhen, China). A 22-gauge catheter was aseptically placed in the dorsal metatarsal artery and attached to a transducer (DTX plus DT 4812; Becton Dickinson Critical Care Systems, Singapore). The transducer was previously verified against a mercury manometer at 50, 100, and 200 mmHg, and zeroed at the level of the manubrium for direct monitoring of arterial blood pressure [systolic (SAP), diastolic (DAP), and mean (MAP)]. Blood was collected and placed into lithium heparin syringes (A-Line; Becton, Dickson and Company, Oxford, UK), for determination of pH, arterial partial pressure of carbon dioxide (PaCO₂) and oxygen (PaO₂), packed cell volume, hemoglobin, bicarbonate, lactate, and glucose at the dog’s corrected body temperature, using a blood gas analyzer (GEM Premier 3000; Instrumentation Laboratory, Warrington, UK). The gas analyzer was calibrated before each experiment by using 2 aqueous buffered solutions containing precise concentrations of CO₂ and O₂.

A 7-Fr 4 lumen 110 cm Swan-Ganz catheter (Arrow Balloon Thermodilution Set; Arrow International, Morrisville, North Carolina, USA) was introduced through the jugular vein using an introducer (Introducer kit; Arrow International) for determination of cardiac output (CO) by thermodilution (COM-1 Cardiac Output Computer; Edwards Life Sciences, Irvine, California, USA). The distal port of this catheter was connected to another pressure transducer and advanced into the pulmonary artery using the characteristic pressure wave changes associated with the right ventricle and pulmonary artery. The transducer was connected to the distal port of the Swan-Ganz catheter,
zeroed at the level of the manubrium to allow measurement of mean pulmonary arterial pressure (MPAP) and pulmonary arterial occlusion pressure (PAOP), and switched to the proximal port for measurement of central venous pressure (CVP). For CO determinations, 5 mL of dextrose (Dextrose 5%; Solution DX-5; Pisa Farmaceutica, Mexico City, Mexico) iced to a temperature of 1°C to 4°C was rapidly hand-injected into the proximal port of the Swan-Ganz catheter at end-expiration. At each measurement time, 3 consecutive measurements that were within 10% of each other were recorded and their average taken as CO (L/min). The thermistor on the Swan-Ganz catheter was used to measure core body temperature (T), which was maintained between 37.5°C and 38°C. Samples of mixed venous blood were anaerobically collected for gas analysis.

Experimental protocol and measurements

The FE SEL was adjusted to 1.8% after instrumentation and maintained for 30 min to establish baseline values for CO, HR, CVP, SAP, DAP, MAP, and MPAP. From these values, the following parameters were calculated:

- cardiac index (CI; ml/min per kg BW), CI = CO/BW;
- stroke volume index (SVI; ml/beat per kg BW), SVI = CI/HR;
- pulmonary vascular resistance index (PVRI; mmHg/ml per min per kg BW) = [(MPAP — PAOP)/CI];
- systemic vascular resistance index (SVRI; mmHg/ml per min per kg BW) = [(MAP — CVP)/CI];
- oxygen delivery (DO₂; ml O₂/min per kg BW) = (CaO₂ × CI)/100, where CaO₂ (arterial oxygen content in ml O₂/dl) = (Hemoglobin × Saturation × 1.34) + (0.0031 × PaO₂);
- oxygen consumption (VO₂; ml O₂/min/kg BW) = [(CaO₂ — CmvO₂) × CI]/100, where CmvO₂ (mixed venous oxygen content in ml O₂/dl) = (Hemoglobin × Saturation × 1.34) + (0.0031 × PvO₂); and
- oxygen extraction ratio (ERO₂; %) = (VO₂/DO₂) × 100 (31).

Each dog received 1 of the following 3 treatments on separate anesthetic occasions, assigned by a randomization scheme (http://www.randomization.com), T1-Lidocaine (LID)-loading dose of lidocaine (Lidocaina 2% Inyectable: Pisa, México), 2 mg/kg BW, IV, followed immediately by a CRI of 100 µg/kg BW per min; T2-Dexmedetomidine (DEX)-loading dose of dexmedetomidine (Dexdorimitor; Orion Corporation, Espoo, Finland), 2 µg/kg BW, IV, followed by a CRI of 2 µg/kg BW per hour; and T3-Lidocaine-Dexmedetomidine (LID-DEX) at the same doses as T1 and T2. Loading doses were diluted up to a final volume of 3 ml with sterile water and injected over 10 s. Treatments for the CRI were diluted into 60 ml of saline (Saline 0.9%; Solution DX-CS; Pisa Farmaceutica) and delivered using a pump infusion device (Colleague; Baxter Healthcare Corporation). The solution for the LID group was prepared by adding 6 ml of lidocaine 2% to 54 ml of saline, resulting in 2 mg of lidocaine per ml. For the DEX group, 0.08 ml of dexmedetomidine 0.05% was added to 59.9 ml of saline, resulting in 0.66 µg of dexmedetomidine per ml. For the LID-DEX group, 6 ml of lidocaine and 0.08 ml of dexmedetomidine were added to 53.9 ml of saline, resulting in the same concentrations of each drug as for the LID and DEX groups. These concentrations correspond to an infusion rate of 0.05 ml/kg BW per min of any of the solutions. The FE SEL was decreased for each treatment to 1.4% for group LID, 1.1% for group DEX, and 0.8% for group LID-DEX, based on MAC equipotent doses previously determined (30). A second set of measurements was completed after 45 min of CRI administration.

For recovery from anesthesia the CRIs and sevoflurane administration were discontinued. Upon return of reflexes and spontaneous breathing, the dogs were disconnected from the anesthesia machine and extubated when a swallowing reflex was present. After recovery, dogs received carprofen (Rimadyl; Pfizer Animal Health, Capelle a/d I Jssel, The Netherlands) 4 mg/kg BW, SQ, q24h for 2 d. All dogs were rehomed after this experiment was completed.

Statistical analysis

Statistical analysis was performed using Prism 6.0 computer software (GraphPad Software; La Jolla, California, USA). The Shapiro-Wilk test was used for the assessment of normality. Data were examined with a 2-way repeated measures analysis of variance (ANOVA) to compare the effect of treatment with baseline and for comparisons between treatments. The Holm-Sidak test was used for multiple comparisons between means of treatments (32). Data are reported as mean ± standard deviation (SD). Statistical significance was accepted at P < 0.05.

Results

Baseline values for each of the 3 treatments were completed approximately 45 min after induction (Table 1). Following the dexmedetomidine CRI administration, HR, CO, CI, PVRI, and DO₂ were significantly decreased with respect to baseline in both the DEX and LID-DEX groups (P < 0.0001) and the LID CRI group; whereas MAP (P < 0.0005), DAP (P < 0.0005), PAOP (P < 0.0001), SVRI (P < 0.0001), and O₂ER (P < 0.0001) were significantly increased in both the DEX and LID-DEX groups with respect to baseline and the LID group. All dogs receiving dexmedetomidine (DEX) showed second-degree atrioventricular block in the first 20 min after administration.

Arterial blood gas values, lactate, and glucose were within normal range and not significantly different between groups. Mean and SD lower and upper values were 7.38 ± 0.004 and 7.39 ± 0.009 for pH, 35 ± 1.0 and 37 ± 1.2 mmHg for PaCO₂, 487 ± 25 and 503 ± 16 mmHg for PaO₂, 22 ± 1 and 23 ± 2 mmol/L for bicarbonate, 1.0 ± 0.1 and 1.1 ± 0.1 mmol/L for lactate, and 9.1 ± 2.0 and 9.8 ± 1.1 mmol/L for glucose.

Discussion

In this study equipotent anesthetic doses of LID-DEX and DEX in combination with sevoflurane in dogs resulted in similar cardiovascular effects, characterized by significant increases in SVR and MAP, with concomitant decreases in HR and CO, compared with an equipotent dose of LID combined with sevoflurane, which did not induce any alterations in cardiovascular parameters. The cardiovascular effects in the
LID-DEX and DEX groups are mostly related to the effects of DEX, which are induced in both conscious and anesthetized dogs (2,5,7,9–12,17,20). Similar cardiovascular effects of increased MAP and decreased HR and CO have been reported in horses anesthetized with isoflurane, receiving CRIs of LID-medetomidine when compared to LID (6). In our study the decrease in CO from baseline in the DEX group (42%) and LID-DEX group (41%) was due to a decrease in HR that was more than the approximately 40% decrease in CO from administering an IV loading dose of lidocaine, 2 mg/kg BW, followed by a CRI of 100 µg/kg BW per min (T1-LID and T3-LID-DEX), and an IV loading dose of medetomidine, 2 µg/kg BW, followed by a CRI of 2 µg/kg BW per hour (T2-DEX and T3-LID-DEX). Data are expressed as mean ± SD.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Baseline T1</th>
<th>T1-LID</th>
<th>Baseline T2</th>
<th>T2-DEX</th>
<th>Baseline T3</th>
<th>T3-LID-DEX</th>
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<tbody>
<tr>
<td>HR (beats/min)</td>
<td>112 ± 11</td>
<td>115 ± 13</td>
<td>116 ± 14</td>
<td>68 ± 4</td>
<td>115 ± 13</td>
<td>74 ± 7a,b</td>
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<tr>
<td>CO (L/min per kg BW)</td>
<td>178 ± 27</td>
<td>178 ± 22</td>
<td>179 ± 23</td>
<td>103 ± 11b</td>
<td>184 ± 28</td>
<td>108 ± 11b</td>
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<td>SAP (mmHg)</td>
<td>118 ± 10</td>
<td>117 ± 9</td>
<td>117 ± 9</td>
<td>119 ± 11</td>
<td>119 ± 11</td>
<td>117 ± 10</td>
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<td>MAP (mmHg)</td>
<td>77 ± 2</td>
<td>81 ± 3</td>
<td>76 ± 5</td>
<td>90 ± 5b</td>
<td>77 ± 5</td>
<td>91 ± 6b</td>
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<tr>
<td>PCV (%)</td>
<td>90 ± 2</td>
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<td>89 ± 6</td>
<td>98 ± 3b</td>
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<td>CVP (mmHg)</td>
<td>3 ± 0.4</td>
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<td>SVR (mL/bid per kg BW)</td>
<td>1.6 ± 0.2</td>
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<td>MPAP (mmHg)</td>
<td>14 ± 0.4</td>
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<td>5.6 ± 0.5</td>
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<td>5.5 ± 0.4</td>
<td>12.0 ± 1.1b</td>
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<td>11.0 ± 1.7b</td>
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<td>SVRI (mmHg/mL per min per kg BW)</td>
<td>0.49 ± 0.06</td>
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<td>0.91 ± 0.02b</td>
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<td>0.88 ± 0.03b</td>
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<td>PVRI (mmHg/mL per min per kg BW)</td>
<td>0.05 ± 0.006</td>
<td>0.04 ± 0.005</td>
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<td>0.03 ± 0.003b</td>
<td>0.05 ± 0.002</td>
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<tr>
<td>DO2 (mL/min per kg BW)</td>
<td>30.3 ± 1.5</td>
<td>29.3 ± 2.0</td>
<td>30.5 ± 1.6</td>
<td>19.9 ± 2.0b</td>
<td>29.6 ± 1.1</td>
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<tr>
<td>VO2 (mL/min per kg BW)</td>
<td>5.0 ± 0.4</td>
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<td>T (°C)</td>
<td>38.2 ± 0.2</td>
<td>38.1 ± 0.1</td>
<td>38.2 ± 0.1</td>
<td>38.1 ± 0.2</td>
<td>38.2 ± 0.2</td>
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<tr>
<td>PCV (%)</td>
<td>41 ± 1</td>
<td>41 ± 0.8</td>
<td>40 ± 1</td>
<td>43 ± 1.5</td>
<td>41 ± 0.5</td>
<td>43 ± 2</td>
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</table>

a Significant difference from baseline.
b Significant difference with respect to the LID group (P < 0.05).

