



ANESTHETIC MANAGEMENT OF TOTAL THYROIDECTOMY IN A PATIENT WITH CHRONIC ENLARGED GOITER AND CARDIAC ARRHYTHMIA: A CASE REPORT

Anaesthesiology

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ABSTRACT

Managing airways in patients with long-standing goiter, especially when combined with conditions like atrial fibrillation, presents significant challenges in anesthesia. In this case, the patient exhibited a huge goiter of both lobes of thyroid accompanied by moderate tracheal compression and atrial fibrillation. Anesthesia induction involved sedation and supplemental oxygenation, followed by intubation using a flexible fiberoptic laryngoscope and a flexometallic endotracheal tube. The use of a flexible laryngoscope posed challenges in avoiding any pressure response during the procedure. Additionally, recognizing hyperthyroidism as a causative factor for atrial fibrillation played a crucial role in anesthesia management. Overall, careful planning, specialized equipment, and an understanding of the underlying conditions are essential for successful airway management in such complex cases.

KEYWORDS

Airway management, Thyroidectomy, Atrial fibrillation, Goiter, Hyperthyroidism

INTRODUCTION

Thyroidectomy is the common endocrine surgical procedure being carried out throughout the world. Majority of these cases have deranged thyroid functions test and occasionally may have even malignant changes in the thyroid gland. The presence of a long-standing goiter with altered airway anatomy poses a significant challenge for airway management, particularly in cases complicated by cardiac arrhythmias [1-3]. In this case, we will discuss a patient presenting with both a longstanding goiter and atrial fibrillation. Thorough preparation and anticipation of anesthetic complexities can lead to improved outcomes in patients undergoing such procedures

CASE PRESENTATION

A 65-year-old female presented to the anesthesia clinic with a painless neck swelling persisting for 9 years, accompanied by dyspnea when lying down for the past 8 months, which improved in the lateral position. The swelling was located in midline on the anterior neck, moved with swallowing and was not associated with dysphagia or hoarseness. The patient also reported weight loss.

On examination, her weight was 46 kg, height 142 cm, and BMI 22.8kg/m². Pulse rate was irregular at 92/min, with a blood pressure averaging 118/76 mmHg. The patient was Mallampati class III, limited neck movements, and unassessable sternal and thyroidal distances. Thyroid eye signs were absent. Inspection revealed a spherical swelling extending from the thyroid to the sternal notch, with smooth skin and no tenderness or temperature elevation. Auscultation revealed no bruits.

Blood Investigations were normal and thyroid function tests indicated hyperthyroidism. Chest x-ray showed normal. X-Ray Neck (AP & lateral) showed below. Indirect laryngoscopy showed Bilateral vocal cord movement. FNAC confirmed a multinodular goiter. ECG showed atrial fibrillation with controlled ventricular rate & echocardiography revealed mild cardiac abnormalities. Metoprolol tartrate 25 mg twice daily were initiated as per cardiologists recommendation.



Figure - X-Ray Neck (AP & lateral)

Preoperative evaluation led to the decision for surgery under ASA III

classification. Preoperative fasting was confirmed, and informed consents were obtained. Preoperative planning was conducted to secure the airway in anticipation of potential technical intubation challenges, following the difficult airway algorithm outlined by the American Society of Anaesthesiologists (ASA) [4]. Awake fiberoptic intubation was planned, with a difficult airway trolley prepared. Airway preparation included nebulized lignocaine and cautious sedation. After pre-oxygenation and attenuation of pressure response, nasal bronchoscopy guided intubation was performed with a flexometallic endotracheal tube. Anaesthesia was maintained with sevoflurane, oxygen, N₂O and intermittent vecuronium doses. Intraoperative hemodynamics remained stable, with no significant blood loss. Postoperatively, the patient was managed in the surgical ICU, on elective ventilator support, and started on amiodarone and fentanyl infusions. Extubation occurred on day 2 postoperatively after confirming negative cuff leak and stable hemodynamics.

