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COMPARISON OF ULTRASOUND-GUIDED VS. STANDARD LANDMARK TECHNIQUES

For training novice operators in placing needles into the lumbar subarachnoid space of canine cadavers

Introduction
The standard technique for placing a needle into the canine lumbar subarachnoid space is primarily based on palpation of anatomic landmarks and use of probing movements of the needle, however, this technique can be challenging for novice operators. The aim of the current observational, prospective, ex vivo, feasibility study was to compare ultrasound-guided vs. standard anatomic landmark approaches for novices performing needle placement into the lumbar subarachnoid space using dog cadavers.

Material and Methods
Eight experienced operators validated the canine cadaver model as usable for training landmark and ultrasound-guided needle placement into the lumbar subarachnoid space based on realistic anatomy and tissue consistency. With informed consent, 67 final year veterinary students were prospectively enrolled in the study. Students had no prior experience in needle placement into the lumbar subarachnoid space or use of ultrasound. Each student received a short theoretical training about each technique before the trial and then attempted blind landmark-guided and ultrasound-guided techniques on randomized canine cadavers. After having performed both procedures, the operators completed a self-evaluation questionnaire about their performance and self-confidence.

Results
Total success rates for students were 48% and 77% for the landmark- and ultrasound-guided technique, respectively. Ultrasound guidance significantly increased total success rate when compared to the landmark-guided technique and significantly reduced the number of attempts. With ultrasound guidance self-confidence was improved, without bringing any significant change in duration of the needle placement procedure. Findings indicated that use of ultrasound guidance and cadavers are feasible methods for training novice operators in needle placement into the canine lumbar subarachnoid space after a short theoretical training.