The effects of medetomidine and DEX on CO are dose-related (7,10,11,17,21). In isoflurane-anesthetized dogs, medetomidine, which is considered half as potent as DEX for its sedative and cardiorespiratory effects (34,35), caused a decrease in CO of 15%, 22%, 27%, 44%, 48%, and 61% with IV loading doses of 0.2, 0.5, 1.0, 1.7, 4, and 12 µg/kg BW, followed by equal corresponding CRIs (µg/kg BW per hour), respectively (7). Similarly, in isoflurane-anesthetized dogs, DEX caused a decrease in CO of 19%, 30%, and 58% with IV loading doses of 0.5, 1.2, and 3 µg/kg BW, followed by equal corresponding CRIs (µg/kg BW per hour), respectively (10,17). In our study, the approximately 40% decrease in CO from administering an IV dose of 2 µg/kg BW and CRI of 2 µg/kg BW per hour of DEX in sevoflurane-anesthetized dogs is also in agreement with those studies.

Heart rate is also affected in a dose-dependent manner by medetomidine and DEX in isoflurane-anesthetized dogs. In general, lower loading doses followed by equal corresponding CRIs (µg/kg BW per hour) of medetomidine (< 1.7 µg/kg BW) decreased HR to a maximum 36%, whereas higher doses (> 4 µg/kg BW) and equal corresponding CRIs (µg/kg BW per hour) decreased HR by up to 45% (7). For DEX, lower doses (< 1.2 µg/kg BW) followed by equal corresponding CRIs (µg/kg BW per hour) decreased HR to a maximum 33%, whereas doses of 3 µg/kg BW and equal corresponding CRIs (µg/kg BW per hour) decreased HR by up to 62% (2,10,17).

In our study, HR decreased by 39% in the DEX group, using a loading dose of medetomidine 2 g/kg BW per hour of medetomidine.
explain the attenuated vasoconstrictor response of the pulmonary circulation (41). Despite the observed cardiovascular effects of alpha-2 agonists, their use has become more popular in healthy patients undergoing surgery due to their potent analgesic and sedative effects. However, the cardiovascular effects of alpha-2 agonists have not been thoroughly evaluated in dogs undergoing surgical stimulation, so it is not known if the changes and their magnitude, as determined in this and other studies, are consistent in patients in whom sympathetic activity from nociceptive input is more likely to occur. One study demonstrated MAP to be stable and within acceptable limits (99 mmHg) with HR of 49 to 68 beats/min in dogs undergoing soft tissue or orthopedic surgery under isoflurane anesthesia, while receiving a CRI of 1, 2, or 3 μg/kg BW per hour of DEX after IV pre-medication with 5 μg/kg BW (5). In another study in dogs undergoing ovariohysterectomy, medetomidine (1 μg/kg BW and a CRI of 1 μg/kg BW per hour) was administered after induction and before start of surgery and decreased HR immediately afterward, but increased steadily to baseline throughout surgery, whereas CI did not change from baseline and during surgical stimulation, and SAP remained stable from baseline and only increased significantly during removal of the ovaries (9).

A decrease in CO has a direct effect on oxygen delivery (DO2), since the latter is the product of the CO and CaO2. Consequently, O2ER is also affected since it is the ratio of VO2 and DO2. Decreases in DO2 and increases in O2ER were shown in this and other studies when dexmedetomidine is used (10,17); however, if blood lactate concentrations remain unchanged despite a decrease in DO2 and an increase in O2ER, it should indicate that tissues can maintain aerobic metabolism, reflecting that CO is still adequate under these conditions. We did not detect changes in lactate concentrations, despite a decrease in DO2 and an increase in O2ER. Similarly, lactate levels remained unchanged in dogs undergoing surgery while receiving a CRI of DEX or medetomidine (5,9). Despite affecting CO, the reduction in blood flow caused by DEX has been shown in dogs to preferentially affect the skin and spleen, whereas blood flow to heart, brain, liver, intestine, and kidneys remains well preserved and above levels that induce underperfusion, which was also supported by unchanged lactate concentrations (14).

In conclusion, the administration of DEX or the combination of LID-DEX produces significant hemodynamic changes resulting in decreased CO, HR, and increased SVR pressure and PAOP in dogs anesthetized with sevoflurane; however, such changes were not associated with compromised tissue perfusion in research healthy dogs.

Acknowledgment

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References


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— NDLR
Comparison of an online learning module to hands-on training in teaching a cautery disbudding technique for dairy calves including cornual nerve block application

Charlotte B. Winder, Stephen J. LeBlanc, Derek B. Haley, Kerry D. Lissemore, M. Ann Godkin, Todd F. Duffield

Abstract — Disbudding and dehorning are common and necessary practices on Canadian dairy farms, as having horned dairy cattle increases risk of injury to humans and cattle (1). Disbudding refers to the removal of the horn buds prior to this time. Although polled sires are available for most dairy breeds, the overall use of such genetics is low (4) and reflects the recent introduction and availability of this trait in commercial sires. All disbudding or dehorning procedures are painful when done without analgesia (1,5). Three-quarters of Ontario dairy producers report performing these procedures themselves, or destruction of the horn buds prior to this time. Although polled sires are available for most dairy breeds, the overall use of such genetics is low (4) and reflects the recent introduction and availability of this trait in commercial sires. All disbudding or dehorning procedures are painful when done without analgesia (1,5). Three-quarters of Ontario dairy producers report performing these procedures themselves,
while the remainder employ a veterinarian or veterinary technician to disbud or dehorn (4). Frequency of use of pain control for these procedures by North American dairy producers ranges from 15% to 40% (6–8), although more recent work in Ontario reported a higher rate of local anesthetic (62%) and non-steroidal anti-inflammatory drug (NSAID) (24%) use (4). Painful procedures have been identified by dairy industry stakeholders as key welfare issues (9). Beyond the individual animal, these procedures have impact at the industry level, as consumers often emphasize “freedom from pain” as important (10). The veterinary profession has a moral obligation to promote animal welfare (11), and encouraging best practices for pain management on-farm should be an important role of the food animal veterinarian.

Cautery disbudding is the most commonly used method for dairy calves in North America, employed on 67% to 88% of farms (7,8). Best practices for pain control involve administering both local anesthetic, commonly given as a cornual nerve block, and an NSAID (2,3,12). A mandatory program (proAction) which will be implemented by the Dairy Farmers of Canada in 2017, has animal care requirements that include use of pain control for dehorning (13).

While administration of an NSAID is uncomplicated, the use of a cornual nerve block requires training in technique in order to be successful. Typically, dairy producers learn this skill one-on-one with their veterinarian. Other training methods include published factsheets (14) and online training videos. A search of “dehorn calf” on “YouTube” showed dozens of short videos demonstrating a variety of methods and techniques. To the authors’ knowledge, no training videos for disbudding or dehorning technique or pain control application have been studied for efficacy. These alternative methods of distributing information may provide additional resources for producers trained by the traditional, one-on-one method, or may be used as the sole resource for a producer who is unable or unwilling to acquire training through a veterinarian.

Training in providing appropriate pain control for disbudding or dehorning is also included in the curriculum for veterinary medicine students. At the Ontario Veterinary College (OVC), practical training is provided in the final year for students in both the Food Animal and the Rural Community Practice streams. Dairy producers cite their herd veterinarian as being influential in their disbudding or dehorning practices (4); therefore, it is essential that veterinary students be comfortable not only in conducting these procedures themselves, but also are skilled in providing training to their clients when appropriate.

With this in mind, the objective of our trial was to determine if an online training module is as effective as hands-on, small group learning, for teaching naïve participants (veterinary students) to successfully perform a cornual nerve block and disbud a dairy calf less than 8 wk of age with a small-diameter thermal disbudding iron (Portasol; Elmira, Oregon, USA). Our hypothesis was that online learning would be less effective than hands-on training, resulting in poorer technique, slower time to perform the procedure, and lower confidence in the students’ ability to perform the procedure.

Materials and methods
Experimental methods were approved by the University of Guelph Research Ethics Boards’ Certification of Ethical Acceptability of Research Involving Human Participants (REB#14SE037) and the University of Guelph Animal Care Services (AUP#3403). Calves in the study were housed on commercial farms as well as the university’s research farm. The study took place between June and August of 2015.

Sample size
Our goal was to have at least 16 participants per group, based on an estimation of 90% success (10% rescues) in the hands-on group, compared to 50% success (50% rescues) in the online group, with a standard deviation of 20%. This calculation assumed 95% confidence and 80% power. The anticipated success rate of the hands-on group was based on our group’s experience with this type of training in year 4 of the DVM curriculum, whereas the anticipated success of the online group was difficult to estimate as there is no previous research in this area. We felt 50% success was generous for a psycho-motor skill being taught entirely online, with no practice opportunities.

Participation and study flow
Invitations to participate were sent to Year 1 and 2 students enrolled in the DVM program at the OVC, as well as summer students working at the OVC. Thirty-four students volunteered to participate in the trial. Participants were required to have had no experience watching or performing a cornual nerve block. Twenty-one students were enrolled in the DVM program; the remainder were enrolled in other undergraduate or graduate programs at the University of Guelph.

Volunteers were allocated to 1 of 2 treatments: online (n = 20) or hands-on training (n = 14). Students contacted us by e-mail if they wished to participate; the first to contact us was randomly assigned to either hands-on or online training, with the second volunteer assigned to the other group, and so forth. Due to scheduling conflicts with the dates of the hands-on training sessions, 3 participants were unable to attend their assigned date, and then were kept in the trial but assigned to the online group. Hands-on training was done in small groups of 2 to 4 participants by a Registered Veterinary Technician (RVT) employed with the Ruminant Field Service at the OVC, experienced in providing similar teaching in Year 4 of the DVM curriculum. Training followed a standardized protocol (available on request from the corresponding author), whereby the RVT introduced the topic and demonstrated both the cornual nerve block and disbudding technique on 1 calf (2 horn buds). Participants were then given a single horn bud each on which to practice, with as much help from the RVT as required.

Online training participants were given access to an online training module developed to mirror the training protocol for the hands-on group. The training module included short videos with audio explanations, pictures, and an optional quiz. Participants were able to view the online module as many times as they wished before the evaluation day. The module can be

Evaluations occurred on 8 d, separate from training days, with between 2 and 6 students evaluated per day. Evaluations were held on both commercial farms (7 participants: 3 online, 4 hands-on) and the university farm (27 participants: 16 online, 11 hands-on). At least 1 participant from each treatment was present at each evaluation. One evaluator completed all assessments, and was blinded to the participants’ treatment group allocation. Each participant was evaluated separately, out of sight and hearing of others. The evaluation was split into 4 sections: background knowledge, handling and restraint, nerve block application, and disbudding. Background knowledge was assessed by a written quiz, which asked participants to identify the correct drug, volume, appropriate needle length and gauge, and appropriate injection site. Evaluations of calf handling, block application, and disbudding used rubric scoring (available on request from the corresponding author). Handling and restraint score was based on correct application of the halter, choice of location to tie the calf, securing the calf’s head tightly enough, and security of the quick-release knot. Cornual nerve block technique score was based on correct location and the number of needle insertions. Disbudding technique score was based on correct location and correct duration of application of the disbudding iron on the skin. Time taken for blocking and disbudding was also recorded, and this was done without the participants’ knowledge. Participants were asked to rate their self-confidence in their ability to successfully block and disbudd a calf on a scale of 1 (very unconfident) to 5 (very confident), both before and after the evaluation.

