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Evaluation of diaphragmatic function after interscalene block with liposomal bupivacaine: A randomized controlled trial

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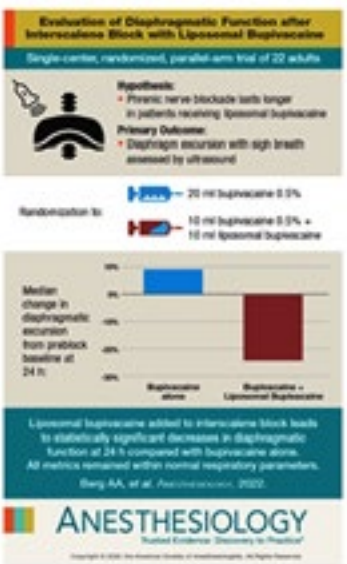
Background: Interscalene blocks provide analgesia for shoulder surgery but also cause phrenic nerve paralysis. Liposomal bupivacaine is approved for use in interscalene blocks with the potential to provide longer pain control. However, the impact of liposomal bupivacaine on the phrenic nerve has not been evaluated. It was hypothesized that patients who received an interscalene block with the addition of liposomal bupivacaine would have a decreased diaphragmatic excursion at 24h.

Methods: This was a double-blinded study of adult patients who were randomized to receive an interscalene block either with 20 ml 0.5% bupivacaine (bupivacaine group) or 10 ml 0.5% bupivacaine plus 10 ml liposomal bupivacaine. Twenty-six patients were randomized with 22 included in the analysis. Diaphragmatic excursion (via ultrasound) and spirometry were assessed before the block, in PACU, and at 24 h. The primary outcome was diaphragm excursion with sigh.

Results: At 24 h, the liposomal bupivacaine group median [25th, 75th], had a greater percent change in diaphragmatic excursion during sigh breath compared to the bupivacaine group, –24% [–30, –9] versus 9% [–8, 26], difference in location, 32 (95% CI, 12 to 52), P = 0.007. Five patients in the liposomal bupivacaine group had a greater than 25% reduction in diaphragmatic excursion at 24 h versus zero in the bupivacaine group. They also had a significantly greater percent reduction in FEV1 and FVC compared with the bupivacaine group at 24 h (median decrease of 22% vs. 2%, P = 0.006, and median decrease of 19% vs. 1%, P = 0.049, respectively).

Conclusions: The addition of liposomal bupivacaine to bupivacaine in an interscalene block results in statistically significant reductions in diaphragm excursion and pulmonary function testing 24 h after block placement when compared to bupivacaine alone. This reduction, however, falls within the range of normal diaphragmatic function.



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