Comparison of thoracic ultrasonography and thoracic radiography to detect lung lesions in hospitalized dairy calves

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Introduction

The detection of lung lesions in dairy calves is commonly achieved using thoracic ultrasonography (TUS) and radiography (TR). However, it remains unclear from the literature if one diagnostic procedure is superior to another. The main objective of this study was therefore to evaluate the sensitivity (Se) and specificity (Sp) of TUS and TR to detect lung lesions in dairy calves with the hypothesis that TUS and TR have similar Se and Sp.

Materials and Methods

Fifty hospitalized dairy calves (≤7 days; ≤100kg; standing; with or without respiratory signs) were enrolled. After collection of clinical data, each calf was successively evaluated with TUS (positive if lung consolidation ≥1cm) and TR (positive if an alveolar pattern was visualised) by two blinded operators. Only calves with lesions detected by TUS or TR underwent a computed tomography (CT) (positive if lung consolidation was present) used as the gold standard. All imaging tests were performed within 24 hours. Se and Sp were estimated by a two-stage Bayesian method.

Results

Among the 50 calves, 26 have lung lesions on CT. SeTUS and SeTR were 0.68 (95% Bayesian credible Intervals (BCI):0.61-0.86) and 0.75 (95%BCI:0.70-0.91), respectively. SpTUS and SpTR were 0.88 (95%BCI:0.62-0.99) and 0.87 (95%BCI:0.62-0.99), respectively. There was only a mild difference between Se and Sp of both tests (SeTUS - SeTR: -1.45 (95%BCI:-1.72;-1.33) and SpTUS - SpTR: -1.75 (BCI:-1.92;-1.33)).

Significance

In conclusion, in this study, TUS and TR have a good Se and Sp and TUS was mildly less performant than TR to detect lung lesions in dairy calves.