A calf was considered to be inadequately blocked, and the participant was immediately stopped (rescued), if the calf elicited any of the following behaviors during the first 5 s of the application of the dehorning iron: head shake, ear flick, foot stamp, vocalize, rear, fall, kick, or tail flick. These have been validated as behavioral indicators of disbudding and dehorning pain (15–18) and were considered to indicate an inadequate local nerve block. Exceptions were made if it was clear the calf was avoiding flies. Rescued calves were then re-blocked by the RVT and the evaluation was continued. Rescues were also performed if any of the handling, restraint, or block techniques were considered to be unsafe for the calf or participant by the evaluator. Based on requirements from the Research Ethics Board, participants were also informed of their right to stop their participation in the study at any time if they wished. Participants who declined to complete the evaluation were also considered to have been unsuccessful in block administration (rescued).

### Statistical analysis

All analysis was done using STATA13 (StataCorp, 2013. College Station, Texas, USA). Descriptive statistics were reviewed, and univariable association with treatment group was conducted on all potential explanatory variables.

Kaplan-Meier survivor function graphs were used to view differences in time to task completion (nerve block application, disbudding iron application, and total time) between online and hands-on trained groups. Univariable Cox-proportional hazard models were run for time to nerve block completion, time to disbudding completion, and total time. The proportional hazard assumption was assessed by the Kaplan-Meier graphs, a non-significant test of non-zero slope, and by plotting Schoenfeld residuals over log of time.

As rubric scores (written quiz, handling, block technique, disbudding technique) and self-confidence scores were ordinal, association with treatment group was assessed using ordered logistic regression. A non-significant Hosmer-Lemeshow goodness of fit test was used to assess model fit.

Association between training group and an unsuccessful nerve block (rescue) was assessed using Fisher’s exact test as only 4 rescues were performed, all having come from the online trained group. Univariable exact logistic regression was used to examine the association between rescues and rubric scores (handling and block technique) to explore how well rubric scores compared

### Table 1. Mean rubric scores, time taken to completion of cornual nerve block and disbudding, and mean self-confidence scores (1 to 5; 1 = very unconfident, 5 = very confident) for participants trained by online tutorial compared to those with hands-on training.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Online training</th>
<th>Hands-on training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean score</td>
<td>95% Confidence interval</td>
</tr>
<tr>
<td>Theory and technique</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Written score</td>
<td>4.8</td>
<td>4.7, 5.0</td>
</tr>
<tr>
<td>Handling score</td>
<td>3.1</td>
<td>2.7, 3.5</td>
</tr>
<tr>
<td>Block score</td>
<td>2.3</td>
<td>1.7, 2.6</td>
</tr>
<tr>
<td>Disbudding score</td>
<td>2.7</td>
<td>2.4, 2.8</td>
</tr>
<tr>
<td>Time taken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Block time</td>
<td>68</td>
<td>57, 77</td>
</tr>
<tr>
<td>Disbudding time</td>
<td>69</td>
<td>50, 88</td>
</tr>
<tr>
<td>Total time</td>
<td>126</td>
<td>100, 153</td>
</tr>
<tr>
<td>Self-confidence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-evaluation</td>
<td>3.2</td>
<td>2.9, 3.3</td>
</tr>
<tr>
<td>Post-evaluation</td>
<td>4.3</td>
<td>3.8, 4.5</td>
</tr>
<tr>
<td>Change in score</td>
<td>1.1</td>
<td>0.8, 1.4</td>
</tr>
</tbody>
</table>

### Table 2. Univariable associations of rubric scores, time to completion, and self-confidence scores (1 to 5; 1 = very unconfident, 5 = very confident) with online training (hands-on training as the referent group).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds ratioa or Hazard ratiob</th>
<th>P-value</th>
<th>95% Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory and technique</td>
<td>4.7</td>
<td>0.06</td>
<td>0.9, 23.6</td>
</tr>
<tr>
<td>Written score</td>
<td>0.2</td>
<td>0.02</td>
<td>0.03, 0.7</td>
</tr>
<tr>
<td>Block score</td>
<td>0.1</td>
<td>0.05</td>
<td>0.01, 1.0</td>
</tr>
<tr>
<td>Disbudding</td>
<td>0.1</td>
<td>0.05</td>
<td>0.01, 1.0</td>
</tr>
<tr>
<td>Time to completion</td>
<td>0.5</td>
<td>0.04</td>
<td>0.2, 1.0</td>
</tr>
<tr>
<td>Block application</td>
<td>0.3</td>
<td>0.05</td>
<td>0.2, 0.7</td>
</tr>
<tr>
<td>Disbudding</td>
<td>0.4</td>
<td>&lt; 0.01</td>
<td>0.2, 0.8</td>
</tr>
<tr>
<td>Total</td>
<td>0.1</td>
<td>&lt; 0.01</td>
<td>0.01, 0.4</td>
</tr>
<tr>
<td>Pre-evaluation</td>
<td>0.6</td>
<td>0.48</td>
<td>0.2, 2.4</td>
</tr>
<tr>
<td>Post-evaluation</td>
<td>4.4</td>
<td>0.04</td>
<td>1.0, 18.7</td>
</tr>
</tbody>
</table>

a Odds ratio.
b Hazard ratio.
to a less subjective outcome (rescue). The more conservative (1-sided \( P \)-value) \( P \)-values for these models are reported. A non-significant Hosmer-Lemeshow test was used to assess the fit of the model.

**Results**

**Descriptive statistics**

Four participants were unsuccessful in providing an adequate nerve block (rescued); 2 participants declined to complete the cornual nerve block application, and 2 calves were rescued during disbudding iron application (separate from the participants who declined to complete the block). All 4 rescues were from the online treatment group.

Descriptive statistics by treatment group are outlined in Table 1. While written scores were higher for those in the online group (4.8 ± 0.1) compared with the hands-on group (4.4 ± 0.2), those in the online group had lower scores for handling (3.1 ± 0.2, online; 3.7 ± 0.2, hands-on), block technique (2.3 ± 0.2, online; 2.5 ± 0.2, hands-on), and disbudding technique (2.7 ± 0.1, online; 2.9 ± 0.1, hands-on). Online learners also took longer to perform all tasks. Application of the cornual nerve block took a mean of 68 s (± 5 s) for the online group compared with 51 s (± 5 s) for those trained hands-on. Disbudding iron application took a mean of 69 s (± 10 s) for online learners compared with 36 s (± 6 s) for participants trained hands-on. Consequently, total time was longer for online learners (126 ± 13 s) compared with hands-on (87 ± 10 s). Confidence scores for those trained online were 3.2 ± 0.1 before evaluation, and rose to 4.3 ± 0.1 after evaluation. Hands-on trained participants had a mean confidence score of 3.8 ± 0.1 before evaluation; after evaluation this rose to 4.4 ± 0.2.

**Validation of rubric scoring**

Rubric scores were negatively associated with having been in the rescue group. For a 1-point increase in rubric score, odds of requiring a rescue were significantly lower for block technique score (OR: 0.3; 95% CI: 0.03, 0.99; \( P = 0.04 \)) and also tended to be lower for handling score (OR: 0.3; 95% CI: 0.1, 1.2; \( P = 0.08 \)). Block technique rubric score was therefore considered to be a valid measure of block efficacy.

**Online versus hands-on training groups**

An increase in written score by 1 point tended to be associated with an increased probability of being in the online group (Table 2, OR: 4.7; \( P = 0.06 \); 95% CI: 0.9 to 23.6), while a similar increase in all other technical scores was significantly associated with decreased odds of having been trained online. An increase in handling score by 1 point was 5 times as likely to have been associated with training in the hands-on group, while a similar increase in block and disbudding technical scores was associated with 10 times the odds of having been trained in the hands-on group (Table 2).

A significant hazard ratio below 1 for the online group was seen for time to completion for all tasks (Table 2). The risk of a participant finishing in a given time was significantly less likely if they were trained online. Those trained in the hands-on group were twice as likely to finish in a given time for cornual nerve block application, and over 3 times as likely to finish in a given time for disbudding iron application (Table 2). The differences in time to completion for cornual nerve block application and disbudding iron application are illustrated by the Kaplan-Meier survival function graphs in Figures 1 and 2.

A higher pre-evaluation confidence score was significantly less likely to have come from an online trained participant; a 1-point increase in score was associated with 10 times the odds of having come from a participant trained in the hands-on group (Table 2). However, post-evaluation confidence scores did not differ between groups; this is explained by a 1-point increase in change in confidence score to be significantly associated with increased odds of having been in the online group (OR: 4.4; \( P = 0.04 \); 95% CI: 1.0, 18.7) (Table 2).

**Discussion**

While participants in this trial were veterinary students, we hypothesize results to be no worse when extrapolated to dairy producers. Our early year DVM students were likely much less
familiar with both cattle handling as well as injection technique, compared to dairy producers or staff on dairy farms. We would therefore expect motivated dairy producers’ success rates after either form of training to be higher than that of our naïve participants.

Differences in performance were seen between the 2 groups, despite the hands-on group having only practiced their technique on a single horn bud. The only exception to the advantage of the hands-on group was the tendency of the online group to perform better in the written quiz. Although all information from the online module was presented to the hands-on participants, online learners could go over this information at their own pace, and could review it as many times as they chose to. This may have helped the online group to solidify their background knowledge.

Although rubric scoring was developed to improve consistency in scoring among participants, it is still somewhat arbitrary in design. We found a significant association between likelihood of failure of the cornual nerve block and a lowered cornual nerve block technical score, which supports the use of our rubric scoring system as a valid measure of success. That said, an effect of evaluation itself may have affected participants’ behavior (Hawthorne effect); we were required by our Research Ethics Board to inform participants that we would intervene during the trial if there was a danger of injury to either themselves or the calf. Consequently, a lack of our intervention may have made apprehensive participants more confident that, if nothing else, they were not going to harm the calf. It is possible this effect was not equal between treatment groups.

While there was no significant difference \( (P = 0.13) \) between the online and hands-on groups with respect to unsuccessful cornual nerve blocks, the number of failures in the online group probably indicates an important difference which should be confirmed in a larger trial with the power to detect this difference. However, the success rate for the online-trained group (75%) was still high, especially considering that this was the first cornual nerve block the participants had ever performed. Differences in self-confidence prior to evaluation were seen between the 2 groups, with online learners rating their confidence significantly lower. This lack of self-confidence is postulated to be a result of the lack of skill, but the opposite might also be true. That is, online learners’ skill level may not differ from hands-on trainees, but a lack of confidence may result in a timid approach resulting in poorer evaluation scores. Online learners had a tendency to increase their confidence score after evaluation, resulting in post-evaluation scores that did not differ between groups. This highlights the importance of the hands-on nature of the evaluation for the online group, but also indicates that the disadvantage of being trained online was not insurmountable; even practicing on a single horn bud was enough to substantially increase their confidence level. Online participants may take less time and be more proficient at the technique with increasing practice attempts. In reality, producers would likely have multiple calves to disbud at one time, and it is likely that their success after online training would improve after practicing on multiple calves. As evidence of block success or failure is fairly obvious, producers will also receive almost immediate feedback, and can use this to further refine technique or choose to seek additional help if not consistently successful.

Most dehorning or disbudding conducted on-farm is by casualty (7,8), which requires application of a cornual nerve block, in addition to NSAID administration, to provide adequate pain control (16,18,19). While local anesthetic is inexpensive, lack of familiarity with technique is likely an important barrier preventing more dairy producers from adopting use of this medication. Readers are also reminded that the dispensing of these medications for use by producers requires a valid veterinarian-client-patient relationship (VPCR); however, it should also be noted that all dairy farms in Canada are required to have an ongoing relationship with a licensed veterinarian, with a valid VPCR and written prescriptions for any off-label drug use (13).

