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Prateek Maurya
Senior Resident, Department
of Oncoanaesthesia, AIIMS,
New Delhi, India

Vasudha Ahuja
Senior Resident, Department
of Oncoanaesthesia, AIIMS,
New Delhi, India

Brajesh Kumar Ratre
Associate Professor,
Department of
Oncoanaesthesia, AIIMS,
New Delhi, India

Corresponding Author:
Prateek Maurya
Senior Resident, Department
of Oncoanaesthesia, AIIMS,
New Delhi, India

Anesthetic management of completion thyroidectomy with sternal resection and reconstruction in a patient with difficult airway with C3 vertebrae body fracture

Prateek Maurya, Vasudha Ahuja, Brajesh Kumar Ratre

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Abstract

We present a case of a 53-year-old female with a history of right hemi thyroidectomy 12 years ago, diagnosed with metastatic thyroid carcinoma involving the sternum and C3 vertebrae. The patient underwent a completion thyroidectomy, sternal resection, and sternal reconstruction. The anticipated difficult airway due to the sternum mass and C3 vertebral fracture necessitated meticulous planning. An epidural catheter was placed at the T₆-T₇ level for pain management. Preoperative medications included Fentanyl, Propofol, and Rocuronium. Fiber optic-guided intubation was performed in a neck-neutral position. The patient was successfully intubated without complications.

Keywords: Thyroid cancer, airway management, cervical vertebrae fracture, sternal resection

Introduction

Metastatic thyroid carcinoma involving the sternum and cervical vertebrae is a rare and challenging scenario in anesthesia management ^[1]. Difficult airway due to anatomical considerations poses unique challenges in securing the airway ^[2]. We present a case where careful planning and specialized techniques were employed to manage this complex situation.

Case Presentation

Patient Information: A 53-year-old female with a history of right hemithyroidectomy 12 years ago was diagnosed with metastatic thyroid carcinoma involving the sternum and C3 vertebrae.

Diagnosis: Metastatic thyroid carcinoma involving the sternum and C3 vertebrae.

Procedure: The patient underwent completion thyroidectomy, sternal resection, and sternal reconstruction.

Imaging: CT scan revealed destruction of the C3 vertebrae with extension along neural foramina, but the trachea and main bronchi were normal. Direct laryngoscopy showed normal and mobile vocal cords.

Anesthetic Approach: Given the anticipated difficult airway due to the sternum mass and C3 vertebral fracture, a careful approach was taken. Prior to administering preoperative medications, an epidural catheter was placed at the T₆-T₇ level for pain management during the procedure. Preoperative medications included Fentanyl (100mcg), Propofol (150mg), and Rocuronium (50mg). Bag-mask ventilation was performed for 3 minutes. The patient was intubated using a fiber optic scope in a neck-neutral position, ensuring no desaturation or cervical movement during the procedure.

Intraoperative Findings

During sternal resection, a direct injury to the subclavian vein occurred, resulting in significant blood loss of approximately 2 liters. The management involved the transfusion of 2 units of Packed Red Blood Cells (PRBC) and 4 units of Fresh Frozen Plasma (FFP) to restore hemodynamic stability.

Analgesia and Postoperative Care

The patient's epidural port was positioned near the head end, rendering it inaccessible during the operative procedure. To enable remote administration of epidural drugs from the anesthesia workstation, an extension line was utilized. Postoperatively, the patient was shifted to the ICU for overnight elective ventilation and close monitoring.

Discussion

The presented case highlights the intricate challenges encountered during the anesthetic management of a patient with metastatic thyroid carcinoma involving the sternum and C3 vertebrae, complicated by a difficult airway due to the sternum mass and C3 vertebral fracture. The successful outcome in this case was achieved through a combination of careful planning, pharmacological interventions, and procedural precision.

The anticipated difficult airway was a primary concern, given the patient's unique anatomical presentation. The sternal mass and C3 vertebral fracture posed limitations on neck extension, which necessitated a well-thought-out airway strategy [3, 4]. The decision to perform fiber optic-guided intubation in a neck-neutral position was based on the need to avoid cervical movement, especially at the site of the C3 fracture. This approach minimized the risk of spinal cord injury and ensured a secure airway [5].

To address the potential pain associated with the procedure and promote patient comfort, an epidural catheter was placed

at the T₆-T₇ level before the initiation of preoperative medications. This allowed for effective pain management during and after the surgery, contributing to an overall positive perioperative experience.

The utilization of Fentanyl, Propofol, and Rocuronium for preoperative medication provided optimal conditions for intubation. Bag-mask ventilation for 3 minutes facilitated appropriate oxygenation before intubation, reducing the risk of desaturation. The choice of fiber optic-guided intubation further underscored the importance of tailored techniques for cases with expected airway challenges.

The successful outcome of this case demonstrates the significance of a multidisciplinary approach involving anesthesiologists, surgeons, and radiologists. The use of advanced imaging, such as CT scans, aided in understanding the extent of vertebral involvement and allowed for precise airway planning. The importance of direct laryngoscopy in assessing vocal cord mobility cannot be understated, as it contributed to the decision-making process regarding the airway management approach.

Conclusion

The anesthetic management of this complex case showcases the significance of personalized strategies in overcoming challenging anatomical obstacles. Careful planning, effective pharmacological interventions, and expertise in airway management collectively ensured the successful intubation of the patient and a positive perioperative outcome.



Fig 1: CT scan showing thyroid mass and fracture of cervical vertebrae



Fig 2: Ovassapian airway in-situ to aid oral fiber optic intubation



Fig 3: Bronchoscopic images showing insertion of fiber optic into the trachea followed by railroading of endotracheal tube

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