

A Surrogate Evaluation of Dura Proximity Across Loss-of-Resistance Techniques During Combined Spinal–Epidural Analgesia: A Prospective Cohort Study

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Introduction

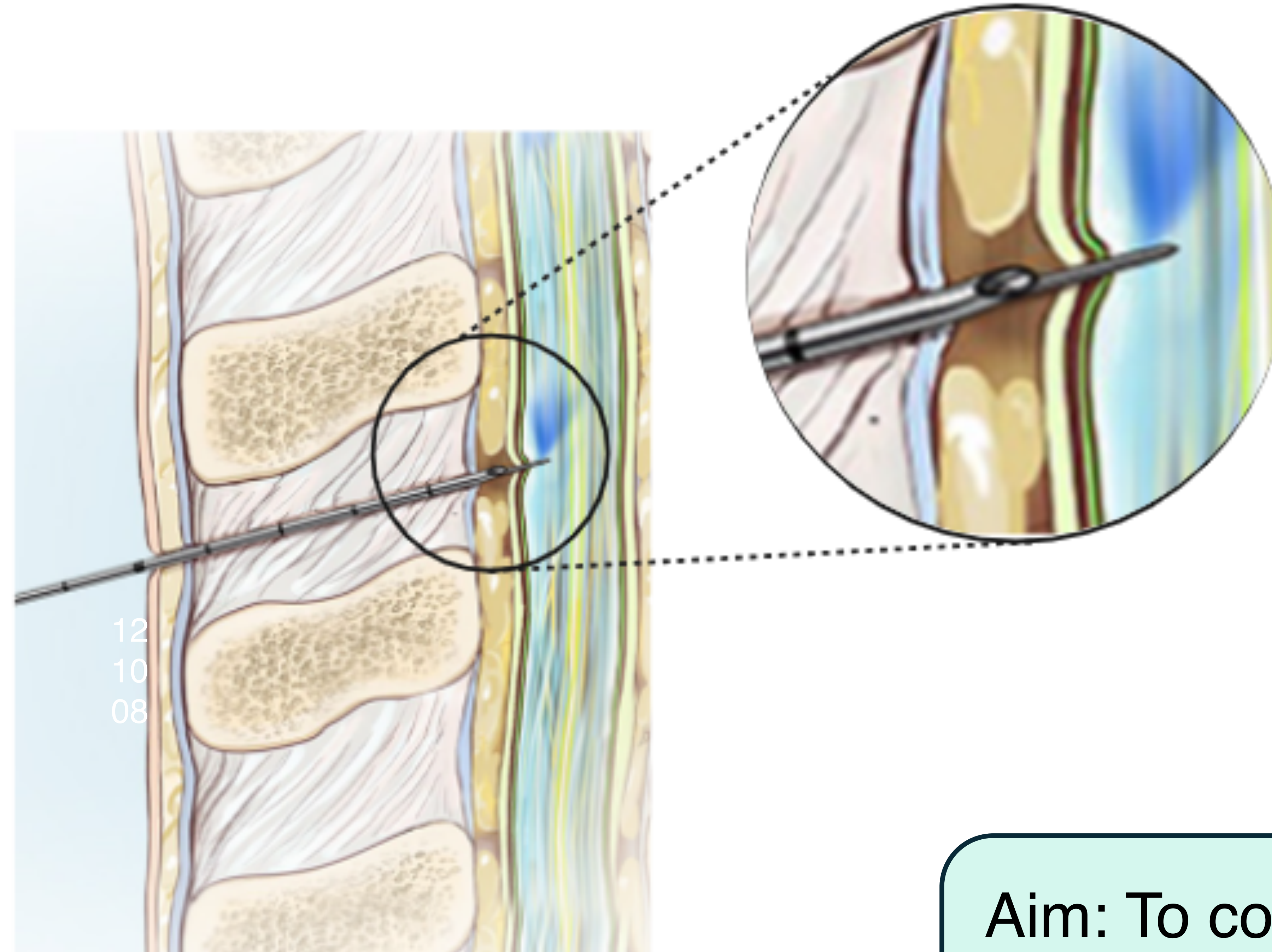
Identification Epidural space

Loss of resistance=

Method of injection

+

Medium



Hypothesis:
Continuous large-volume saline loss-of-resistance increases the safety margin by generating greater separation between the Tuohy needle and the dura.

Aim: To compare how different loss-of-resistance techniques influence the Tuohy–spinal needle distance, as a surrogate marker of dural proximity during combined spinal–epidural procedures.



