

CHAPTER 6

INTRAOPERATIVE NEUROMONITORING AND ANESTHESIA MANAGEMENT IN THYROID SURGERY

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INTRODUCTION

Thyroid surgery is one of the most frequently performed head and neck surgical procedures for benign and malignant thyroid diseases. The most critical complications are injury to the recurrent laryngeal nerve (RLN) and the superior laryngeal nerve (SLN). RLN injury may result in hoarseness, aspiration, dysphagia, and significant deterioration in quality of life, whereas SLN injury particularly leads to loss of high-pitched voice and vocal fatigue in professional voice users. With technological advances, intraoperative neuromonitoring (IONM) has gained increasing importance in the prevention of nerve injuries and has become standard practice in most centers. However, its effectiveness is directly related not only to the surgeon's dissection technique but also to appropriate anesthesia management (1,2). The most recent International Neural Monitoring Study Group guidelines (1) further emphasize its role in high-risk thyroidectomy cases.

HISTORICAL DEVELOPMENT OF NEUROMONITORING

IONM was first introduced in experimental studies in the 1960s and has been used in thyroid surgery since the 1990s. While intermittent stimulation techniques were initially employed, today continuous IONM (c-IONM) systems have been developed, allowing real-time monitoring of nerve function (3,4).

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malignancies. Meta-analysis data have shown that IONM significantly reduces permanent RLN palsy in high-risk thyroidectomy cases. In cases of bilateral nerve dysfunction, the decision can be made to stage surgery rather than performing bilateral thyroidectomy in a single session. IONM is also beneficial for the preservation of the external branch of the superior laryngeal nerve, especially in professional voice users (8,9).

LIMITATIONS

Electrode placement and displacement may affect signal quality, and false negative and false positive results may occur. Device cost and increased operative time may also be limiting factors.

CURRENT GUIDELINES

The American Thyroid Association recommends IONM in high-risk cases, whereas the European Thyroid Association considers its routine use optional but recommends it in malignancy and reoperation cases (9). The 2023 updated guidelines from the International Neural Monitoring Study Group highlight IONM as strongly recommended in reoperations, malignancies, and extensive neck dissections (10).

CONCLUSION

Intraoperative neuromonitoring in thyroid surgery is an important technology that reduces nerve injury and improves patient safety. However, its effectiveness is dependent on appropriate anesthesia management. Limited use of muscle relaxants, preference for TIVA protocols, correct application of electrode intubation, and close collaboration between surgeon and anesthesiologist are essential for success.

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