DISCUSSION

Tracheal intubation difficulties in patients with thyroid disease are typically influenced by factors such as tracheal compression and the characteristics of the tumor, including its position and firmness. In this challenging intubation scenario, the fiberoptic laryngoscope emerged as the most valuable instrument for visualizing the glottis [5].

Dealing with a patient who has a significantly enlarged thyroid gland, also known as a goiter, can present challenges for airway management. The enlargement of the thyroid gland can cause compression and displacement of the trachea. Distorted anatomy – visualization of larynx may be difficult, patient may be unable to lie supine. In a large thyroid, emergency airway by cricothyroid puncture or tracheostomy may be difficult or impossible leading to potential difficulties in intubation and maintaining a clear airway during anesthesia or emergency situations.

During thyroid surgery, important steps where arrhythmias may occur include : Manipulation of the thyroid gland can stimulate the vagus nerve, leading to bradycardia or even more serious arrhythmias, Dissection near the recurrent laryngeal nerve (RLN), Use of electrocautery can cause thermal injury to surrounding tissues, Manipulating nearby structures such as blood vessels can stimulate the autonomic nervous system, Anaesthesia induction and emergence can cause fluctuations in heart rate and blood pressure, which may predispose the patient to arrhythmias.

In addition to atrial fibrillation, several other types of arrhythmias may occur during thyroid surgery sinus tachycardia, sinus bradycardia, premature ventricular contractions, supraventricular tachycardia and ventricular tachycardia.

Thyroid dysfunction is an important risk factor for paroxysmal atrial fibrillation [6,7]. The incidence of atrial fibrillation is higher in cases

with hyperthyroidism compared to euthyroid patients [7,8]. The incidence of atrial fibrillation has been shown to be very high in patients with sub-clinical hyperthyroidism. Sub-clinical thyroid dysfunction, which is biochemically characterized by an abnormal TSH value with normal values of thyroid hormones T3 and T4, is also common. Serum Free T4 was indicate to be an independent predictor for atrial fibrillation, both in patients with proven thyroid dysfunction and in euthyroid patients [7]. It was also shown that the value of Free T3 at admission is an independent predictor of atrial fibrillation [9].

Increase risk of complication such myocardial infarction, stroke or even cardiac arrest. Arrhythmia may also affect hemodynamic stability, leading to fluctuation in blood pressure and cardiac output, which can be particularly concerning in patients with underlying cardiovascular disease, additionally they can prolong the duration of surgery and recovery, impacting patient outcomes.

The choice of antiarrhythmics depends on the specific arrhythmia encountered, patient factors, and institutional protocols. During thyroid surgery, several antiarrhythmic medications may be kept ready in case arrhythmias occur. These medications include: Beta-blockers (e.g., metoprolol, propranolol), calcium channel blockers (e.g., verapamil, diltiazem), Amiodarone, Lidocaine, Magnesium sulfate.

Cases with hyperthyroidism present symptoms of adrenergic hyper stimulation such as anxiety, tachycardia and heat intolerance. Beta-blockers are first-line drug in treating symptomatic patients as they antagonize the hyperthyroid induced hyper adrenergic condition. Selected beta-blockers, such as propranolol and metoprolol also decrease the peripheral conversion of T4 to T3, but the relatively small magnitude of this effect may be of limited clinical significance [10, 11]. Perioperative arrhythmias, immediate management depends first on Heart rate and blood pressure. Blood pressure remain adequate and rate control (HR <110/min) can attempt using Beta-blocker (Metoprolol) or calcium channel blocker. Hyperthyroidism is a reversible cause of AF. In fact, approximately two-thirds of hyperthyroid patients experience spontaneous return to sinus rhythm after restoration of normal thyroid hormone levels [12,13].

CONCLUSIONS

The perioperative morbidity in cases with hyperthyroidism can be very much decreased by properly pre-operative preparation and optimization of thyroid function. Prudent induction, meticulous examination, suitable endotracheal tube selection, and fiberoptic laryngoscope employment enabled successful intubation in a patient with a huge goiter.

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