

Our anesthesia experience in a case with Giant Goiter

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ABSTRACT

Although large goitre disease is rare in developed countries, they are more frequently encountered in underdeveloped regions. Large thyroid masses requiring surgery pose challenges for anesthesia and surgery due to their proximity to vital anatomical structures. A 53-year-old female patient presented to the anaesthesia clinic for a total thyroidectomy. A prominent mass was observed in the anterior and lateral neck, extending from the mandibula to the sternal notch and ears. CT scans revealed narrowing of the tracheal lumen to 4 mm, indicating stenosis. Upon arrival in the operating room, the head of the surgical table was elevated to 45 degrees. Following standard monitoring, induction was performed. Laryngoscopy revealed a Cormack/Lehane grade 3 view. Due to difficulty with intubation, the endotracheal tube (ETT) was guided with a bougie. After a 3- hour surgery, the patient was extubated with 2 mg/kg sugammadex. The patient's vital signs remained stable. Thyroid nodules are common, and total thyroidectomy is one of the most frequently performed surgeries globally. The main challenges for anesthesiologists during thyroid surgery include the gland's endocrine function, anatomical structures, and bleeding risks. A thorough preoperative assessment and preparation helped prevent complications in this case.

Keywords: Giant Goiter, anesthesia, thyroidectomy

INTRODUCTION

Thyroid nodules are one of the most common pathologies in the population. When there is more than one nodule in the thyroid gland, multinodular goiter (MNG) is mentioned. MNG, which does not release hormones, occurs because of enlargement of the thyroid gland without iodine deficiency and can reach very large sizes.¹ In developed countries, cases of large goiters are rarely seen; however, this problem continues as endemic goiter in some countries.

In late diagnosed cases with MNG, cosmetic problems, dyspnea and compression problems that may cause dysphagia may be observed. Large thyroid masses requiring surgery are special for surgery and anesthesia because of the vital structures in the anatomical neighborhood. The preferred method of thyroidectomy is general anesthesia.

Lesions over 4 cm in the thyroid gland increase the risk of malignancy, and anesthetic management is complicated by difficult mask ventilation, difficult intubation, longer operative time, difficulty in surgical exploration and increased likelihood of bleeding. Therefore, careful

preoperative examination and preparation are necessary. Preoperative preparation should include preparation for difficult intubation and blood products that may be required.

Our patient scheduled for thyroidectomy had a giant goiter compressing the trachea. We aimed to present the anesthetic management of our patient in whom we anticipated mask ventilation and difficulty in intubation.

CASE

A 53-year-old woman who presented to the anesthesia outpatient clinic with a gradually growing swelling in the neck that had been present for about 20 years described respiratory distress when lying supine for the last 6 months. Her height was 163 cm and weight were 65 kg. Examination revealed a firm, palpable, non-tender large mass extending from the submental area superiorly to the sternal notch inferiorly and to the ear level on the lateral borders (**Figure 1**). The patient with a Mallampati score of 3 was informed about the operation and the procedures to be performed and

her consent was obtained. Laboratory tests showed normal T3 and T4 levels and TSH level was suppressed. Fine needle aspiration biopsy result was benign. Computed tomography of the neck and thorax showed that both lobes of the thyroid gland were severely hyperplastic and multinodular, extending from the hypopharyngeal space to the thoracic inlet. It was observed that the hyperplasia especially in the isthmus region narrowed the lumen up to 4 mm in the proximal part of the trachea and caused tracheal stenosis.



Figure 1. Firm neck mass extending from the submental area to the sternum

Our patient who had no known disease other than hypertension was evaluated as ASA II. After preoperative preparations were completed, the patient was brought to the operating theatre for bilateral total thyroidectomy with the diagnosis of MNG. Preparations were made considering that ventilation and intubation might be difficult. Awake fiberoptic intubation is considered the gold standard technique in anticipated difficult airway cases. However, due to our patient's severe anxiety, communication difficulties, and inability to cooperate with awake intubation, this approach was deemed inappropriate. Instead, intubation was performed after induction, with an experienced team present and alternative airway management plan readily available. A heating blanket was laid on the operating table. Since the patient described respiratory distress when lying in the supine position, the head of the table was raised at a 45-degree angle. After standard monitoring, 3 mg/kg propofol 1 mcg/kg fentanyl 0.6 mg/kg rocuronium was given and mask ventilation was performed (Figure 2). Although a difficult airway was anticipated in our case, adequate mask ventilation was achieved just before the administration of the muscle relaxant. For this reason, rocuronium was administered at a standard dose. Approximately 3 minutes later, the laryngoscopy image was found to be Cormack/Lehane grade 3 with video laryngoscope. Since the endotracheal tube (ETT) (Neurostyle EMG ETT, Inside Diameter 7.00 mm, GERMANY) suitable for neuromonitoring could not be guided with a guide, the ETT was advanced through a bougie (i- Bougie VBM Medizintechnik GmbH 14 Fr) and intubated. Anesthesia was maintained with 2.5% sevoflurane 50% medical air/oxygen mixture and 0.5 mcg/kg/min remifentanyl infusion. Invasive arterial monitoring was performed. The patient was positioned, and the operation was started. At the end of the operation which lasted approximately 3 hours, 500 ml of blood loss occurred. Thyroid tissue of 1900

grams (g) was removed, and a drain was placed. The patient received postoperative analgesics 1 mg/kg tramadol, 50 mg Dex ketoprofen and 4 mg ondansetron as antiemetic. She was given 2 mg/kg sugammadex and extubated according to extubating criteria,² then sent to the recovery unit (Figure 3). The patient who did not develop any complication and whose vital signs were stable was transferred to the surgery department after 1 hour. The patient who had no problems in follow-up was discharged on the 3rd postoperative day with recommendations.



