

## What is the Learning Curve for Intraoperative Neuromonitoring in Thyroid Surgery?

### Content

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**Background:** The study describes the initial experience and learning curve of intraoperative neuromonitoring (IONM) during thyroidectomy. We describe the prevalence and patterns of IONM technical problems.

**Methods:** Prospective series of 152 consecutive thyroid operations (304 nerves at risk) were analyzed. Standard technique consists of monitoring vagal and RLNs before, during and after resection. Personal gain of experience was defined by the preceding number of thyroid operations. To establish the number of thyroidectomies required before achieving an effective and safe IONM technique, all of the procedures were divided into three chronological groups of about 50 cases (groups 1, 2, and 3).

**Results:** Patients (90%) had successful IONM with initial endotracheal tube position. Fifteen patients (10%) needed further tube adjustment. Out of 15 patients 14 (93%) were due to non-optimal contact of endotracheal surface electrodes to vocal cords. Tube malrotation was the main reason for initial failure (53%). The success rates of prompt IONM technique were 80% in group 1, 92% in group 2, and 98% in group 3 ( $p < 0.05$ ). Mean operating time was low in group 3 ( $p < 0.03$ ). Vagus and RLNs were localized and monitored in all the cases (100%). The incidence of temporary RLN injury was 2.6%. No permanent complications occurred. Negative EMG response indicated an altered function of RLN and stage thyroidectomies were scheduled. Transient RLN palsies were seen without changes during the entire study period.

**Conclusions:** This is the first series of thyroidectomies with standardized IONM technique performed in Italy. Neuromonitoring was effective in providing identification and function of laryngeal nerves. IONM successful rates were affected considerably by the extent of surgical and anesthesiological experiences, starting with relatively low rates in the beginner group and then increasing. We assessed the learning curve: improved operative variables and safe technique were seen in about 50 patients.