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Short Communication

Endocrine Surgical Procedure: Thyroidectomy and Emergency Surgical Procedures

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Abstract
Thyroidectomy is a well-described procedure used to excise the thyroid gland. It is a common procedure in modern medicine and may be used to treat malignancy, benign disease, or hormonal disease that is not responsive to medical management. The delicate anatomy of the anterior neck, the critical nature of adjacent structures, and tight working spaces make thyroidectomy a challenging procedure to perform safely and effectively. Thyroidectomy, as a procedure, has developed as the anatomic understanding and surgical approaches have evolved. In the 1870s, Billroth and Kocher pioneered the classic thyroidectomy and reported a mortality rate of 8%, a significant success at the time.

Introduction

The thyroid gland is an endocrine gland that secretes thyroid hormone, a regulatory hormone with multiple critical physiologic functions. Hypothyroid and hyperthyroid states both produce a relatively non-specific constellation of symptoms, and thyroid malfunction is a consideration in the differential diagnosis for a similarly long list of symptoms. Nevertheless, hypothyroidism is classically described as producing cold intolerance, dry skin, lethargy, constipation, pretibial edema, and weight gain. Hyperthyroidism is classically associated with weight loss, heat intolerance, osteoporosis, muscle weakness, muscle tremor, brittle hair or hair loss, and atrial fibrillation.

In the immediate vecinity of the thyroid gland are the parathyroid glands, which can be identified by their brownish-yellow hue as compared to the yellow hue of fat globules. The superior parathyroid glands are classically found near the posterolateral aspect of the superior pole approximately 1 cm superior to the intersection of the recurrent laryngeal nerve (RLN) and the inferior thyroid artery (ITA). The inferior parathyroid glands are described as being located adjacent to the inferior aspect of the thyroid lobe between the inferior thyroid artery and vein. Importantly, the inferior parathyroid glands are ventral (anterior to) the plane of the recurrent laryngeal nerve, though their location is more variable than the superior glands.

The vagus nerve gives off two branches bilaterally, the superior and the recurrent laryngeal nerves (RLN), which are most clinically relevant during thyroid surgery. The recurrent laryngeal nerve, later branching off cranial nerve X, travels distally and takes a recurrent proximal course. On the right side, the RLN loops around the subclavian artery, and on the left side, it loops around the aortic arch and courses proximally towards the thyroid gland. The recurrent laryngeal nerves run deep to the gland and are at risk of injury during thyroidectomy. The right recurrent laryngeal nerve runs at a more oblique angle as compared to the left due to its course around the right subclavian artery. The left recurrent laryngeal nerves tend to take a straighter course within the tracheoesophageal groove. The RLN classically enters the thyroid posterior to the cricothyroid joint and can be found in close proximity to the superior parathyroid gland.

Emergency surgery
In case of emergency surgical procedure, rapid preparation of the patient includes administration of β-blockers, corticosteroids, anti-thyroid drugs and iodine. The administration of β-blockers should be judicious in lieu of potential risk of congestive cardiac

failure precipitation, bronchospasm in chronic obstructive pulmonary disease (COPD) patients and hypoglycemia in diabetic patients.

Administration of anesthesia

The practice of superficial and deep cervical plexus blockade as well as cervical epidural anaesthesia are not recommended anymore as these techniques are invariably associated with potential risk of complications such as inadequate anesthesia or wearing of the effect of local anesthetics and cardio respiratory arrest.

Airway management

Availability of fibreoptic bronchoscope eases the pressure to a large extent on the attending anesthesiologist. The relaxation caused by the anesthetic agents and muscle relaxants may lead to obstruction of the airway which can present with marked stridor initially during induction of anesthesia and inability to ventilate partially or completely with face mask after administration of general anesthesia.

Positioning

The surgical access warrants maximum exposure of thyroid gland which can be achieved by placing a padded ring under the head of the patient and a rolled sheet under the shoulders. The administration drugs necessitate an easy access to intravenous line which can be made possible with the use of extension tubing.

Superior laryngeal nerve damage

Superior laryngeal nerve can get damaged in 3-5% of the thyroidectomy procedures and the commonest injury occurs to external branch of superior laryngeal nerve, resulting in the paralysis of cricothyroid muscle which causes alteration in the quality of voice as the vocal folds fail to tense during sound production.

Conclusion

The perioperative morbidity in patients with thyroid disease can be greatly reduced by proper preoperative preparation and optimization of physiological status of thyroid. Airway management in such patients poses unique challenges and one should be thoroughly prepared for any anticipated or unpredictable airway difficulty. Postoperatively, any incidence of hemorrhage leading to formation of hematoma can cause respiratory obstruction.

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