Figure 2. Mask ventilation after anesthetic induction



Figure 3. Before extubation

DISCUSSION

Thyroid nodules are a common pathology in the population and total thyroidectomy is one of the most common surgeries performed worldwide. Abnormal enlargement of the thyroid gland is called goiter. In patients with asymmetric enlargement of the thyroid gland, surrounding structures including the trachea, esophagus or blood vessels are compressed. In these patients, symptoms including cosmetic problems, hoarseness, tracheomalacia, laryngeal oedema and respiratory problems are frequently observed, and they may present with hyperthyroidism and lead to an increased risk of thyroid cancer.³ In our patient, cosmetic problems due to a large goiter, dyspnea in the supine position and left deviation of the trachea, which was also seen on chest X-ray, were present.

Lesions over 4 centimeters (cm) in the thyroid gland increase the risk of malignancy, while lesions over 6 cm are considered giant goiter. Although the incidence of giant goiter has decreased in our country, this disease is still prevalent in some countries. The removed thyroid tissue weighed 1900 g and was larger than 15 cm.

In patients with giant goiter, the extension of the thyroid gland to the mediastinum makes it open to complications with problems such as difficulty in surgical dissection during the operation and bleeding due to proximity to vascular structures.⁴ Blood preparation should be performed in the preoperative period. The duration of the surgical procedure performed in our patient was longer than normal. With the experience and success of the surgical team, the main vascular structures were not damaged and there was no need for blood transfusion. Blood gas and electrolyte abnormalities did not develop at the end of the surgical period which lasted approximately 3 hours.

Thyroidectomy is generally a safe procedure with a relatively low mortality rate. However, some postoperative complications such as bleeding, compressive hematoma, damage to the laryngeal nerves and trachea, and hypocalcemia may occur.^{5,6} In the perioperative monitoring of our case, complications such as bleeding, respiratory distress, hoarseness, and hypocalcemia were not observed. The volume of the thyroid tissue and surgical skill play a significant role in reducing the risk of complications.⁷

The rate of difficult laryngoscopy during thyroid surgery is reported to be between 6.8% and 9.6%.^{9,10} Airway management is a fundamental skill for anesthesiologists. Unexpected difficult airway management contributes to perioperative morbidity and mortality. Difficult airway represents a complex interaction between patient factors, the clinical setting, and the practitioner's skills.⁸ A thorough preoperative assessment allows the anesthesiologist to make necessary preparations while protecting the patient from morbidity and mortality. Many different methods can be used to achieve intubation in cases of difficult airway. However, there is no evidence in the literature to show that one method is superior to another. What is crucial, however, is intervening with a pre-planned strategy for a predicted or known difficult airway situation.

The physical examination of our patient revealed a large mass extending from the mandible to the sternal notch, laterally towards the ears. This included many of the anatomical features used in predicting a difficult airway.¹¹ Due to the large thyroid tissue, the mandible could not be fully drawn forward and upward, making mask ventilation difficult. During intubation, the epiglottis was positioned on the left and superiorly, which allowed us to guide the tube and perform intubation by advancing the tube through a bougie. An anesthesiologist must be prepared for a difficult airway in patients scheduled for thyroidectomy due to a large thyroid and should be ready to implement a series of strategies in case of an unforeseen difficulty. By conducting a thorough preoperative evaluation, the anesthesiologist should apply the most suitable airway management alternatives based on experience and the situation, preventing irreversible hypoxic lesions.

Succinylcholine or high dose rocuronium is recommended as a muscle relaxant in cases of predicted difficult intubation, as it provides rapid intubation conditions and has a short duration of effect. On the other hand, if rocuronium is used, its muscle relaxant effect can be rapidly reversed with sugammadex. Therefore, due to the advantage of rapid muscle relaxation or the ability to reverse it, we preferred to use rocuronium in our case. Although a difficult airway was anticipated in our case, adequate mask ventilation was achieved just before the administration of the muscle relaxant. Rocuronium at a standard intubation dose of 0.6 mg/kg was chosen to induce muscle relaxation while keeping the duration of neuromuscular blockade under control. Considering the patient's age, comorbidities, and the risk of difficult ventilation, a higher dose was avoided to reduce the risk of prolonged blockade. In difficult intubations, extubating should be performed carefully due to the possibility of reintubation. At the end of the procedure, after preparing for reintubation conditions and fiberoptic bronchoscopy, we successfully extubated the patient once sugammadex was administered and the patient was awake and cooperative.

The primary issues anesthesiologists face during thyroid surgery are related to the thyroid being an endocrine organ, its anatomical structures, and potential bleeding complications. Before elective thyroid surgeries, patients are rendered euthyroid. In hypothyroid patients, drug biotransformation is slower, which may delay recovery from general anesthesia. Hemodynamic changes, anemia, hypoglycemia, coagulopathy, and a reduction in hepatic and renal drug clearance may also occur.¹² During our patient's follow-up, we did not observe any disturbances in drug metabolism or hemodynamic. However, as with all endocrine organ pathologies, caution should be exercised with drug metabolism in thyroid diseases as well.

CONCLUSION

In this case, we wanted to emphasize that the anesthetic management for total thyroidectomy in cases of giant goiter, which are rare in our country, started with a thorough preoperative evaluation and preparation. We believe that this process should continue with careful airway management, intraoperative monitoring, and proper postoperative care.

With good anesthetic management, the perioperative course of complex cases can be made safer, the risk of complications can be reduced, and patient outcomes can be improved. Especially in cases of large goiter, careful planning of airway management, appropriate preoperative preparations, and collaboration with an experienced surgical team contribute to achieving a successful outcome for both the anesthesiologist and the surgeon.

ETHICAL DECLARATIONS

Informed Consent

The patient signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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