Stimulation threshold greatly affects the predictive value of intraoperative nerve monitoring.

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Abstract

OBJECTIVES/HYPOTHESIS:
Using a standardized, graded, intraoperative stimulation protocol, we aimed to delineate the effects of various stimulation levels applied to the recurrent laryngeal nerve on the postoperative predictive value of intraoperative nerve monitoring.

STUDY DESIGN:
A total of 917 nerves at risk were included for analysis. Intraoperatively, patients underwent stimulation of the recurrent laryngeal nerve at 0.3, 0.5, 0.8, and 1.0 mA followed by postoperative laryngoscopy for correlation with intraoperative findings.

METHODS:
Sensitivity, specificity, positive predictive value, and negative predictive value were calculated at each stimulation level.

RESULTS:
Sensitivity, specificity, positive predictive value, and negative predicative values ranged from 100% to 37%, 6% to 99%, 2% to 39%, and 100% to 99%, respectively at 0.3 to 1.0 mA. No demographic variables affected sensitivity or specificity. Receiver operating characteristic analysis identified 0.5 mA as the level of stimulation that optimizes sensitivity and specificity.

CONCLUSIONS:
The predictive value of intraoperative nerve monitoring varies greatly depending on the stimulation levels used. At low amplitudes of stimulation, nerve monitoring has high sensitivity and negative predictive value but low specificity and positive predictive value, related to the high rate of false positives. At high levels of stimulation, specificity and negative predictive value are high, sensitivity is low, and the positive predictive value rises as the rate of false negatives increase and the rate of false positives decrease. A stimulation level of 0.5 mA optimizes the predictive value of nerve monitoring; however, stimulation at multiple levels significantly improves the predictive value of intraoperative nerve monitoring.

LEVEL OF EVIDENCE:
2b.

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KEYWORDS:
Recurrent laryngeal nerve; intraoperative nerve monitoring; thyroid surgery

PMID:
25302692
[PubMed - indexed for MEDLINE]