

The Use of the VetBLUE Protocol and Sonographic Gallbladder Wall Evaluation Pre- and Post-anesthesia for the Detection of Lung Atelectasis and Gallbladder Wall Edema in 63 Dogs Undergoing General Anesthesia

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INTRODUCTION

Lung ultrasound (LUS) is used for the rapid detection of atelectasis and pulmonary complications peri-operatively. Recently, VetBLUE (VB-LUS) profiles in dogs undergoing elective surgical sterilization showed minimal changes; however, LUS has not been applied to dogs undergoing longer and more involved general anesthetic procedures. Gallbladder wall edema, a marker for canine anaphylaxis and right-sided volume overload, was a secondary objective since dogs often receive opioids and intravenous contrast agents that can incite histamine release; and splanchnic venous pooling occurs during general anesthesia.

METHODS

VB-LUS and sonographic gallbladder wall characterization pre- and post-general anesthesia was performed at induction and extubation. VB-LUS findings of dry lung (A-lines with glide sign), wet lung (B-lines), and consolidation (shred and tissue sign) were recorded. Gallbladder wall edema was defined by the presence of a sonolucent intraluminal line with gallbladder thickening referred to as the gallbladder halo sign. Comparison of VB-LUS findings were made pre- and post-procedure, between spontaneous breathing (SB) and anesthetic mechanical ventilation (AMV), and induction agents. Positive VB-LUS findings post-procedure had repeated Vet BLUE evaluations performed.

RESULTS

VB-LUS findings differed pre- and post-procedure ($p < 0.001$; Wilcoxon signed rank test) but not between SB ($N=52$) and AMV ($N=11$) ($p=0.452$; Mann-Whitney U test) or induction agents ($p=0.136$; Mann-Whitney U test). Gallbladder wall edema was absent in dogs pre-medicated with morphine, including several dogs that had associated vomiting, or those administered intravenous contrast agents. Dogs with positive VB-LUS findings post-procedure had resolution of VB-LUS findings within 1–3 hours.

CONCLUSION

VB-LUS findings of lung atelectasis were apparent post-procedure with resolution occurring within 1–3 hours post-extubation. The induction agent tiletamine-zolazepam, although not statistically significant, had a higher frequency of abnormal VB-LUS findings compared to the other agents. Gallbladder wall edema did not occur with morphine with or without associated vomiting, contrast agents, or with venous splanchnic pooling. These findings are important for interpreting VB-LUS and sonographic gallbladder findings peri-operatively to distinguish between expected VB-LUS and gallbladder wall findings vs. anesthetic-related complications.

SPEAKER INFORMATION

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