

Comparison of a Handheld Device vs Endotracheal Tube-Based Neuromonitoring for Recurrent Laryngeal Nerve Stimulation

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KEY TAKEAWAYS

Loss of Signal presents increased surgical challenge.



Deciding whether a Loss of Signal is true or spurious and then troubleshooting the device can add surgical time and lead to surgeon frustration.



Endotracheal Tube-Based Neuromonitoring was subject to high rates of false loss of signal that increased with Thyroidectomy Difficulty Score.

False Loss of Signal with Endotracheal Tube-Based Neuromonitoring in total thyroidectomy (first operated side) may expose patients to unnecessary staged surgery.



7 patients (8.3%) had loss of Endotracheal Tube-Based Neuromonitoring signal on the initial side of dissection. However, upon pDS [Checkpoint® stimulation with palpation], robust RLN contraction was elicited, allowing the surgeon to proceed to the contralateral side without concern for bilateral RLN injury.

Stimulation using the Checkpoint Stimulator with palpation is a reliable alternative to Intraoperative Nerve Monitoring in Thyroidectomy.¹



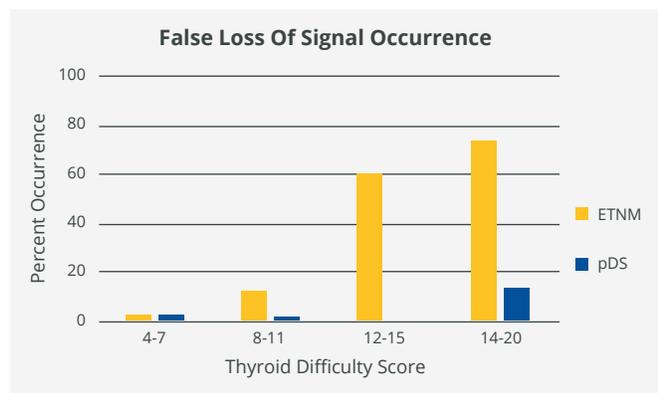
The study lends support to the notion that a device with fewer potential points of failure may be a more robust monitoring platform.



We believe that this signal [Checkpoint stimulation with palpation] is convincingly palpated even in novice hands and has a limited learning curve.



Scan the QR code to watch the Checkpoint stimulation with palpation technique in this surgical video.



Endotracheal Tube-Based Neuromonitoring showed increased occurrence of false Loss of Signal as difficulty increased, which was not observed for Checkpoint stimulation with palpation.

ETNM = Endotracheal Tube-Based Neuromonitoring
pDS = Checkpoint Stimulation with Palpation

Source: Otolaryngology Head Neck Surg, 2021 May 25

¹As the authors state, "Quantitative waveform information provided by ETNM software for tube-based neuromonitoring that is not available for pDS. The International Neural Monitoring Study Group has described how changes in waveform amplitude and latency can help troubleshoot suspected false LOS, such as tube rotation or displacement, and prognosticate nerve function in true injuries."

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ABSTRACT

Objective. To measure the effect of thyroidectomy difficulty on intraoperative neuromonitoring false loss of signal (LOS) and to compare intraoperative endotracheal tube-based neuromonitoring (ETNM) and Checkpoint palpation-based direct stimulation (pDS) signals with postoperative laryngoscopy. We hypothesized that pDS has higher a positive predictive value for postdissection confirmation of recurrent laryngeal nerve function than ETNM and that this difference is accentuated with increasing thyroidectomy difficulty.

Study design. Prospective single-arm cross-sectional study comparing ETNM and pDS for patients undergoing hemi-, total, or completion thyroidectomy from July 2018 to March 2020.

Setting. Single-surgeon series at a tertiary care hospital.

Methods. Percentage concordance and positive and negative predictive values were measured. Each thyroidectomy was assigned a validated thyroidectomy difficulty score, and recorded recurrent laryngeal nerve signals were compared with postoperative vocal fold mobility.

Results. Percentage concordance was 90.09%. Positive and negative predictive values were 0.19 (95% CI, 0.09-0.31) and 1.0 for ETNM and 0.59 (95% CI, 0.35-0.82) and 1.0 for pDS. The difference in positive predictive value was significant (0.40 [95% CI, 0.33-0.47], $P < .001$). False LOS rates for ETNM and pDS were 13.19% versus 3.30% (9.89% [95% CI, 1.80%-18.62%], $P = .0155$), 44.11% versus 0% (44.11% [95% CI, 25.80%-60.54%], $P < .001$), and 73.33% versus 13.33% (60% [95% CI, 24.76%-78.46%], $P = .001$) for the second through fourth thyroidectomy difficulty score quartiles, respectively. False LOS with ETNM was linearly correlated with increasing difficulty ($R^2 = 0.97$).

Conclusion. ETNM was subject to high rates of post dissection false LOS that increased with thyroidectomy difficulty score. pDS is a reliable alternative that has higher positive predictive value than ETNM, particularly in more challenging cases such as those with posteriorly fixed thyroid cancers and fibrotic glands.

Evidence level. 2.

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