FREQUENCY AND NUMBER OF ULTRASOUND LUNG ROCKETS (B-LINES) USING A REGIONALLY BASED LUNG ULTRASOUND EXAMINATION NAMED VET BLUE (VETERINARY BEDSIDE LUNG ULTRASOUND EXAM) IN DOGS WITH RADIOGRAPHICALLY NORMAL LUNG FINDINGS

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Lung ultrasound is superior to lung auscultation and supine chest radiography for many respiratory conditions in human patients. Ultrasound diagnoses are based on easily learned patterns of sonographic findings and artifacts in standardized images. By applying the wet lung (ultrasound lung rockets or B-lines, representing interstitial edema) versus dry lung (A-lines with a glide sign) concept many respiratory conditions can be diagnosed or excluded. The ultrasound probe can be used as a visual stethoscope for the evaluation of human lungs because dry artifacts (A-lines with a glide sign) predominate over wet artifacts (ultrasound lung rockets or B-lines). However, the frequency and number of wet lung ultrasound artifacts in dogs with radiographically normal lungs is unknown. Thus, the primary objective was to determine the baseline frequency and number of ultrasound lung rockets in dogs without clinical signs of respiratory disease and with radiographically normal lung findings using an 8-view novel regionally based lung ultrasound examination called Vet BLUE. Frequency of ultrasound lung rockets were statistically compared based on signalment, body condition score, investigator, and reasons for radiography. Ten left-sided heart failure dogs were similarly enrolled. Overall frequency of ultrasound lung rockets was 11% (95% confidence interval, 6–19%) in dogs without respiratory disease versus 100% (95% confidence interval, 74–100%) in those with left-sided heart failure. The low frequency and number of ultrasound lung rockets observed in dogs without respiratory disease and with radiographically normal lungs suggests that Vet BLUE will be clinically useful for the identification of canine respiratory conditions. © 2014 American College of Veterinary Radiology.

Key words: Lung rockets, Respiratory distress, Thoracic radiography, Ultrasound, Vet BLUE lung examination.

Introduction

Lung ultrasound has higher sensitivity than lung auscultation and supine chest radiography for many acute and potentially life-threatening respiratory conditions in people.1-5 Fundamental principles of lung ultrasound in acute respiratory conditions generally center around the observation of ultrasonographic artifacts based on the dry lung (A-lines with a glide sign) versus wet lung (ultrasound lung rockets or B-lines) concept. Ultrasound does not transmit through aerated lung and the presence of ultrasound lung rockets (wet lung artifact) primarily represent forms of interstitial edema.6-10

In normal human lungs, ultrasound lung rockets are infrequent and dry lung artifacts predominate.1,5,8 Thus, when ultrasound lung rockets are present, their regional distribution can be used as an evidence-based tool in addition to traditional means of lung auscultation and supine chest radiography.1,5,8,9,11-14 Normal ultrasound findings and artifacts are readily teachable6-9,12,13 and an international consensus statement by lung ultrasound experts has supported their use for diagnosing many respiratory conditions.5 Other lung ultrasound findings have also been defined (shred sign, tissue sign, nodule sign [signs of consolidation]),15,16,22 but are not expected to be present in dogs with radiographically normal lungs.

No data are currently available regarding the frequency and number of ultrasound lung rockets in dogs without respiratory disease and with radiographically normal lung findings. The Thoracic FAST (Thoracic Focused Assessment with Sonography for Trauma [TFAST]) protocol, despite detecting other lung pathology, is the only standardized lung ultrasound examination currently described for...