This trial showed hands-on training to be a highly effective method of teaching cornual nerve block and cautery disbudding technique, even when done with very limited practice opportunities and naïve participants. Online learning may be suitable as an adjunct to hands-on training, or as a resource to refresh the skills of those who may not perform this task routinely. While online training is not recommended as a sole method of instruction, in the absence of available hands-on training it may be a suitable alternative method.

Acknowledgments

The authors thank Sarah Ferguson, Rachel Skippen (RVT), and the study participants for their valuable contributions to this work.

References


Book Review
Compte rendu de livre

Reptiles and Amphibians, 2nd edition

This self-assessment color review book is an update to the popular 1st edition that was published in 1995. The author, Dr. Frederic Frye, is widely considered to be one of the grandfathers of herpetological medicine. The 2nd edition contains 232 short clinical cases of varying difficulty for the reader to work through featuring a combination of color photos, radiographs, photomicrographs, laboratory data, and questions. A detailed explanation to the questions are found on the following page. Thirty-two clinicians, in addition to Dr. Frye, contributed to the cases found within the book.

The book is purposefully laid out such that the cases appear in random order instead of being grouped by species, diseases, or organ system. This emulates the randomness of cases as they may appear on a day-to-day basis in clinical practice. However, for those hoping to use the text as a quick reference guide, there is a table of contents that broadly classifies the cases based on anatomy, disorders, or common conditions. In addition, the Appendix lists both the common name and the scientific name of the species found within the book, and the index is cross-referenced by case number allowing the reader to quickly review a disease or condition.

In general, the cases represent an excellent diversity of diseases, conditions, and species that would be encountered in pets seen in exotic animal practice, or in species found in small zoos or in a research setting. While there has been an update to amphibian diseases of significant importance such as *Batrachochytrium dendrobatidis* or *B. salamandrivorans*, there is a lack of updates on clinical cases and explanations of a few diseases such as Inclusion Body Disease of Boids (*Arenavirus*), ranaviral infections in turtles, or herpesviral or adenoviral infections in lizards. However, this book is intended to be a complement, and not a stand-alone text, to the ever-growing body of medical literature on reptiles and amphibians, and as such it serves its purpose well. Most of the photographs and radiographs are of excellent quality; however, some of older photographs are dark and small, making it more difficult for the reader to sometimes identify a lesion. If a digital version of this book is available, then the ability to expand an image on a screen with good resolution would help with this problem.

This Self-Assessment Color Review of reptiles and amphibians will appeal to a wide audience from experienced veterinarians and herpetologists, to veterinary residents and interns during their formal training, to veterinary students and amateur herpetologists. Even experienced readers will be challenged to think broadly about disease processes and conditions, instead of jumping to a quick conclusion based on pattern recognition.

Reviewed by Douglas Whiteside, DVM, DVSc, DACZM, DECZM (ZHМ), Senior Staff Veterinarian, Calgary Zoo, Calgary, Alberta.
Purina Launches Neurologic Breakthrough in Canine Nutrition

Thousands of dogs with idiopathic epilepsy may soon benefit from Purina’s introduction of the first and only therapeutic diet indicated to help nutritionally manage dogs with this condition as an adjunct to veterinary therapy.

Purina® Pro Plan® Veterinary Diets NC NeuroCare™ is formulated with medium chain triglyceride (MCT) oil to help nutritionally manage dogs with epilepsy that are also being administered anti-epilepsy drugs (AEDs). The diet is enhanced with a unique blend of nutrients — eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), antioxidants and B vitamins, as well as MCT oil — to help nutritionally manage dogs with cognitive dysfunction syndrome (CDS).

Idiopathic epilepsy is the most commonly diagnosed neurological disorder in dogs.1 Unfortunately, the reality for many affected dogs — and owners — is living with debilitating, uncontrolled seizures and/or unpleasant medication side effects.

“More than two-thirds of dogs with epilepsy continue to have seizures long-term, despite treatment,”2 and 20–30 percent of affected dogs remain poorly controlled.3,4,5 The inspiration for the development of NeuroCare.

Glucose serves as the primary fuel for the brain; however, brain glucose metabolism is compromised in patients with epilepsy, creating a need for an alternate source of brain energy. According to Dr. Gagné, adding ketones as an energy source for the brain is an approach that has been used for decades in children with epilepsy;6 according to Dr. Gagné, adding ketones as an energy source for the brain is an approach that has been used for decades in children with epilepsy;7 however, the human “ketogenic” diet, which is high in fat and low in protein and carbohydrates, has yet to be shown to significantly improve seizures in dogs as it does in humans.7

Fortunately, dogs can readily metabolize medium chain triglycerides (MCTs) to produce ketones.8 Experts also believe that dietary MCTs may have direct antiseizure effects via blocking the Alpha-Amino-3-Hydroxy-5-Methyl-4isoxazolepropionic Acid (AMPA) receptors in the brain.9

A six-month randomized placebo-controlled, double-blinded crossover study conducted in dogs with idiopathic epilepsy at the Royal Veterinary College in London, in partnership with Purina, demonstrated for the first time that a diet with MCT oil can have positive effects on reduction of seizure frequency when fed as an adjunct to veterinary therapy.9 Results included:

• 71% of dogs showed a reduction in seizure frequency
• 48% of dogs showed a 50% or greater reduction in seizure frequency
• 14% of dogs achieved complete seizure freedom

Based on this information, Purina developed its NeuroCare diet, formulating it with MCT oil. Dr. Gagné notes that NeuroCare is formulated with lower amounts of fat and higher proportions of protein and carbohydrates than the traditional human ketogenic diet. “This provides for a complete and balanced diet — which is important, given that epileptic dogs need to be on this specialized diet for the remainder of their lives,” he explains.

Along with epilepsy, compromised brain glucose metabolism is a significant factor in brain aging and cognitive dysfunction syndrome (CDS), a condition similar to Alzheimer’s Disease in humans.10 Canine CDS is believed to be significantly underdiagnosed; while an estimated 14 percent of dogs aged eight and older are affected, only 1.9 percent are diagnosed.11 Key to the diagnosis is use of the “DISHAA” questionnaire that identifies signs of disorientation, altered interactions, disturbances in sleep-wake cycles, house soiling, altered activity and anxiety.

In a randomized, double-blinded, 90-day study conducted by CanCog Veterinary Research, in which dogs diagnosed with CDS were fed a test diet containing 6.5% MCT oil and a unique blend of nutrients, dogs improved significantly across all DISHAA categories. This study, along with the RVC epilepsy study, provided the inspiration for the development of NeuroCare.

“Understanding brain chemistry and its role in the development of debilitating conditions such as epilepsy and CDS is leading to important developments in therapeutic nutrition,” states Dr. Gagné. “It is our hope that NeuroCare can help thousands of dogs live significantly better lives.”

References

1. 2016 Veterinary Landscape Dashboard.

Contact: Nestle Purina, 2500 Royal Windsor Drive, Mississauga, ON L5J 1K8; website: http://www.purinaveterinarydiets.com/default.aspx
**Abstract** — Five healthy beagle dogs anesthetized with isoflurane were administered medetomidine (α-2 adrenoceptor agonist) by the epidural route. Mean arterial pressure (MAP) and end-tidal concentration of isoflurane (ISO) were measured 1, 2.5, and 4 h after administration. Epidural administration of medetomidine reduced the isoflurane dose required to prevent changes in vital parameters following mechanical stimulation and maintained the MAP at a higher level compared to the control.

**Résumé** — Efficacité de la médétomidine pour l’analgésie épidurale : effets sur le besoin d’isoflurane et la tension artérielle systémique moyenne chez les chiens. De la médétomidine a été administrée à cinq chiens Beagle en santé anesthésiés à l’aide de l’isoflurane (agoniste adrénocepteur α-2) par voie épidurale. La tension artérielle moyenne (TAM) et la concentration de fin dexpiration de l’isoflurane (ISO) ont été mesurées 1 heure, 2,5 heures et 4 heures après l’administration. L’administration de médétomidine par épidurale a réduit la dose d’isoflurane requise pour prévenir des changements aux paramètres vitaux après la stimulation mécanique et a maintenu la TAM à un niveau supérieur comparativement au groupe témoin. (Traduit par Isabelle Vallières)

**Adequate peri-operative analgesia is essential for early functional recovery from orthopedic surgery and for optimal patient care** (1). Administration of analgesic drugs during surgery reduces the volatile anesthetic requirement and thus prevents severe hypotension, which can lead to peri-operative complications (2).

In veterinary medicine, α-2 adrenoceptor agonists are widely used to provide dose-dependent sedation, analgesia, and muscle relaxation (3). Medetomidine, which is classified as an α-2 adrenoceptor agonist, is administered as anesthetic premedication or for rescue analgesia and is given intramuscularly or intravenously, particularly in small animals (3). However, medetomidine causes initial peripheral vascular constriction and reflex bradycardia, followed by vasodilation, due to stimulation of the α-2 adrenoceptors in the central nervous system. Administration of α-2 adrenoceptor agonists can therefore lead to a reduction in cardiac output or hypotension, even at clinically utilized doses (3).

Epidural administration of agents with analgesic properties provides effective anesthesia and analgesia for procedures involving the pelvis, pelvic limbs, tail, perineum, abdomen and thorax (4). Although local anesthetics and opioids are the commonly administered agents in veterinary medicine, the primary mediators of spinal analgesia may also derive from endogenous norepinephrine at α-2 adrenoceptor subtypes A and B (5). Therefore, α-2 adrenoceptor agonists are considered effective analgesic agents. This has been demonstrated in 2 previous studies in which administration of medetomidine at 10 and 15 μg/kg body weight (BW) in cats and dogs, respectively (6,7), produced an analgesic effect. This was tested in an awakened condition by the electrical stimulation method. In addition, a volatile anesthetic-sparing effect after injection of dexmedetomidine at 0.5 to 6.0 μg/kg BW in dogs was also observed in another study (8). In contrast, a study researching the synergistic effect with an opioid, medetomidine, 5 μg/kg BW, injected by the epidural route in dogs found that this did not provide sufficient analgesia or reduce the inhalant anesthesia requirement (9).

The minimum alveolar concentration (MAC)-blunting adrenergic response (BAR) is the MAC that prevents an autonomic response to a noxious stimulus. The MAC-BAR is usually higher than the MAC and it provides information to achieve an adequate level of surgical anesthesia that prevents autonomic adrenergic responses and movements in animals (10).

This study aimed to evaluate the isoflurane-reducing effect of epidural medetomidine following mechanical stimulation in anesthetized dogs. We hypothesized that epidural injection of medetomidine produces volatile anesthesia-sparing effects and subsequently results in maintenance of a high systemic blood pressure.

The study was approved by the Institutional Animal Care and Use Committee of Azabu University (protocol 140805-1). Five
intact male beagle dogs aged 78 to 82 mo [mean ± standard deviation (SD), 80.4 ± 1.1 mo] and weighing 9.5 to 12.8 kg (10.9 ± 1.4 kg) were used. Before experimentation, all dogs were subjected to blood tests [complete blood (cell) count (CBC), biochemical analysis, and electrolyte determination], thoracic and abdominal radiography, and general physical examination. All dogs were confirmed to be in good to excellent health. Food and water were withheld from the dogs for 12 h prior to experimentation.

