

Safety and Reliability of a Handheld Stimulator for Neural Monitoring During Thyroid Surgery

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ABSTRACT

Objective. The Checkpoint nerve stimulator (Checkpoint Surgical, Cleveland, OH) is a U.S. Food and Drug Administration-cleared device for neural localization and monitoring during surgery. Its safety, efficacy, and reliability for neural monitoring during thyroid and parathyroid surgery have not been compared to more standard formats of neural monitoring.

Study design. Retrospective review.

Methods. Vagal, recurrent, and superior laryngeal nerve monitoring were performed using both the Checkpoint stimulator and Medtronic NIM 3.0 laryngeal electromyography endotracheal tube (Medtronic, Jacksonville, FL) during thyroid and parathyroid surgery. A total of 21 operated sides in 15 patients were included for analysis. Latency and amplitude data for the Checkpoint stimulator were recorded using the NIM monitor and compared to normative endotracheal tube surface electrode data.

Results. Mean amplitude using the Checkpoint stimulator was 574.6 microvolts (μV), 1060.6 μV , and 182.8 μV for the vagus, recurrent laryngeal, and superior laryngeal nerves, respectively. Mean amplitude using standard laryngeal electromyography was 709 μV , 1077.0 μV , and 183.7 μV for the same nerves. Mean latency was significantly shorter with stimulation of the recurrent laryngeal nerve compared to the vagus nerve with both stimulators ($P < 0.001$). No neural injuries occurred during the study.

Conclusion. The Checkpoint stimulator is a safe and reliable alternative to traditional laryngeal electromyography providing equivalent induced electromyography of the vocalis for neural monitoring during thyroid and parathyroid surgery.

Level of Evidence. 4.

Keywords. Checkpoint stimulator; Endotracheal tube surface electrodes; electromyography; nerve stimulator; neural monitoring; parathyroid surgery; thyroid surgery.



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