Comparison of Text versus Video as Thoracic Ultrasound Learning Strategies in a Veterinary Student Population

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Results

Significant differences in Total Completion and Total Attempt Scores within and across Stations 1, 2 and 5 (Figures 4 and 5).

- Year 3 students scored significantly higher than Year 1 students at Stations 1, 2 and 5.
- Significantly greater scores for all students between Stations 1-2 and Stations 2-5.

Significant differences in identification of the presence or absence and quantification of B-lines in Stations 3 and 4 between the written manual and video groups (Figures 6 and 7).

- Significantly greater score in quantification of B-lines in video group at Station 3.
- Significantly greater score in identification of the presence or absence of B-lines in video group at Station 4 with a trend toward significance in the quantification of B-lines.

Significantly higher reported confidence on the final survey compared to the initial survey in all areas (Figure 8).

- Performing a PULS examination.
- Diagnosing pleural effusion, pneumothorax and interstitial-alveolar disease.

Discussion

- Both the learning resource material and the experience of performing an ultrasound examination multiple times contributed to a greater rate of completion (total completion score) and accuracy (total attempt score) as the students progressed through Stations 1, 2, and 5.
- No differences between teaching formats in overall completion and total score is supported by similar findings in a study looking at text vs. video for teaching laparoscopic knot-tying in medical students.6
- Differences between the identification and quantification of B-lines at Stations 3 and 4 may be attributable to the presence of coalescing B-lines at each of these stations, though the severity of interstitial-alveolar disease within each cadaver was not recorded and is a limitation of this study.

- The dynamic examples of coalescing B-lines moving to and fro with respiration within the video may have contributed to a higher rates of success in their identification and quantification as opposed to still images.
- A previous study analyzing video vs. text-based teaching of the Dix-Hallpike test to medical students for diagnosing vertigo found no differences in theoretical knowledge between the two formats,7 however diagnostic imaging knowledge and interpretation may prove different.
- Significantly increased student reported confidence levels across all areas could be the result of the learning resource material and/or experience of performing multiple ultrasound examinations, though a limitation of the study is the inability to differentiate between these two factors.
- Another limitation of the study includes insufficient time provided for reviewing the teaching material leading to unknown completion rates of the video and the manual, which was noted.

Materials and Methods

- A total of 40 University of Calgary Veterinary Medicine (UCVM) students from years 1-3 were recruited and randomized into one of two groups: video or written lab manual. The total UCVM year 1-3 student body is 90 students, indicating a 44% student participation rate.
- After completing an initial survey reporting their confidence, students performed an abbreviated pleura and lung ultrasound (PLUS) scan® on a canine cadaver before viewing the learning resource material. Students then rotated through a series of 4 ultrasound stations before completing a final survey (see Figures 1 and 2). Each station was graded using an Objective Structured Clinical Examination (OSCE) marking rubric by 4 different OSCE examiners (the same examiner remained at their respective station for all students).
- Calculated data: Stations 1, 2, and 5 included all graded data (anatomy, technique at all 4 sites, pathological diagnosis); Stations 3 and 4 included graded data limited to pathological diagnosis; confidence scores (Likert-like scale) on initial and final surveys.
- Total Completion Score: Percentage of attempted points (correct or incorrect) out of maximum possible score
- Total Attempt Score: Percentage of correct points out of total attempted points.
- Statistical analysis: Column statistics, Wilcoxon signed rank test, linear regression, linear regression with repeated measures.
- Statistical significance assumed when p < 0.05.

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References