The dogs were pre-medicated with atropine sulfate (Atropine sulfate injection 0.5 mg; Mitsubishi Tanabe Pharma, Osaka, Japan, 0.025 mg/kg BW, SQ. Subsequently, anesthesia was induced with isoflurane (Isoflurane for Animals; Intervet K.K., Tokyo, Japan) in 100% oxygen delivered via a mask. Anesthesia was maintained with isoflurane using a non-rebreathing anesthetic circuit, Bain coaxial system (Compos β Metran, Saitama, Japan). Dogs were orotracheally intubated with an endotracheal tube and mean systemic arterial pressure (MAP; mmHg) was measured using oscillometry with the cuff positioned on the proximal tail. The blood pressure cuff represented 40% to 60% of the proximal tail’s circumference, the end-tidal concentration of isoflurane (ISO; %) was measured from the distal endotracheal tube, and the heart rate [HR; beats per minute (bpm)] was measured via electrocardiogram lead II.

To ensure standardized conditions, hemoglobin saturation estimated non-invasively with a pulse oximeter (SpO₂) was maintained between 95% and 100%, an esophageal temperature probe introduced orally monitored temperature at 36.0°C to 37.0°C, and end-tidal partial pressure of carbon dioxide with mechanical ventilation was maintained between 35 and 45 mmHg. These parameters were monitored using a multi-parameter monitoring system (AM130 FUKUDA M&E, Tokyo, Japan). Complete calibration using gas was performed at the start of the study and confirmed the range of error within 0.1% of the isoflurane concentration. In addition, before each experiment, it was confirmed that the baseline and 2.5% vaporizer setup displayed on the monitor were 0.0% to 0.1% and 2.3% to 2.7%, respectively, without being connected to the dogs.

All dogs were administered lactated Ringer’s solution (Solulact; Terumo, Tokyo, Japan) at a rate of 3 mL/kg BW per hour, IV, through a 22-gauge catheter (Surflo; Terumo) positioned in the cephalic vein.
After confirmation of anesthetic stability, which included waiting for a period of 15 min during which there was no response to deep pain stimulation, the epidural injection was administered between the 7th lumbar and 1st sacral vertebrae with the dog in sternal recumbency. Correct spinal needle (Terumo Spinal Needle; Terumo) placement in the epidural space was confirmed by both the hanging drop and loss of resistance methods. Dogs then received medetomidine (Domitor; Nippon Zenyaku Kogyo, Koriyama, Japan), 10 µg/kg BW or 20 µg/kg BW (diluted with 0.2 mL/kg BW sterile saline for the M10 and M20 groups, respectively), or sterile saline (0.2 mL/kg BW for the S group) as a control group, all administered by the epidural route. Lameness was estimated at the end of each experimental procedure. If lameness was observed, carprofen (Rimadyl Injectable; Zoetis Japan, Tokyo, Japan), 4.4 mg/kg BW, q24h, and buprenorphine (Lepetan injection; Otsuka Pharmaceutical, Tokyo, Japan), 0.02 mg/kg BW, q8h, were administered subcutaneously until lameness disappeared. The dogs were re-anesthetized according to the 3 different protocols with a washout period exceeding 7 d.

All mechanical stimulation procedures were performed with the dog placed in the right lateral recumbency position. The ISO was determined by applying mechanical stimulation involving the clamping of the 3rd metatarsal bone of the left limb to estimate deep pain using bone forceps at 1, 2.5, and 4 h after administration. The stimulated site was shaved pre-examination to minimize the risk of hair-induced artifacts. The degree of clamping was standardized by closing the first ratchet of bone forceps in order to maintain the condition. A positive response to the mechanical stimulus for the determination of ISO was performed as previously described in another study (10). The ISO was determined as the mean of the concentration of isoflurane at which the dog did not demonstrate a positive response and a subsequent lower concentration tested positive. MAP and HR were measured 1 min before application of the mechanical stimulus and were determined as the mean MAP and HR at which the dog did not demonstrate a positive response and a subsequent lower concentration tested positive.

The ISO, MAP, and HR values were reported as mean ± SD. Statistical analyses were performed using a one-way analysis of variance (ANOVA) and post-hoc Tukey Kramer test. P-values < 0.05 were considered statistically significant.

The ISO values for the dogs in the S, M10, and M20 groups were 2.92 ± 0.38%, 2.08 ± 0.60%, and 0.88 ± 0.99% at 1 h; 2.74 ± 0.31%, 1.94 ± 0.73%, and 1.08 ± 0.36% at 2.5 h; and 2.64 ± 0.30%, 1.94 ± 0.75%, and 1.62 ± 0.30% at...
4 h, respectively. Significant differences were observed between the S and M20 groups at 1 h (P < 0.01), between the S and M20 groups (P < 0.01) and M10 and M20 groups (P = 0.048) at 2.5 h, and between the S and M10 groups (P = 0.024), and S and M20 groups (P < 0.01) at 4 h (Figure 1).

The MAP values for the dogs in the S, M10, and M20 groups were 55.4 ± 7.80 mmHg, 80.8 ± 31.80 mmHg, and 113.6 ± 13.92 mmHg at 1 h; 65.0 ± 13.58 mmHg, 75.6 ± 25.74 mmHg, and 95.2 ± 11.78 mmHg at 2.5 h; and 64.8 ± 9.20 mmHg, 78.6 ± 17.54 mmHg, and 79.0 ± 12.41 mmHg at 4 h, respectively. Significant differences were observed between the S and M20 groups (P < 0.01), and between the M10 and M20 groups (P = 0.031) at 1 h, and between the S and M20 groups at 2.5 h (P = 0.012) (Figure 2A).

The heart rates of the dogs in the S, M10, and M20 groups were 122.4 ± 11.59 bpm, 105.4 ± 18.28 bpm, and 83 ± 18.48 bpm at 1 h; 128.0 ± 12.75 bpm, 109.4 ± 15.26 bpm, and 76.6 ± 15.95 bpm at 2.5 h; and 129.0 ± 17.89 bpm, 108 ± 18.33 bpm, and 91.4 ± 17.05 bpm at 4 h, respectively. Significant differences were observed between the S and M20 groups at all time points (P < 0.01 at 1 h and 2.5 h and P = 0.015 at 4 h), and between the M10 and M20 groups at 2.5 h (P = 0.011) (Figure 2B). No dogs received analgesia after the procedure.

In the present study, despite the fact that all 5 dogs had a negative epidural pressure and loss of resistance during injection, only 1 dog had a high ISO (2.5%) at 1 h after administration of medetomidine at 20 μg/kg BW. This ISO value was similar to the ISO requirement with a saline injection (2.7%) and higher than that following administration of medetomidine at 10 μg/kg BW (2.1%). A previous study reported that 12% of 636 dogs undergoing hind-limb orthopedics surgery administered bupivacaine by the epidural route showed persistent signs of pain despite adequate anesthetic procedure (11). It may have also been difficult to accurately identify the spinal needle insert position in the dog with the 2.5% ISO in the present study, and this outlier could explain the insignificant difference between the M10 and M20 groups at 1 h.

Noxious stimulation is classified as electrical, thermal, mechanical, or chemical (12). In the present study, we chose the mechanical stimulation method as a previous study revealed that this method could present similar results to the electrical stimulation used to estimate MAC, and this method is reproducible surgically because it induces deep pain (13).

We adopted MAC-BAR rather than MAC as MAC-BAR is more suited to measuring an adequate level of surgical anesthesia that prevents autonomic adrenergic responses and movements in animals (10). According to a previous report using sevoflurane, the MAC-BAR was 1.3 to 2.1 times higher than the MAC value. With isoflurane, the MAC is approximately 1.3% to 1.4% in mongrel dogs (13). Therefore, the MAC-BAR of isoflurane could be estimated at 1.69% to 2.94%. However, the MAC-BAR of the control group herein was higher than our surmised value. The study reported by Magnusson et al (14) indicated that beagle dogs needed a higher MAC of isoflurane in both young (2 to 3 y; 1.82 ± 0.08%) and old (> 11 y; 1.45 ± 0.06%) than the values reported with mixed breeds (14). When these higher requirements were adopted, the expected ISO would be approximately 1.9% to 3.8%, and this range coincides with our results.

Branson et al (9) found that medetomidine at 5 μg/kg BW administered in the epidural space of dogs did not produce sufficient analgesic effect, as measured by the tail clamp test (9). In contrast, 2 studies reported that medetomidine at 10 μg/kg BW in cats and at 15 μg/kg BW in dogs increased the pain threshold (6,7). Moreover, Campagnol et al (8) found that administration of dexmedetomidine, 1.5 to 6.0 μg/kg BW, had an isoflurane-sparing effect in dogs. Since dexmedetomidine is approximately twice as potent as medetomidine, we could infer that this study examined approximately 3.0 to 12.0 μg/kg BW of medetomidine. Therefore, we assumed that an epidural medetomidine injection exceeding 5 μg/kg BW was required to provide an isoflurane-sparing effect against mechanical stimulation. Moreover, we estimated a higher dosage (> 15 μg/kg BW), which has not been examined previously.

In the present study, epidural administration of medetomidine at 10 or 20 μg/kg BW decreased isoflurane requirements by 29.4% and 67.0% at 1 h, 29.9% and 60.0% at 2.5 h, and 28.8%, and 38.5% at 4.0 h, respectively. These reduction rates may be comparable to that of morphine at 0.1 mg/kg BW (15). In the present study, the group administered medetomidine at 10 μg/kg BW experienced a similar isoflurane-sparing rate as those in a previous study in which dexmedetomidine, 6.0 μg/kg BW, was injected by the epidural route (8). In addition, similar to the previous study, the reduction rate in the present study was dose-dependent. However, high-dose epidural injections of medetomidine, 20 μg/kg BW, have not been reported. These findings may be explained by blockade of the nociceptive pathway at the level of the spinal cord via activation of the α-2 adrenoceptors. Systemic administration of medetomidine also provides analgesia and has a volatile anesthetic-sparing effect. Ewing et al (16) reported that medetomidine at 30 μg/kg BW injected intravenously reduced the isoflurane requirement by 47.2% (16). Therefore, epidural injection of medetomidine may have a greater volatile anesthetic-sparing effect with regard to hind-limb procedures than systemic administration, even at a reduced dosage. In addition, the analgesic effects recorded in the present study persisted over 4 h; this was longer than that reported for medetomidine at 30 μg/kg BW via intramuscular injection (17).

The HR of the dogs in the M20 group was lower than that of the dogs in the S group at all time points, and in dogs in the M10 group at 2.5 h. This may indicate that medetomidine was cleared from the cerebrospinal fluid (CSF) around the spinal injection site and therefore had a similar effect to that of systemic injection. Previous studies that administered medetomidine and dexametomidine by the epidural route showed a similar HR-reducing effect, but reported a lower HR than that in the present study (7,8). This discrepancy in HR rates may be because the present study maintained a higher volatile anesthetic concentration than the previous 2 studies. Vesal et al (7) performed their study in conscious animals, while the method of isoflurane concentration determination in the study by Campagnol et al (8) was different from that herein since they
excluded the changes in HR and MAP as nociception indicators. Therefore, in the present study, a higher concentration of isoflurane was required than that in the study by Campagnol et al (8) and since higher concentrations of inhalant anesthetic result in vasoconstriction, HR may be increased to maintain the MAP via the baroreceptor reflex.

To confirm whether analgesia was due to the epidural effect alone, further studies should include an intramuscular injection group and should measure medetomidine in CSF sampled from the cisterna magna and in blood. A previous study reported that epidural administration of morphine in the lumbosacral space, which reduces the halothane requirement for hind limbs against an electrical stimulus, can also be performed for the forelimbs (both 0.13 and 0.26 mL/kg BW injection groups) due to CSF adsorption and anterior movement (15).

There are several limitations to the present study. First, the number of dogs may have been insufficient to detect significant differences between the M10, M20, and control groups. The main reason why there were not significant differences in the ISO reduction effect between groups S and M10 at 1.0 and 2.5 h may be due to the small sample size, despite the fact that there was an approximately 30% reduction in ISO effects at each time point. Second, we measured MAP using the oscillometric method in order to estimate systemic hemodynamics, although measuring blood pressure using invasive techniques is superior to measurements with a non-invasive technique. However, Koyama et al (18) reported a high correlation between direct and indirect measurements with a non-invasive technique. However, Koyama et al (18) reported a high correlation between direct and indirect measurements with a non-invasive technique.

