

Roles and opportunities for technicians in using digital imaging technology to perform necropsies

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Abstract

With the ever-changing demands of food animal practices, the roles of technicians within them are evolving as well. In population medicine, timely and accurate postmortem diagnoses can result in earlier detection of disease outbreaks and opportunities to make treatment and management changes. Digital postmortem examinations have been used with great success in the feedlot industry, and advances in digital imaging technology now allow for the capture and transfer of images of advanced diagnostic quality without being cost-prohibitive. Technicians have the opportunity, through assisting in the collection of necropsy data using digital imaging technology, to greatly influence the number of animals being necropsied annually by providing cost-effective options for producers. The details provided herein are meant to assist technicians in using digital imaging technology to perform necropsies in a consistent and standardized fashion while outlining opportunities for other uses of digital imaging technology.

Key words: cattle, necropsy, digital image

Résumé

Avec l'évolution constante des demandes d'aliments pratiques animales, les rôles des techniciens en leur sein sont évoluent aussi. En population médecine, diagnostics post mortem rapides et exacts peuvent entraîner une détection plus précoce des éclosions de maladies et l'occasion d'effectuer le traitement et la gestion des changements. Les examens post-mortem numérique ont été utilisés avec beaucoup de succès dans l'industrie de l'engraissement, et les progrès de la technologie d'imagerie numérique permettent maintenant pour la capture et le transfert d'images de qualité diagnostique de pointe sans être prohibitif. Les techniciens ont l'occasion, en aidant à la collecte de données de l'autopsie à l'aide de la technologie d'imagerie numérique, d'influencer fortement le nombre d'animaux autopsiés par année en fournissant des options rentables pour les producteurs. Les détails fournis dans ce document visent à aider les techniciens en utilisant la technologie d'imagerie numérique pour effectuer les autopsies, dans un souci de cohérence et de façon normalisée tout en exposant les possibilités pour d'autres utilisations de la technologie d'imagerie numérique.

Introduction

If a picture is worth a thousand words, what are a thousand pictures worth? And to a practitioner, how many pictures would it take to confidently say “bronchopneumonia” or “BVD” upon evaluation of those pictures? Without question, the ability of the practitioner or diagnostician to confidently make a diagnosis from pictures relies on the receipt of pictures with good diagnostic quality. If disagreements in diagnoses occur, more often than not it's the result of image quality as opposed to the actual interpretation of the images.³

In a study conducted by Merck Animal Health and Feedlot Health Management Services, images of 192 animals with clinical respiratory disease were collected from either feedlots or calf ranches in order to validate a mobile and web-based application (DVMDx™) designed to collect digital necropsy images. During this study, tissue samples were submitted to a diagnostic laboratory for histopathological and microbiological evaluation. Those results were then compared to the diagnosis provided by veterinarians familiar with interpreting digital necropsy images. Digital and laboratory diagnoses agreed in 79% of the cases when the primary diagnoses were compared, and 88% when all diagnoses were compared.¹

These types of platforms now allow for collaborative diagnostic opportunities between diagnostic facilities and practitioners, while also providing the ability to efficiently store pictures and necropsy data. Technicians can be used not only to perform the necropsies, but also to train distant clients to perform necropsies on their own animals, and then can play an active role in the quality assurance of the pictures. Additionally, where sample collection opportunities exist, technicians can be used to both collect and submit samples as directed by the practitioner.

Prior to validating the mobile and web-based application (DVMDx™), a prosecution protocol was established and then followed in all cases. A standardized approach was essential during this comparison so that no omissions were made. This first step is crucial when deciding to use digital imaging technology to perform necropsies, and also lends opportunity for technicians that frequently assist with post-mortem examinations since they can assist practitioners in the development of protocols tailored to any species. Keep in mind that additional views may always be warranted based on treatment history or pathology noted on examination.

Although current digital cameras allow for the capture of images of advanced diagnostic quality, the camera is not the only factor, and a large portion of the responsibility lies with the user. Since the quality of the pictures can be significantly influenced by the person performing the necropsy,³ a few items should always be considered when working to achieve images of diagnostic quality:

Orientation: Taking clear pictures doesn't necessarily mean that the individual looking at a lesion knows where that lesion is in the carcass. Identification of anatomy is key, and always orienting the picture with the animal's spine at the top of the camera's view-finder can easily circumvent a sideways staring veterinarian.

Lighting: When able, use your body to cast a shadow over the tissues you wish to photograph. Although the sun may be shining, it does not necessarily mean that the quality of a picture will be improved. In fact, sunlight reflects off of wet surfaces and appears as white spots on review, and can therefore lead to misinterpretation of lesions (Figure 1). Figure 2 demonstrates how a shadow can be cast to deliberately avoid such artifacts. If using the camera flash in buildings or at night, make sure to review pictures prior to submitting them for diagnosis as dust particles or precipitation can often be illuminated, causing the camera to focus there resulting in an unfocused subject. The use of a flash in an already dark setting rarely illuminates everything seen in the view finder, and therefore the use of head lamps or vehicle headlights can greatly improve the chances of obtaining a picture of good diagnostic quality.

Don't zoom: Despite the technological advances, images that are enlarged by zooming-in fall victim to enlarged pixels, which when enlarged by the veterinarian during review reduces the image resolution and image quality, and thus detail. It is best to fill the camera's view finder with the

subject material you wish to photograph. This allows the individual interpreting the pictures to get the clearest view possible, and potentially eliminate the need to zoom-in when interpreting pictures.

Once necropsy data are captured, it is important to establish a valid database so that the information can be used in a manner that benefits both the producer and practitioner. Timely and accurate postmortem diagnoses can result in earlier detection of general production diseases, zoonotic, emerging, and foreign animal diseases as well as create opportunities to make appropriate treatment and/or management changes. This is another area where technicians can provide support since database management and querying is invaluable in providing customer service. By assisting producers to enact timely management decisions you increase value for them and can have significant economic impact.

Depending on practice service models and/or provincial or state limitations, the use of technicians to perform field necropsies can also be a good business decision. By employing technicians to perform postmortem examinations, practitioners can focus on bettering their health care services while also allowing them to increase client load. By adding technicians to the team it increases the potential for carcasses to be prosected sooner after death and reduces the chances of autolyzed, frozen or scavenged carcasses, and again increasing value for the producer.

Conclusion

Current advances in digital imaging technology, as well as the creation of platforms designed specifically for the collection of necropsy data, have resulted in more accessible diagnostic options for producers and more accurate collection of mortality data.² Opportunities now exist for technicians



Figure 1. Digital image showing how reflection of light can make interpretation different.



Figure 2. Digital image showing how a shadow can help avoid artifacts caused by light reflection.

to play a more active role in further ensuring food security and overall improvement of livestock health. Technicians also have the potential to significantly impact the total number of postmortem examinations performed annually while creating value for producers. The success of the digital necropsies, however, relies on the quality of the images being submitted for diagnosis. It is therefore imperative that when time and energy are invested in performing a digital necropsy, every effort should be made to ensure that images of diagnostic quality are being obtained.

References

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