

Limited spread of spinal anesthesia using a hyperbaric local anesthetic in older patients**Hiroshi Iwama and Satoshi Ohmori**

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To the editor: Based on our clinical experiences, spinal anesthesia using a hyperbaric local anesthetic results in a narrower spread in older patients and a wider spread in full-term parturients compared with other adults. Although the reason for this remains unclear, the anatomical configuration of the spinal column may be a related feature [1]. In this letter, we evaluate our impressions retrospectively.

Twenty-nine older patients (more than 80 years old) classified as ASA II and 54 full-term parturients classified as ASA I–II were examined. Both groups received spinal anesthesia for lower extremity surgery or cesarean section during 1998. Spinal anesthesia was performed by injecting 2.0 ml 0.3% dibucaine hyperbaric solution via the L4–L5 or L3–L4 interspace at a rate of 0.25–0.5 ml·s⁻¹. Immediately afterwards, the patient was placed in the supine position, and the upper anesthetized thoracic dermatome level was assessed using an alcohol swab 10 min later. Four parturients showed anesthetized levels below T7 and took Trendelenburg's position to extend the levels, so they were excluded from the study. Thirty minutes after the initiation of spinal anesthesia, the anesthe-

tized levels were reassessed in 29 older patients and 50 parturients. Comparisons of demographic data and anesthetized levels were analyzed by unpaired *t*-test or Mann–Whitney *U*-test. Correlation analyses were made by Spearman's rank correlation test.

There were significant differences between the groups with regard to age, male/female ratio, height, weight, and body mass index. The upper anesthetized thoracic dermatome level 30 min later was markedly lower in older patients compared with that in full-term parturients (Table 1). In both older patients and full-term parturients, there was no significant correlation between upper anesthetized level and age ($P = 0.9966$ and $P = 0.3650$, respectively), height ($P = 0.3946$ and $P = 0.6597$, respectively), or body mass index ($P = 0.6325$ and $P = 0.5847$, respectively).

For older patients and for full-term parturients undergoing lower extremity surgery and cesarean section, we had routinely injected 2.0 ml dibucaine to extend the spread to around T10 in older patients and to around T4 in full-term parturients. Our results showed that, in spite of the same volume of dibucaine being injected, the upper anesthetized dermatome levels differed markedly: T9 for older patients and T4 for full-term parturients as a median value. Because almost no parturients in this study had their position changed, this result might support our clinical impression.

Furthermore, neither the age, height, or body mass index affected the spinal spread. This also implies that the spread reaches a different ceiling in older patients and in full-term

Table 1. Demographic data and anesthetized levels

	Older patients ($n = 29$)	Parturients ($n = 50$)	<i>P</i> -value
Age (year)	82 ± 5 (80–98)	32 ± 6 (21–42)	<0.0001
Male/female	16/13	0/50	<0.0001
Height (cm)	151 ± 9 (140–175)	157 ± 6 (143–168)	0.0007
Weight (kg)	49 ± 8 (38–70)	67 ± 10 (49–88)	<0.0001
Body mass index (kg·m ⁻²)	21 ± 3 (17–27)	27 ± 3 (20–34)	<0.0001
Upper anesthetized thoracic dermatome (30 min later)	9 (6–12)	4 (3–6)	<0.0001

The value of the dermatome level is the median (range), the value for the male/female ratio is the number of patients, and other data are mean ± SD (range)

parturients. Thus, these results suggest that the spread of anesthetic using a hyperbaric solution narrows in older patients and widens in full-term parturients. Recent reports [2,3] using magnetic resonance imaging have demonstrated that the curvature of the spine in the supine position becomes straighter with a reduction in thoracic kyphosis during pregnancy, suggesting a cause of the enhanced spinal spread. Conversely, it is possible that the spine in older patients is bent with exaggerated thoracic kyphosis, so that it may be considered that the spinal spread narrows in older patients. However, for full-term parturients other factors, such as a reduction of cerebrospinal fluid volume caused by the gravid uterus, should be considered [4,5]. We speculate that the spinal configuration strongly influences the spinal spread when a hyperbaric solution is used, and the narrow spread in older patients may be caused by the characteristics of their spinal configuration. Further evaluation using hyperbaric bupivacaine is needed.

References

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