Teaching an Ultrasound-Guided Median Interspinous In-Plane Approach for Spinal Anesthesia in Patients with Obesity

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Background

- Neuraxial anesthesia is challenging in patients with obesity due to:
  - Poor palpable surface landmarks
  - Increased depth to intrathecal space
  - Higher rates of multiple puncture attempts and prolonged procedure time
- Ultrasound guidance improves success; however:
  - Paramedian approach requires longer and oblique needle trajectory
  - Limited visualization of deeper targets in patients with higher BMI

Hypothesis

- Compared to paramedian approach, median interspinous in-plane approach will
  - Improve first attempt and overall success rate
  - Reduce puncture attempts
  - Reduce procedural time
  - Improve virtualization of landmarks on ultrasound

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Study Design and Methods

- Randomized control trial
- 80 patients with BMI >30 kg/m² undergoing elective cesarean delivery
- Computer-generated sequence with concealed group allocation
  - Group M: Median interspinous in-plane approach (n=40)
  - Group P: Paramedian interlaminar in-plane approach (n=40)

Outcomes

- **Primary Outcomes**
  - First-attempt and overall success rate
  - Number of puncture attempts
  - Procedural time
- **Secondary Outcomes**
  - Sonographic visibility of landmarks

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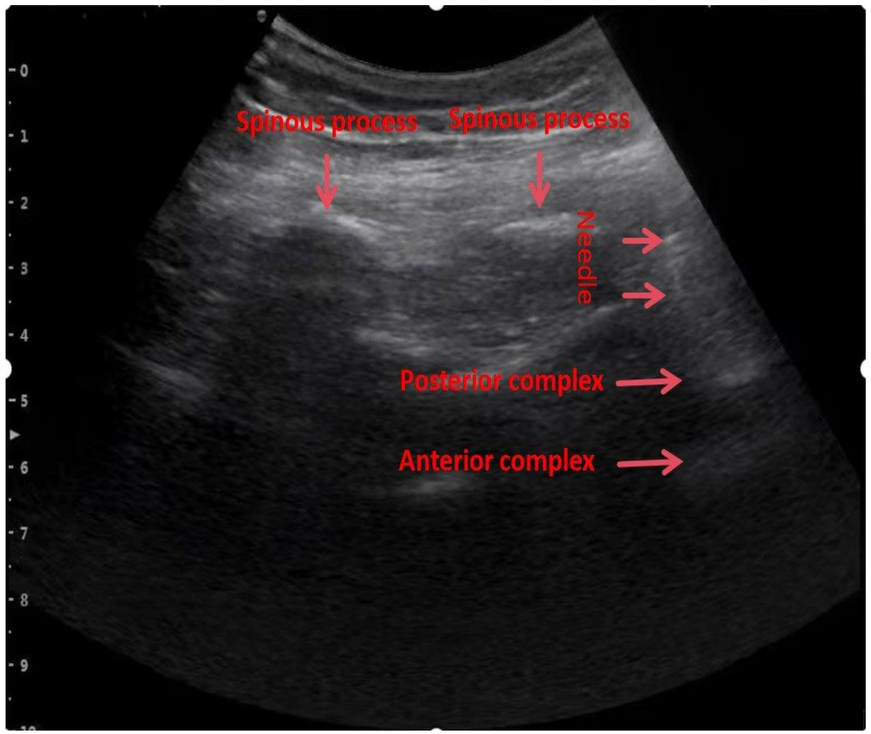
Results



Outcomes	Group P Paramedian interlaminar approach *(n = 40)*	Group M Median Interspinous approach *(n = 40)*	P value
First-attempt Success (%)	10 (25)	29 (72.5)	0.001
Procedure Time (s)	387.00 (310.50, 452.50)	324.50 (299.50, 359.50)	0.002
Number of Attempts	2 (1, 3)	1 (1, 2)	0.001
Overall Success (%)	34 (85)	40 (100)	0.026
Ultrasound Visibility	2 (1, 2)	3 (1, 2)	0.001

Note: Median interspinous approach significantly improves success rate and procedural efficiency.

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Conclusion

- Ultrasound-guided Median interspinous in-plane approach:
  - Improves first-attempt and overall success
  - Reduces puncture attempts
  - Shortens procedure time
- Visibility scores are similar between groups

Mechanistic Advantages

- Flat midline surface → better probe stability
- Superficial spinous processes → clearer landmarks
- Shorter, more vertical needle path → improved real-time guidance

Clinical Implications

- Efficient and reproducible technique
- Suitable for routine obstetric anesthesia
- Valuable for teaching and training in ultrasound-guided neuraxial techniques