CORRESPONDENCE

Pre-procedural ultrasonography and marking for neuraxial anesthesia: an observational study

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To the Editor,

Pre-procedural ultrasonography has been shown to improve the ease and efficacy of establishing neuraxial blockade compared to a landmark-based approach, but it involves significantly increased procedural time.^{1–3} In this pilot study, we sought to determine if an ideal entry point for neuraxial anesthesia could be identified using ultrasonography prior to the patient entering the operating room (OR), thereby reducing OR procedural time.

This prospective observational study was conducted at Vancouver General Hospital. The University of British Columbia Clinical Research Ethics Board (October 20, 2014: #H14-02559) and the Vancouver Coastal Hospital Research Institute (October 31, 2014: #V14-02559) gave ethics approval. Healthy adults with American Society of Anesthesiologists physical status I–II and no history of spine surgery were recruited. All provided written informed consent. Each participant underwent two neuraxial ultrasonography scans using a 2- to 5-MHz curvilinear transducer (Ultrasonix, Richmond, BC, Canada) while sitting with their back flexed and their feet supported, with hips and knees at 90°. A systematic approach was utilized for all scans. Sonographers were instructed to identify the correct level and maximize the view of the posterior longitudinal ligament as the ideal point of entry. The first scan was conducted in the

preoperative area on a stretcher and the second in the OR on a standard OR table. The optimal needle insertion points for neuraxial blockade for the T9–10, L3–4 paramedian, and L3–4 midline approaches were identified. Blinded to each other's scans, the first sonographer used an indelible marker whose ink was visible only under ultraviolet (UV) light (Proporta, Brighton, East Sussex, UK). The second sonographer used visible ink. The primary outcome was the distance between the two marks at each level measured using UV light by a third individual who had been blinded to both scans.

A convenience sample of 30 subjects was recruited. Participant characteristics are shown in the Table. Both sonographers identified the same levels as L3–4 and T9–10 in all 30 volunteers. Distances between markings at each insertion point are shown in the Table. Sonographer needle placement markings were identical in 4/30 (13%) of the T9–10 paramedian approaches, 2/30 (7%) of the L3–4 paramedian approaches, and 6/30 (20%) of the L3–4 midline approaches.

Although a mean discrepancy of 6.1–7.8 mm between preoperative and intraoperative scans may appear small and therefore clinically acceptable, when compared with the dimensions of some standard structures normally visualized during neuraxial ultrasonography (interlaminar distance 32 mm, ligamentum flavum length 12 mm, posterior longitudinal ligament length 10 mm), this discrepancy appears to be somewhat large.^{4,5} This difference is likely due to subtle changes in the patient's position, which could alter thoracic and lumbar neuraxial anatomy. Whether the difference could be overcome with needle angulation is unknown.

Based on the findings from this pilot study, preoperative ultrasonography for marking the neuraxial insertion point may not reliably replicate markings identified in the OR.

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Table Participants' characteristics and outcomes

Age (yr)	40.4 (11.4)
Male/Female	19 / 11
Weight (kg)	72.0 (11.2)
Height (cm)	175 (8)
BMI (kg·m ⁻²)	23.1 (2.7)
Distance between markings (mm)	
T9-10 paramedian	7.8 (5.0)
L3-4 paramedian	7.8 (3.3)
L3-4 midline	6.1 (4.3)

Data are presented as counts or means (standard deviations)

Further research is required to determine if preoperative ultrasonography reduces the number of skin punctures, OR procedural time, or success of neuraxial techniques.

Conflicts of interest None of the authors has any conflicts interests or affiliations to disclose.

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