Medetomidine injection causes a 2-staged blood pressure change; elevation of blood pressure after administration and subsequent hypotension (3). However, in the present study, epidural injection of medetomidine maintained the MAP at a higher level than that in the control group. This may be due to not only systemic absorption of medetomidine but also the reduction of isoflurane (that can cause severe hypotension).

In conclusion, administration of medetomidine by the epidural route has a volatile anesthetic-sparing effect and maintains the MAP at a higher level compared to the control; the effect is potentially dose-dependent.

References

Brief Communication

Canine oral papillomavirus outbreak at a dog daycare facility

Heather E. Lane, J. Scott Weese, Jason W. Stull

Abstract — This report describes an outbreak at a dog daycare facility where 13 of 52 dogs developed suspected canine papillomavirus (CPV) infection. Based on contact tracing, subclinical CPV shedding was speculated. Active surveillance, exclusion of animals with active or recent infection and cohort formation may have been effective in stopping the outbreak.

Résumé — Éclosion du papillomavirus oral canin dans une garderie canine. Ce rapport décrit l’éclosion dans une garderie canine où 13 des 52 chiens ont développé une infection suspectée par le virus du papillome canin (VPC). En se basant sur le retraitage des contacts, on a émis la supposition d’une excrétion subclinique du VPC. Une surveillance active, l’exclusion des animaux avec une infection active ou récente et la formation d’une cohorte ont pu être efficaces pour freiner l’éclosion.

Hospital acquired infections (HAIs) in human healthcare settings are of great health and economic concern (1). Human HAIs have been associated with numerous factors, including weakened immune systems of patients, poor compliance of healthcare staff with procedures such as hand hygiene and high patient-patient interaction (2,3). While traditionally the focus on HAIs is transmission within hospital environments, it is increasingly clear that there can be a strong influence of the community, as patients who are admitted shedding a pathogen (clinically or asymptomatically) can be important sources of infection (4,5). Similar risk factors and transmission dynamics exist in veterinary hospitals and settings such as dog daycares and boarding facilities, in which there may be mixing of animals from different origins. Concentrated populations, admission of animals from diverse backgrounds, direct animal contact, and fomites, among other factors, can create an ideal environment for pathogen transmission (6). Little has been published on pathogen outbreaks and control measures in these animal group settings. However, anecdotal, outbreaks in facilities such as dog daycares are not uncommon and under-reporting is a considerable issue where investigation may be limited or there is reluctance to report problems.

Canine papillomavirus (CPV) is a double-stranded, non-enveloped, DNA virus. Papillomaviruses can be found in various mammalian species, but are highly host-specific with numerous types identified in dogs (7). Infection can be transmitted by direct contact with the papilloma(s) of an infected dog or contact with the virus in the environment. The virus requires microabrasions to access the basal layer of the skin to establish an infection (8). It is not known if dogs need to have visible lesions to be infectious. After an approximately 4-week incubation period (9,10), lesions of varying size and number may become apparent, although subclinical infections are believed to also occur. The most common presentation is the development of oral lesions (papillomatosis) in young dogs, but cutaneous papillomatosis is also possible (9,10).

In most cases, lesions are mild and result in little apparent discomfort or complications, and spontaneous regression typically occurs over 4 to 8 wk (10). However, severe clinical signs can be seen in some animals. In rare cases, lesions can be so severe that they create difficulty eating and drinking and can be a cause of respiratory obstruction (8).

A definitive diagnosis of CPV can only be obtained through histopathology, polymerase chain reaction (PCR), immunohistochemistry, in situ hybridization, or electron microscopy of biopsy samples. Additional diagnostics are needed to determine the CPV type. Given the generally limited severity or long-term health consequences of CPV infection, relatively short duration of clinical signs, and typically self-limiting nature of the disease, confirmatory testing is not often pursued. Several approaches have been suggested for treatment (e.g., surgical excision, vaccination, antimicrobials); however, data on efficacy are lacking due to limited study, the transient nature of lesions and concerns about the use of antimicrobials when not indicated (7,8,11–14).
Although CPV has been described since the 19th century, anecdotally frequently observed in dogs in group settings and is highly transmissible, little published information is available on disease occurrence (9). In 1 CPV outbreak in a dog breeding facility 10% (40/400) of dogs, all approximately 3.5 mo of age, were affected (15). Furthermore, limited information is available on best practices that can be implemented to prevent or control CPV transmission and resulting outbreaks.

At the University of Guelph, Ontario Veterinary College, a dog daycare facility was established as a branch of the community practice program. Daycare dogs were kept separated from community practice patients, although there was a shared entrance and lobby. Procedural separation from veterinary practice patients included separate dedicated items, runs, and common use areas. At the daycare, dogs were managed as a single group, allowed to directly interact with other attendees and animal care attendants were responsible for monitoring the dogs. Common use toys and water dishes were available. Routine environmental cleaning and disinfection practices, using accelerated hydrogen peroxide, occurred once daily.

On September 6, 2011 an animal care attendant noted oral lesions in a 9-month-old dog (D1) at the dog daycare facility. The dog was subsequently examined by a facility veterinarian and papillomavirus infection was presumptively diagnosed. The dog was immediately excluded from the daycare facility until free of oral lesions for 2 wk. On September 14, 2011 similar oral lesions were noted on another dog (D2) at the daycare facility and were also diagnosed by a facility veterinarian as suspected papillomavirus infection. During a conversation with the owner of D2, it was reported that these lesions had been present for approximately 3 to 4 wk. This dog was excluded from the facility as per the previous dog.

Following the 2 identified suspect cases of CPV and concern about likely transmission to daycare dogs from these cases, an active surveillance program was established. Animal care attendants performed daily oral and external evaluations on all dogs at time of admission, with hand hygiene carried out between oral examinations. If clinical signs of CPV infection were found (e.g., newly visible raised lesion in the oral cavity or elsewhere) the affected dog was excluded from the daycare and not permitted to return until 2 wk after cessation of clinical signs (as determined by a veterinarian). A suspect CPV case was defined as a dog with clinical signs compatible with CPV infection. All suspect dogs were diagnosed with suspect CPV infection: September (n = 2), October (n = 1), November (n = 5), December (n = 4), January (n = 1) (Figure 1). All suspect dogs had oral lesions; no cutaneous lesions were reported. The ages of 7 of the suspect dogs were known (range: 4 mo to 7 y; mean: 1.8 y; median: 11 mo). The incidence rate for the 7-month outbreak period was 1.5 suspect CPV cases per 100 dog-days at risk (calculated using the 11 incident cases identified after active surveillance was initiated and the dog-days at risk for this period determined from the attendance logs). Of the suspected dogs, 7 (54%) returned to the daycare facility after resolution of clinical signs (median: 40 d after exclusion; range: 29 to 85 d). Information was not available on additional details of cases, such as severity of illness, breed, comorbidity and specific duration of clinical signs.

Due to the continued case identification despite active surveillance and immediate exclusion, effective December 13, 2011 a cohort system was implemented. This involved the creation of 10 cohorts (4 to 5 dogs per cohort) and each daycare attendee was assigned to 1 of these cohorts based on dog-dog compatibility and planned attendance. Dogs only interacted with other dogs in their cohort and measures were taken to reduce indirect contact between the different cohort members (e.g., water dishes and toys were changed between cohorts; common indoor and outdoor exercise areas were used by all cohorts). Due to logistics and decreasing daycare attendees, existing cohorts were consolidated into 4 cohorts (3 to 10 dogs per cohort) that remained from February 21, 2012 to March 30, 2012.

During the outbreak, clients were provided an information sheet about CPV, including how dogs become infected, clinical course and duration, general information about the outbreak at the facility, and steps that were being taken to protect participating dogs. Clients were asked to report observed signs in their dogs consistent with CPV infection. On March 30, 2012 the outbreak was considered over as no new cases had been identified within 2 incubation periods.
Despite the anecdotally frequent occurrence of oral CPV, there are minimal publications on CPV outbreaks, management, and prevention. This may be due to the transient nature and spontaneous regression of CPV clinical signs and minimum severity in most of the infected animals. However, despite the often minor severity of lesions, CPV is highly infectious, as documented in this outbreak and another study (15), can lead to severe disease in some dogs and therefore should be addressed by prevention and response actions in canine group settings and veterinary facilities.

The origin of CPV in this outbreak cannot be established. The index case (D1) could have become infected through contact with animals outside of the daycare (community acquired) or through contact with an infectious dog or contaminated environment in the daycare facility. Due to the relatively long incubation period of CPV, any of these sources is possible.

Contact tracing based on electronic records and cohort assignments allowed evaluation of CPV transmission opportunities although there was high dog commingling during the first several months of the outbreak, making this evaluation difficult. With 1 exception, all dogs that became infected had 1 or more CPV transmission opportunities within the daycare population [present on the same day and time and with likely contact as a dog incubating CPV infection, with this contact occurring approximately 1 incubation period (4 wk) before the onset of clinical signs]. The exception was D13 whose only contact with a previously infected dog in the facility occurred approximately 2 mo before developing clinical signs. This suggests that an incubation period of greater than 4 wk may be possible, although other sources of infection cannot be excluded. For all other cases, transmission opportunities fell within the 4-week incubation period.

Three cases could each be traced back to a single previously infected dog. If it is assumed these dog-dog interactions were responsible for CPV transmission, dogs would have been infectious from 3 to 14 d prior to case identification (presumably when clinical signs began). Subclinical shedding has not been described for CPV. Since indirect transmission, including environmental contamination and additional external sources of CPV cannot be excluded for these cases, this area deserves further investigation.

There is limited information on the epidemiology of CPV in group settings and utility of control measures to stop an existing CPV outbreak. In the outbreak reported here cohort formation, active surveillance, and exclusion of animals with lesions may have been beneficial in decreasing case numbers by decreasing direct and environmental exposure to the virus. Early case identification (through active surveillance or client reporting of clinical signs) can also be helpful in preventing secondary transmission and occurrence of an outbreak. Due to the nature of this outbreak and data available, the true effect of these measures on halting the outbreak cannot be determined. It is possible an agent other than CPV was responsible for the lesions as confirmatory diagnostics were not pursued by the clients; however, this seems unlikely as in the authors’ opinion no other agents are consistent with the observed lesions and outbreak.

As many veterinary clinics have dog daycare facilities as an added form of revenue, outbreaks within the hospital setting could occur. Although most cases of CPV are mild and self-resolving, it is highly infectious, potentially with subclinical shedding, and an outbreak in hospital patients could be severe. The incorporation of infection control practices aimed at CPV and similar pathogens is important for all clinics, especially those with multiple (potentially mixing) animal groups.

References

Practitioners’ Corner Le coin des praticiens

Is melatonin of value in cancer treatment? Experience with a case of feline mammary carcinoma

Beverly Baxter

A mature, spayed female domestic shorthaired (DSH) cat weighing 5.8 kg was presented to my clinic in January 2015 for evaluation of an upper left thoracic mammary mass, which was diagnosed as a poorly differentiated carcinoma. The cat had multiple recurrences and surgeries and supplementation with oral melatonin. She survived for 2 years following the initial visit. The details are as follows.

The subcutaneous mass was diffuse, 5 to 6 cm across, and had a ropey texture. All lymph nodes palpated normally and survey thoracic radiographs did not demonstrate any abnormalities. A complete blood (cell) count (CBC) showed a mild lymphopenia and blood biochemistry values were within normal limits. Mastectomy of the 2 upper left thoracic mammary glands was carried out under general anesthesia; post-operative recovery was unremarkable. Histopathology revealed a poorly differentiated high grade mammary adenocarcinoma with intravascular and intra-lymphatic invasion. Referral for additional oncology management including chemotherapy was declined. However, the owners did elect to begin oral melatonin supplementation at 3 mg daily, administered in the morning.

