



## A prospective observational study comparing the ease of use and safety of two neuraxial anesthesia kits on an epidural-spinal training model

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### To the Editor,

Quality and safety are major initiatives of the anesthesia community. Periodic evaluation of procedural skills could potentially decrease the risk of common and potentially dangerous errors<sup>1,2</sup> while promoting self-awareness. Although infectious complications following neuraxial anesthesia are rare, they remain a significant cause of morbidity/mortality and subsequent litigation.<sup>3</sup>

We queried whether introducing the new Wiley Spinal<sup>®</sup> neuraxial kit (Epimed, NY, USA) for continuous spinal anesthesia<sup>4</sup> (CSA) would affect sterile technique when compared with B. Braun's custom kit (B. Braun, PA, USA) for combined spinal-epidural anesthesia (CSE) used in our hospital. After anesthesiologists and fellows (subjects) received training in the new CSA kit, we compared the number of breaches in sterile technique that occurred when the subjects used the two kits in a simulation session.

Following approval by the University of British Columbia Research Ethics Board (March 2012) and informed consent, each subject ( $n = 12$ ) was trained

using a lumbar model, GENESIS Simulator (Epimed International, Farmers Branch, TX, USA), to perform CSA with the new kit. Interventions and observations were completed during March–July 2012. Within five weeks following their training, the subjects randomly used the CSE and CSA kits in a videotaped simulation session. To ensure that the videotape assessors were blinded to the subjects' identity, all subjects wore masks, gowns, and gloves to conceal their hands and forearms, and no panoramic views or sounds were captured. Comments were elicited about the kits and lumbar model, and satisfaction was scored on a five-point Likert scale (5 = very satisfied).

Two blinded assessors compared the performances randomly using a pre-established checklist<sup>5</sup> to evaluate possible contamination of the operating field. A point was deducted if a breach occurred. Sterile skin preparation and opening the kit were not evaluated in order to focus on draping and handling of needles/catheter for breaches in aseptic technique.

The videotapes were scored using the checklist. The areas assessed for breaches in aseptic technique were: placement of the drape on the model, placement of items on the tray and table, awareness of hand location, and handling the needles and catheter. *A priori*, maintenance of sterility during insertion was the surrogate for assessing risk of infection (safety).

The number of breaches was similar between the two kits (Wilcoxon signed-rank test:  $W = 42$ ;  $P = 0.14$ ). The median (range) number of breaches in the CSA vs CSE group was 3 (1–4) vs 2 (0–5), respectively. The median (range) difference in the number of breaches (CSA–CSE) was 1 (–3 to 3).

The total number of breaches was calculated for each subject for each technique and compared with the number

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**Table** Breaks in sterile technique during CSA/CSE placement by participant and area

Subject#	CSA/CSE score	Draping	Placing items on tray/table	Hand location awareness	Handling equipment	Catheter control
1	CSA: 3	+	+++	-	-	-
	CSE: 2	+	-	+	-	+
2	CSA: 3	+	-	+	-	-
	CSE: 3	+	-	+	-	-
3	CSA: 4	-	+	-	-	-
	CSE: 3	-	+++	-	-	+
4	CSA: 4	-	-	-	-	+
	CSE: 5	-	-	-	-	-
5	CSA: 2	+	-	+	-	+
	CSE: 2	++	-	+	+	-
6	CSA: 3	+++	-	+	-	-
	CSE: 2	+++	-	+	+	-
7	CSA: 3	+	-	-	-	+
	CSE: 2	+	-	-	+	+
8	CSA: 4	⊙	-	-	+	-
	CSE: 3	-	-	+	-	+
9	CSA: 1	++	+++	++	-	+
	CSE: 0	+	++	++	++	+
10	CSA: 1	-	++++	+	+	+
	CSE: 4	-	++++	-	-	-
11	CSA: 3	+	+++	-	-	-
	CSE: 0	+	++	+	++	+
12	CSA: 3	+++	-	-	+	-
	CSE: 0	+++	+	+	+	++

+ indicates breach; - indicates no breach; ⊙ indicates draping not adequately seen in videotape. The number of + marks equals the number of breaches by the participant in each area. CSA = continuous spinal anesthesia; CSE = combined spinal-epidural

of years of experience ( $\leq 20$  vs  $>20$ ) using a Wilcoxon rank-sum test. No difference was found. The median (range) total number of breaches in the  $\leq 20$  yr vs  $> 20$  yr group was 5 (1-9) vs 5 (3-6), respectively, ( $W = 13.5$ ;  $P = 0.56$ ).

After the study was completed, the results and some sample videos were presented at a departmental meeting. Discussion centred around the use of simulators/models, with or without videotaping, prior to using a new neuraxial technique or kit on patients. Since that meeting, the anesthesiologists have used the simulator/lumbar model to practice their own technique and to teach residents and medical students. Based on our study, we suggest that reviewing videotaped performances would allow evaluation of routine procedures and examine the impact of introducing a new kit. Videotaping might be an effective way to carry out periodic performance reviews, as the videos could be observed closely and repeatedly and deliver immediate and valuable feedback.

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**Conflicts of interest** None declared.

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