

Supplementary Table S1. Between-group differences in postoperative NRS scores and sensitivity analysis

Postoperative time	Group comparison	Adjusted NRS difference (95% CI)	Primary model adjusted p-value	Sensitivity model adjusted p-value	Robustness assessment
At rest					
4 h	L vs SA	-3.49 (-4.51, -2.46)	<0.001	<0.001	Consistent
4 h	D vs SA	-4.80 (-5.83, -3.77)	<0.001	<0.001	Consistent
4 h	D vs L	-1.31 (-2.34, -0.29)	0.008	0.004	Consistent
8 h	L vs SA	-3.37 (-4.40, -2.34)	<0.001	<0.001	Consistent
8 h	D vs SA	-4.69 (-5.71, -3.66)	<0.001	<0.001	Consistent
8 h	D vs L	-1.31 (-2.34, -0.29)	0.008	0.005	Consistent
12 h	L vs SA	-3.00 (-4.03, -1.97)	<0.001	<0.001	Consistent
12 h	D vs SA	-4.40 (-5.43, -3.37)	<0.001	<0.001	Consistent
12 h	D vs L	-1.40 (-2.43, -0.37)	0.004	0.004	Consistent
18 h	L vs SA	-1.83 (-2.86, -0.80)	<0.001	<0.001	Consistent
18 h	D vs SA	-3.34 (-4.37, -2.32)	<0.001	<0.001	Consistent
18 h	D vs L	-1.51 (-2.54, -0.49)	0.002	0.002	Consistent
24 h	L vs SA	-1.71 (-2.74, -0.69)	<0.001	<0.001	Consistent

Postoperative time	Group comparison	Adjusted NRS difference (95% CI)	Primary model adjusted p-value	Sensitivity model adjusted p-value	Robustness assessment
24 h	D vs SA	-1.54 (-2.57, -0.52)	0.001	0.001	Consistent
24 h	D vs L	0.17 (-0.86, 1.20)	0.919	0.906	Consistent
72 h	L vs SA	-0.29 (-1.31, 0.74)	0.790	0.782	Consistent
72 h	D vs SA	-0.63 (-1.66, 0.40)	0.322	0.385	Consistent
72 h	D vs L	-0.34 (-1.37, 0.68)	0.713	0.792	Consistent
During movement					
4 h	L vs SA	-2.91 (-3.94, -1.89)	<0.001	<0.001	Consistent
4 h	D vs SA	-4.83 (-5.86, -3.80)	<0.001	<0.001	Consistent
4 h	D vs L	-1.91 (-2.94, -0.89)	<0.001	<0.001	Consistent
8 h	L vs SA	-2.80 (-3.83, -1.77)	<0.001	<0.001	Consistent
8 h	D vs SA	-4.63 (-5.66, -3.60)	<0.001	<0.001	Consistent
8 h	D vs L	-1.83 (-2.86, -0.80)	<0.001	<0.001	Consistent
12 h	L vs SA	-2.17 (-3.20, -1.14)	<0.001	<0.001	Consistent
12 h	D vs SA	-4.00 (-5.03, -2.97)	<0.001	<0.001	Consistent
12 h	D vs L	-1.83 (-2.86, -0.80)	<0.001	<0.001	Consistent

Postoperative time	Group comparison	Adjusted NRS difference (95% CI)	Primary model adjusted p-value	Sensitivity model adjusted p-value	Robustness assessment
18 h	L vs SA	-1.06 (-2.08, -0.03)	0.042	0.051	Sensitivity analysis not significant
18 h	D vs SA	-1.66 (-2.68, -0.63)	<0.001	<0.001	Consistent
18 h	D vs L	-0.60 (-1.63, 0.43)	0.356	0.383	Consistent
24 h	L vs SA	-0.97 (-2.00, 0.06)	0.068	0.068	Consistent
24 h	D vs SA	-1.09 (-2.11, -0.06)	0.035	0.034	Consistent
24 h	D vs L	-0.11 (-1.14, 0.91)	0.963	0.958	Consistent
72 h	L vs SA	-1.03 (-2.06, -0.00)	0.050	0.056	Sensitivity analysis not significant
72 h	D vs SA	-1.37 (-2.40, -0.34)	0.005	0.009	Consistent
72 h	D vs L	-0.34 (-1.37, 0.68)	0.713	0.781	Consistent

Primary-model estimates are adjusted mean differences on the original 0-10 NRS scale with 95% confidence intervals. For contrasts expressed as the first-listed group minus the second-listed group, negative values indicate lower NRS scores in the first-listed group.

The sensitivity analysis used inverse-normal rank-transformed NRS scores with the same fixed-effects and random-effects structure as the primary model. Sensitivity-model estimates are not displayed because they are expressed in standardized rank units and are not directly comparable with differences on the original NRS scale.

For both models, Tukey adjustment was applied to the three pairwise treatment-group comparisons within each postoperative time-by-condition combination. 'Consistent' indicates that the primary and sensitivity analyses had the same effect direction and the same statistical-significance classification at the 0.05 level.

NRS, numerical rating scale; CI, confidence interval; SA, standard analgesia; L, TAP block with levobupivacaine; D, TAP block with levobupivacaine and dexmedetomidine.