In January of 2016 the cat was presented with a solitary grape-sized focal subcutaneous mass in the same general area but slightly more to the axilla. There were no other clinical or physical concerns. Pre-operative blood analysis revealed a moderate leukopenia due to a neutropenia and lymphopenia. A lumpectomy under general anesthesia was conducted and histopathology diagnosed a metastatic tubular carcinoma within an axillary lymph node. Recovery was without incident and the owners did not report any further abnormalities until September 2016, when a 3rd subcutaneous mass in the region had developed. This mass appeared more invasive, was diffuse, hard, not consistent in texture on palpation, and 6 to 8 cm in size. Pre-anesthetic serum biochemistry values continued to be within normal limits, but a leukopenia persisted. A mass removal was performed again. The owners had continued with the oral melatonin supplementation for the entire duration and did not report any other abnormal clinical signs. Histopathology was declined at the third surgical intervention.

Twenty-four months after presenting for the initial mass (January 2017), the patient was presented for the fourth time with an upper left thoracic/axillary subcutaneous mass. This mass was 8 cm across and irregular in shape, extending deep into the left axilla and feeling firm and lobular on palpation. The owners reported a transient period (24 h) of the cat being off food 2 to 3 wk before presentation, with 1 episode of vomiting. The cat had maintained her weight to this point but she now weighed 5.3 kg. In addition to a mild leukopenia there was a mild increase in total serum protein. The mass was removed under general anesthesia and a drain was placed. A histopathological diagnosis of solid and tubular mammary carcinoma was made. The cat had survived over 730 d since the initial diagnosis.

Feline mammary tumors (FMT) are reported to be the third most common neoplasm in cats, after hemopoietic and skin (1) and there is an increased risk associated with being intact (2,3). Dorn et al (2) showed that neutering decreased the risk of developing FMT 7-fold. Similarly, a controlled retrospective study showed that ovariohysterectomy decreased the risk of FMT 2.7-fold (95% confidence interval; 1.4 to 5.3, P < 0.0010) compared to intact felines and that relative risk was reduced by 91% if the ovariohysterectomy was done by 6 mo of age and 86% if done by 1 y of age (3).

A breed associated risk may exist with DSH and Siamese cats being overrepresented (4–6). The majority of FMTs are classified as carcinomas with metastasis frequently reported (4–6). Feline mammary tumors are subtyped by both growth and histology. Tumors are graded I to IV using a tumor, node, metastasis (TNM) system depending on tumor size and evidence of lymph node involvement or metastasis (5–7). Various histological subtypes of FMTs including solid, tubular, papillary, tubulopapillary, complex, invasive micropapillary, squamous cell, cribriform, and mixed have been described (5,8,9). The grade of tumor can also be defined based on histology using modified versions of the World Health Organization (WHO) or Elston and Ellis grading systems (5,9) in which grade 1 (I) tumors are well-differentiated, grade 2 (II) are moderately differentiated and grade 3 (III) tumors are poorly differentiated. A recent review by Zapulli et al (7) confirmed a relationship between tumor size and survival time for felines with mammary neoplasms but suggests that standardization in histological classification and

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study methodology are required. For example, not all studies have reported significant findings for tumors < 3 cm which may be related to differences in accuracy and instrumentation (10). Further, while Castagnaro et al (8) demonstrated good predictive value for tumor grades I and III but not for grade II, Seixas et al (5) showed statistical significance between histological grade and overall survival using univariate analysis.

Some factors used to determine prognosis in human patients, such as hormone responsiveness (estrogen or progesterone receptor status) are not well-developed in veterinary medicine (11). However, some studies have shown that unlike humans, feline mammary carcinomas do not display a high degree of positive steroid receptors (3,4,11,12). The absence of estrogen responsiveness in most feline tumors (11) seems at odds with the demonstrated protective effect of ovariohysterectomy (3).

This case highlights a cat diagnosed with a poorly differentiated carcinoma; according to Seixas et al (5) only 3.1% of cats with grade III mammary lesions survive to 2 y after presentation. The initial tumor size of 5 cm is in the expected range for a grade III tumor (8). The fact that the lymph node mass diagnosed 1 y after the removal of the original tumor was a different histological type may not be that unusual as involved lymph nodes can display discordant results (42.9% of the time) compared to the primary tumor (11).

The primary recommendation for management of FMT is surgical removal (4,13). It is not clear whether radical mastectomy has any benefit over more conservative surgical removal in terms of survival (4,6). Cats with more aggressive disease as suggested by diagnosis with histological grade II and III tumors would appear to be candidates for adjunct therapy (6,13). However, studies have failed to consistently demonstrate that surgery plus chemotherapy confers any beneficial effect in terms of survival (4,6,14). Managing the side effects of chemotherapeutic agents in cats may be a substantial challenge (4,13). Other barriers to providing chemotherapy include financial means of the owner and patient personality and amenability to handling. Radiation therapy is not routinely recommended for FMT (4).

In this case, the patient received daily oral melatonin (3 mg/day) following removal of the original tumor. Melatonin is an indole amine hormone produced by pinealocytes and extrapineal cells (15). Nocturnal secretions from the pineal gland provide a diurnal peak that mediates a number of biological effects including immunomodulatory, oncostatic, and antioxidant effects (15). Several studies have shown that women who do shiftwork or who regularly cross time zones (e.g., flight attendants) involving frequent changes in their sleep/wake cycle, are at increased risk of breast cancer. The “melatonin hypothesis” suggests that these disruptions in the normal circadian rhythm also disrupt the nocturnal emissions of melatonin (16) and that the loss of melatonin is related to increased risk of malignancy due to an inability to inhibit cyclooxygenase-2 activity which has been implicated in various malignancies including human and feline breast carcinomas (17,18).

This case illustrates a number of interesting points. The most remarkable is the duration of the patient’s survival. The prognosis for poorly differentiated carcinomas is very poor with some studies showing 100% of cats dying by 1 y after surgery (8) and other studies demonstrating only 3% surviving to 2 y after diagnosis (12). This patient’s primary mass also had micro blood vessel and lymphatic invasion. The observation that the subject received daily melatonin treatment suggests that further studies on the possible benefits of melatonin might be useful. While it is not possible to determine from this single case whether melatonin had any role, the paucity of randomized clinical trials of chemotherapeutic agents post-surgery and the high level of side-effects from treatment suggests melatonin might bear consideration for further clinical trials with and without other therapeutics. Further, as Hughes et al (12) discuss, the role of ovariohysterectomy in the incidence of feline carcinomas needs to be considered since most FMT are estrogen receptor negative. It has been suggested that FMT may be a suitable model for human carcinomas but any comparison to women requires that future studies look at the separate incidence and prognosis in all feline molecular subtypes. A final note needs to recognize the dedication of this patient’s owners, who played a major role in her long survival.

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References


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Prevalence of small ruminant lentivirus and Mycobacterium avium subsp. paratuberculosis co-infection in Ontario dairy sheep and dairy goats on page 155

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Non-DVM wages and trends across Canada
Salaires des employés non-vétérinaires et tendances au Canada

Chris Doherty

On the heels of a strong year for many veterinary hospitals across the nation, non-DVM staff are sharing in the spoils, with wage gains outpacing inflation.

Data on non-DVM wages are collected through the provincial Practice Owners Economic Surveys. Non-DVM staff are grouped by job title, allowing for an accurate comparison between similar employees in different provinces.

However, comparing median hourly wage of non-DVM staff only tells half the story. The cost-of-living (COL)-adjusted median hourly wage takes into consideration the variation in how much it costs to live in each province. For example, a family living in Alberta is likely to have much higher monthly expenses compared to one in Prince Edward Island, despite maintaining a similar standard of living; as such, we would expect hourly wages to be higher in Alberta.

For the purposes of this article, the focus will be on the two most populous staff groups: Registered Veterinary Technicians (RVT)/Animal Health Technologists (AHT) and receptionists.

Table 1 outlines the median hourly wages and COL-adjusted median hourly wages for RVTs and AHTs in each province.

Before adjusting for the cost of living, RVT/AHTs in Alberta receive the highest wages, with a median of $22.00. In contrast, Nova Scotia had the lowest wage, with RVT/AHTs in this province earning a median of $16.75.

Once adjusting for COL, however, the standings are dramatically altered. Newfoundland and Labrador moves into top spot.
Table 1/Tableau 1. RVT/AHT median hourly wage and COL-adjusted median hourly wage across Canada/Les salaires horaires médians des TVA/TSA et les salaires horaires médians ajustés au CDV au Canada

<table>
<thead>
<tr>
<th>RVT/AHT</th>
<th>NL</th>
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<th>NB</th>
<th>NS</th>
<th>ON</th>
<th>MB</th>
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<tr>
<td>TVA/TSA</td>
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<td>$19.00</td>
<td>$22.00</td>
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<tr>
<td>COL-adjusted median hourly wages</td>
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<td>$20.68</td>
<td>$19.53</td>
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</table>

Registered veterinary technician (RVT)/Animal health technician (AHT); NL — Newfoundland and Labrador; PEI — Prince Edward Island; NB — New Brunswick; NS — Nova Scotia; ON — Ontario; MB — Manitoba; SK — Saskatchewan; AB — Alberta; BC — British Columbia. 

Figure 1. RVT/AHT national median hourly wages and inflation adjusted wages from 2012 to 2016./Salaires horaires médians nationaux des TVA/TSA et salaires ajustés pour l'inflation de 2012 à 2016.

with a COL-adjusted median wage of $21.16. Other provinces with low costs of living, such as Nova Scotia, also climb the rankings. Alberta, on the other hand, falls to a COL-adjusted median wage of $16.54, due to the high cost of living in the province.

Figure 1 shows the past 5 years of wage growth for RVT/AHTs. The national median wage climbed by just over 1% in 2016, from $19.00 to $19.20. While this may seem low at first glance, from 2012 to 2016, the RVT/AHT median wage has grown by 9.7%. By comparison, inflation in Canada over the same time period has increased 4.9%, according to the Bank of Canada. Therefore, RVT/AHT wages have significantly outpaced inflation, leading to greater purchasing power for these non-DVM staff.

Table 2 outlines the median hourly wage and COL-adjusted median hourly wage for receptionists in each province.

Similar to the situation experienced by RVT/AHTs, Alberta was the highest paying province for receptionists, with a median hourly wage of $17.00. Prince Edward Island had the lowest wage, with receptionists earning a median of $13.25.

Once again, however, the adjustment for cost of living upends the initial rankings. After COL adjustment, Alberta’s median hourly wage falls to $12.78, the lowest in the country. Prince Edward Island’s median wage climbs to $16.01, behind only New Brunswick and Nova Scotia.

Figure 2 shows the changes in the national median wage for receptionists over the past 5 years. In the last year, receptionist wages grew by 2.5%, from $15.00 to $15.38. From 2012 to 2016, the national median wage grew by 9.8%, remarkably close to the wage gains experienced by RVT/AHTs. Once again, this outpaces inflation by a wide margin.

Avant l’ajustement au coût de la vie, le TVA/TSA en Alberta recevait le salaire le plus élevé, avec une médiane de 22 $. Par contre, la Nouvelle-Écosse recevait le salaire le plus bas, car un TVA/TSA dans cette province gagnait un salaire médian de 16,75 $.


