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Water Immersion vs. Gas Insufflation in Canine Duodenal Endoscopy: Is the Future Underwater?

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The endoscopy of the gastrointestinal tract is often part of the diagnostic protocol for canine acute and chronic gastroenteropathy. To analyze properly the intestinal wall, it is fundamental to distend the lumen, usually inflating it with air. In human medicine, it is well known how the gas insufflation (GI) with air or carbonic dioxide during colonoscopy can induce pain in the patient. More and more frequently it is used with warm-to-touch water, instead of air, to distend the lumen. Randomized controlled trials suggest that the introduction of water to distend the lumen of the colon decreases spasm of the musculature of the bowel and pain, and significantly increases the visualization of mucosal texture and the adenoma detection rate.

This study was the first in veterinary medicine to compare GI and water immersion (WI) during duodenoscopy in anesthetized dogs, in order to evaluate eventual differences in procedural nociception and in the quality of mucosal visualization.

Twenty-five dogs, subjected to endoscopy under general anesthesia, were included in the study. To evaluate differences in nociception during anesthesia, heart rate and arterial blood pressure (systolic, diastolic and mean) were measured throughout the procedure and divided into four steps (baseline, water, air, outcome). A random sequence of GI or WI was applied to dilate duodenal lumen and, in every condition, the same mucosal image of the bowel was recorded. For every dog, two images (GI and WI) were recorded and subjected to a texture analysis by using image processing approaches like skeletonization and entropy evaluation, and to a subjective blind evaluation by three expert endoscopists, considering the architecture and the intestinal texture. No systematic significant differences were detected for the cardiovascular parameters and the texture analysis between GI and WI, except for the subjective evaluation by the endoscopists, who identified the WI images as qualitatively better.

The results of this study highlight how the algic answer does not change between the two methods, maybe influenced by the drugs used during the endoscopy, which well control nociception and give deep anesthesia. Based on the evaluation of the endoscopists, the WI allows to get better quality images, with a detailed visualization of the intestinal villi, while this is still not confirmed by objective texture analysis.