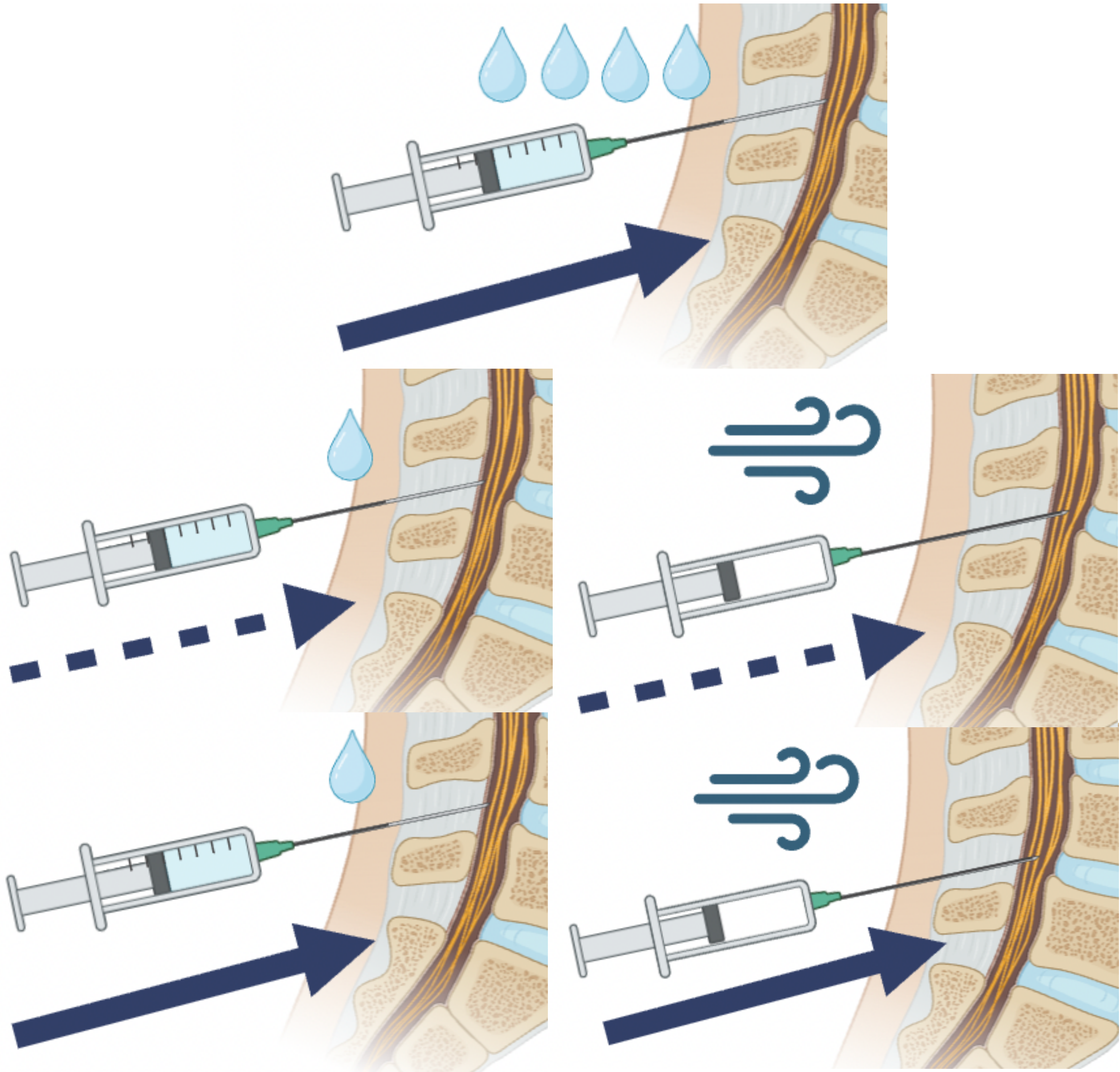
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Methods

Single-center prospective cohort study comparing different LOR techniques during combined spinal epidural anesthesia

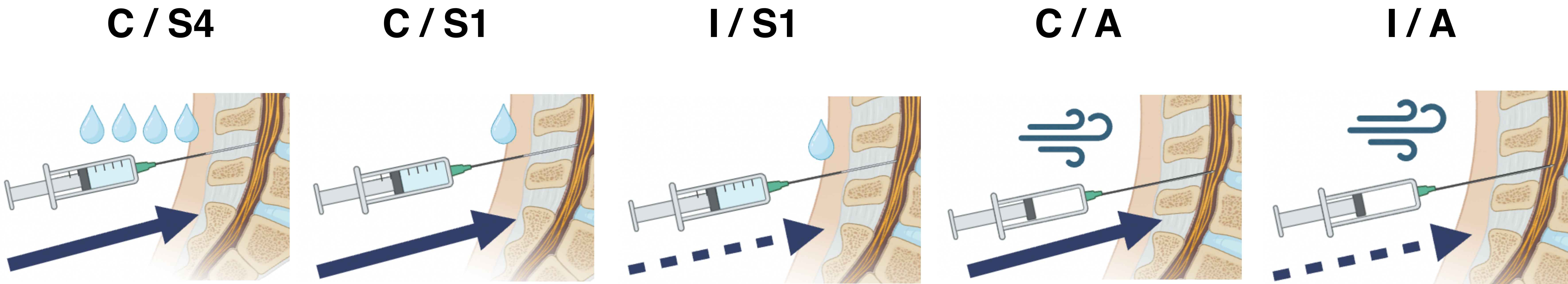


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Results



n	21	25	20	21	20
Age, mean (SD)	33.3 (3.9)	33.3 (3.4)	35.2 (4.7)	35.9 (3.3)	35.0 (3.6)
BMI , mean (SD)	27.5 (6.1)	28.9 (4.6)	27.9 (4.4)	30.2 (3.9)	28.5 (3.9)
Distance, mean (95% CI)	11.4 (10.5-12.4)	10.0 (9.2-10.9)	8.3 (7.3 - 9.3)	8.3 (7.3 - 9.2)	9.6 (8.6-10.6)
Difference, mean (SD)	-	1.4 (0.6)	3.1 (0.7)	3.1 (0.7)	1.8 (0.7)
P-value	-	0.034	<0.001	<0.001	0.009

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Discussion

The mechanical interaction between the epidural needle and the dura is influenced by both the physical properties of the injected medium and the technique used.

Our findings provide quantitative mechanical evidence that the hydraulic properties and volume of the medium used during loss-of-resistance influence the final position of the Tuohy needle relative to the dura.

The quantifiable increase in Tuohy–dura distance observed with higher-volume saline loss-of-resistance may be particularly relevant in training settings or in anatomically challenging cases.

Limitations: Single-center design, non-randomized group allocation, and inclusion of only experienced anesthesiologists.