La figure 1 présente les cinq dernières années de croissance salariale pour les TVA/TSA. Le salaire médian national a grimpé d’un peu plus de 1 % en 2016, passant de 19 $ à 19,20 $. Même si cela semble peu de prime abord, signalons que, de 2012 à 2016, le salaire médian des TVA/TSA a augmenté de 9,7 %. Par comparaison, l’inflation au Canada pendant la même période de temps a crû de 4,9 %, selon la Banque du Canada. Par conséquent, les salaires des TVA/TSA dépassaient significativement l’inflation, ce qui procurait un pouvoir d’achat supérieur à ces employés non-vétérinaires.

Le tableau 2 indique le salaire horaire médian et le salaire horaire médian ajusté au CDV pour les réceptionnistes dans chaque province.

Comme pour la situation observée pour les TVA/TSA, l’Alberta possédait le salaire le plus élevé pour les réceptionnistes, avec un salaire horaire médian de 17 $. L’Île-du-Prince-Édouard affichait le salaire le plus bas pour les réceptionnistes, avec une médiane de 13,25 $.

Cependant, de nouveau, l’ajustement au coût de la vie modifie le classement initial. Après l’ajustement au CDV, le salaire horaire médian de l’Alberta chute à 12,78 $, soit le plus bas au pays. Le salaire médian de l’Île-du-Prince-Édouard grimpe à 16,01 $, derrière celui du Nouveau-Brunswick et de la Nouvelle-Écosse.

La figure 2 montre l’évolution du salaire médian national pour les réceptionnistes au cours des cinq dernières années. Au cours de la dernière année, les salaires des réceptionnistes ont augmenté de 2,5 %, pour passer de 15 $ à 15,38 $. De 2012 à 2016, le salaire médian national a grimpé de 9,8 %, soit une hausse remarquablement semblable à celle observée pour les TVA/TSA. De nouveau, cette augmentation est supérieure au taux d’inflation par une marge importante.

Même si un TVA/TSA en Nouvelle-Écosse peut gagner un salaire bien en deçà d’un TVA/TSA en Alberta, le véritable
pouvoir d’achat de ce salaire dans la province maritime est significativement supérieur, après avoir tenu compte du coût de la vie. Il s’agit d’une considération importante pour les employés et les employeurs lors de l’examen des niveaux de rémunération des employés non-vétérinaires. Compte tenu des variations du coût de la vie, il pourrait ne pas être suffisant d’offrir un salaire légèrement supérieur à celui versé dans une province voisine.

Notes: Médianes horaires des réceptionnistes et salaires horaires médians ajustés au CDV de 2012 à 2016.

While an RVT/AHT in Nova Scotia may earn a wage well below that of one in Alberta, the true purchasing power of that wage in the maritime province is significantly higher, after accounting for the cost of living. This is an important consideration for both employees and employers, when examining non-DVM compensation levels. Given the variations in cost of living, it may not be enough to simply offer a slightly higher wage than a neighboring province.

Notes: Median hourly wages were determined using the 2016 Provincial Practice Owners Economic Surveys. There was no Provincial Economic Survey in Quebec in 2016. Cost-of-Living-Adjusted Median Wage was determined through use of the most recent Statistics Canada data on Average Household Expenditures, by Province. The Average Household Expenditure in each province was divided by the Average Household Expenditure of the nation as a whole, to determine the province to nation ratio. This ratio was then multiplied by the median hourly wage in each province for RVTs/AHTs and Non-registered Assistants (as determined by the results of each respective Provincial Economic Survey), to determine the Cost of Living Adjusted Median Wage in each province. Inflation data are taken from the Bank of Canada’s inflation calculator.

http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/famil130a-eng.htm

Table 2/Tableau 2. Receptionist median hourly wages and COL-adjusted median hourly wages across Canada/Salaires horaires médians des réceptionnistes et salaires horaires médians ajustés au CDV au Canada

<table>
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<tr>
<th>Receptionist</th>
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<th>NB</th>
<th>NS</th>
<th>ON</th>
<th>MB</th>
<th>SK</th>
<th>AB</th>
<th>BC</th>
</tr>
</thead>
<tbody>
<tr>
<td>NL — Newfoundand Labrador; PEI — Prince Edward Island; NB — New Brunswick; NS — Nova Scotia; ON — Ontario; MB — Manitoba; SK — Saskatchewan; AB — Alberta; BC — British Columbia.</td>
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<td>$15.56</td>
<td>$14.71</td>
<td>$12.78</td>
<td>$14.95</td>
</tr>
</tbody>
</table>
1. A) Fluconazole is not highly protein-bound, enabling its penetration into sites including the CNS, aqueous humor, prostate, and urinary tract. Ketoconazole and itraconazole are highly protein-bound, which limits their penetration into the CNS, aqueous humor, prostate, and urinary tract. Clotrimazole is used as a topical antifungal.

2. C) Answer A would be correct for a dog. Answer B would be correct for a horse. Answer D is a common cause of ulceration in dogs.

3. D) Antigen tests detect antigen from adult female worms, not male worms.

4. C) The correct answer is *Corynebacterium pseudotuberculosis*, the most common etiologic agent associated with ulcerative lymphangitis.

5. A) The signs suggest both limbs are affected. The most common reason for this posture is laminitis; bilateral presentation of the other diseases is unlikely, especially in an 8-month-old heifer. Bovine anatomy consists of fused and full-sized third and fourth metatarsal bones, with no splints. Pedal bone fracture in medial claws often results in a cross-legged stance, and in lateral claws a wide-based stance. Signs of radial paralysis are largely distal limb extensor deficits.

Answers to Quiz Corner
Les réponses du test éclair

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History and clinical signs

A 10-year-old spayed female domestic shorthaired cat was examined at the ophthalmology service at the Western College of Veterinary Medicine. This cat was presented for evaluation of pigmented lesions in the left iris. The menace responses, and palpebral, oculocephalic, direct and consensual pupillary light reflexes were present bilaterally. Schirmer tear test (Schirmer Tear Test Strips; Alcon Canada, Mississauga, Ontario) values were 16 and 21 mm/min in the right and left eyes, respectively. The intraocular pressures were estimated with a rebound tonometer (Tonvet; Tiolat, Helsinki, Finland) and were 13 and 25 mmHg in the right and left eyes, respectively. Fluorescein staining (Fluorets; Bausch & Lomb Canada, Markham, Ontario) was negative bilaterally. On direct examination there was brown discoloration of the left iris extending approximately 300° and mainly involving the peripheral iris. Biomicroscopic examination (Osram 64222; Carl Zeiss Canada, Don Mills, Ontario) revealed the darkly pigmented areas to be flat and the pigmentation to extend into the iridocorneal angle involving the pectinate ligaments. Examination of the right eye was within normal limits. Following topical application of 0.5% tropicamide (Mydriacyl; Alcon Canada, Mississauga, Ontario) indirect ophthalmoscopic (Heine Omega 200; Heine Instruments Canada, Kitchener, Ontario) examination was completed and did not identify abnormalities in either eye. A photograph of the left eye at presentation is provided for your assessment (Figure 1).

What are your clinical diagnosis, differential diagnoses, therapeutic plan, and prognosis?

Discussion

The clinical diagnosis was diffuse iris melanoma in the left eye. The differential diagnosis for pigmented iris lesions is benign melanosis or iris freckles/nevi. Diffuse iris melanoma is a progressive pigmentation of the iris and is usually unilateral. Pigmentation often develops in multifocal areas on the surface of the iris with these areas gradually increasing in size and coalescing over time to become a diffuse lesion (1). The pigmented areas may be slightly raised and velvety in appearance. As diffuse iris melanoma progresses, the tumor invades deeper into the iris stroma and may lead to changes in pupil shape and mobility (1). Benign melanosis may be congenital or acquired, and unilateral or bilateral. These pigment spots are small clusters of normal melanocytes on the surface of the iris and tend to have sharp borders and remain superficial. Freckles are smaller spots, while nevi are somewhat larger in area. These lesions can be congenital or acquired and tend to increase in number with age (2).

Melanocytic tumors are the most common type of primary intraocular neoplasia in dogs and cats. Cats typically develop flat, diffuse tumors of the iris as described, while dogs typically develop raised, nodular lesions. In both species, infiltration of the iridocorneal angle in advanced disease leads to secondary glaucoma. While canine uveal melanocytic neoplasia is typically benign in regard to systemic spread, feline diffuse iris melanoma has the potential for metastasis and rates of 19% to 63% have been reported (3–6). The lymph nodes, lungs, liver, and spleen are the most common sites; however, radial bone metastasis has been reported in 1 cat (1,7).

Definitive diagnosis of diffuse iris melanoma requires light microscopic examination of the affected uveal tissue. Uveal biopsy is rarely completed due to the invasiveness of the procedure. Thus, the clinical diagnosis of diffuse iris melanoma is based on the appearance and photographic documentation of progressive, expanding, and coalescing areas of hyperpigmentation, with possible changes in pupil shape and mobility. When cats present with small pigmented lesions, it is recommended that serial photographs be taken over several months to years in...
order to document changes and progression of the lesions. Once a clinical diagnosis of diffuse iris melanoma is made, however, the question remains what is the most appropriate therapy.

Definitive treatment is currently limited to enucleation of the globe as adjunctive therapy protocols have not been developed. Use of diode laser by a veterinary ophthalmologist to photoablate small, focal, iris lesions may be an option in very early stages; however, the efficacy in preventing progression of the tumor is not known and as the tumor is multifocal in nature, new lesions can be expected to form (1). The clinical dilemma is, therefore, determining the appropriate time to perform enucleation. Ideally, the clinician should be convinced of the clinical diagnosis in order to avoid enucleation of an eye with benign melanosis. Referral examination by a veterinary ophthalmologist is recommended to help confirm the clinical diagnosis. Diffuse iris melanoma is slowly progressive and although it is not known exactly when metastasis occurs in the course of disease, it is presumed to be in the latter stages. Thus clinicians should avoid premature or unnecessary removal of a healthy and visual eye. Nevertheless, the goal is to remove the eye prior to development of metastasis. Staging with thoracic radiographs and abdominal ultrasound is not useful as these modalities are not sensitive enough to reveal the miliary nature of tumor metastasis in distant organs.

Several studies have attempted to correlate histopathologic features of enucleated globes at various stages of disease with metastasis (4–6,8). Unfortunately, metastasis of diffuse iris melanoma is rarely confirmed and may not be noted until postmortem examination if this is completed. There is a strong correlation between the extent of local tumor infiltration and survival time (4). When enucleation is performed while the tumor is still confined to the iris stroma affected cats survive as long as control cats (4). When enucleation is performed after invasion of the ciliary body stroma, there is a progressively poorer prognosis. Cats with glaucoma attributable to tumor infiltration have significantly reduced survival time compared to control cats (4). Histopathologic features associated with increased presumed metastasis include the presence of tumor in the scleral venus plexus, extrascleral extension, necrosis within the neoplasm, a mitotic index of > 7 mitoses in 10 high-power (×400) fields, choroidal invasion, and increased E-cadherin and melan-A immunoreactivity of the tumor cells (5,6,8).

Most of the current literature suggests that metastasis is more likely to occur with more extensive tumors. Once tumor cells are within the filtration angle and scleral venus plexus there is greater potential for spread to distant organs. Therefore, enucleation is justified based on an increased amount and size of pigmented areas, with spread of pigmentation into the iridocorneal angle. It is essential that an enucleated globe with suspected iridal melanoma be submitted for light microscopic evaluation to evaluate the extent of the neoplasia, which will in turn help determine the prognosis for the patient.

In this cat, pigmentation was confirmed on biomicroscopic examination to involve the pectinate ligaments and therefore enucleation was recommended and completed. Light microscopic examination of the globe confirmed the clinical diagnosis of diffuse iris melanoma. The cat continues to do well; however, it is recommended that she be monitored closely for development of systemic disease that may be associated with metastasis.

References

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