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Fiberoptic intubation in the lateral position in emergency airway management of a patient with large thyroid swelling

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Abstract:

The airway management of a patient with a large thyroid swelling is challenging, especially when complicated by airway deformity, compression of the trachea, retrosternal extension, and respiratory difficulty. Awake airway management using a fiberoptic bronchoscope is the safest technique in patients with anticipated difficult airways. We hereby discuss the emergency airway management of a patient with large thyroid swelling with tracheal compression and retrosternal extension using awake fiberoptic bronchoscopy in a lateral position.

Keywords:

Awake fiberoptic, lateral intubation, thyroid swelling

Introduction

Managing the airway with a large thyroid swelling is challenging, especially when complicated by airway deformity, compression of the trachea, retrosternal extension, and respiratory difficulty. The 2022 American Society of Anesthesiologists (ASA) practice guidelines for managing the difficult airway have included awake airway management in patients with suspected difficult intubation and ventilation.[1] We hereby discuss the emergency airway management of a patient with large thyroid swelling accompanied by compression and deviation of the trachea with retrosternal extent who presented to our emergency department with respiratory distress.

Case Report

A 69-year-old female with a body mass index of 35 kg/m^2 presented to our institution with complaints of difficulty in breathing for 3 days while lying in the supine position. She had a history of neck swelling for 30 years, which was lemon-sized and suddenly progressively increased in the last 15 days to the size of around 20 cm × 20 cm × 10 cm. This was associated with dysphagia, hoarseness of voice, and respiratory distress. The patient felt an improvement in respiratory symptoms in the right lateral position and was lying in that position for 3 days.

The patient was in altered sensorium; hence, mouth opening and Modified Mallampati score could not be assessed. Dependent perioral and tongue edema was noted on the right side of the face as the patient was lying in the right lateral position for 3 days. The

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patient had a midline neck swelling, which was firm in consistency, globular in shape, and 20 cm × 20 cm × 10 cm in size. There was a local rise of temperature, and it was not able to get below the swelling, signifying retrosternal extent [Figure 1]. The magnetic resonance imaging (MRI) records revealed a large lobulated mass lesion measuring 13 cm × 13.6 cm × 15.7 cm in the neck region, possibly arising from the thyroid gland and displacing the larynx and trachea to the left side [Figure 2]. The lesion was extending into the superior mediastinum to the level of the arch of the aorta. No vascular involvement was noted.

The patient's vitals were a heart rate of 120 beats/min (bpm), blood pressure – 150/80 mmHg, and SpO_2 – 99% on the face mask with O_2 at 8 L/min. Her respiratory rate was 24/min. Indirect laryngoscopy could not be done. Based on the patient's condition, it was decided to secure the patient's airway. An otorhinolaryngology consultation was done, and they expressed their inability to perform front-of-neck access in this patient due to neck swelling. An awake fiberoptic intubation was planned to secure the airway. Written informed consent was taken from the patient's kin.

The patient was nebulized with 4 ml of 4% lignocaine. Intravenous glycopyrrolate 0.2 mg was administered. Xylometazoline drops were administered nasally, following which an adrenaline-soaked gauge was inserted nasally for nasal preparation. The patient was administered 10% lignocaine spray puffs near the vocal cords orally.

The patient was put on an indigenously designed elevation pillow to form the ramped-up position in the right lateral position. Standard ASA monitors were attached. Para-oxygenation with nasal prongs was started at 6 L/min in addition to oxygenation with a face mask at a flow rate of 10 L/min at FiO2 100%. The nasopharyngeal airway was used to dilate the left nostril. Due to the patient's positioning in the right lateral position, the fiberscope was inserted nasally and angulated at around 45 degrees to the ground toward the right side, unlike the vertical position of the scope (as done in the supine position). On the visualization of vocal cords, 5 ml of 2% lignocaine was injected through the scope's working channel for spray as-you-go for anesthetizing the vocal cords. A size 6.5 internal diameter (ID) cuffed flexometallic endotracheal tube was inserted and fixed at 26 cm after confirming bilaterally equal air entry and end-tidal carbon dioxide ($EtCO_2$) detection via capnography. The patient was then shifted to the intensive care unit (ICU) for mechanical ventilation and further management. Preoperative investigations were within normal limits except for the total leukocyte count (TLC), which was 69,000. Blood cultures were sent. Empirical broad-spectrum antibiotics were started. The thyroid function tests were normal (TSH 1.49 mIU/L, T_3 99 ng/dL, T_4 4.53 mcg/dL). Biopsy results revealed anaplastic carcinoma of the thyroid gland. After 48 h, the patient underwent total thyroidectomy and tracheostomy under general anesthesia. The patient was shifted to the ICU, wherein antibiotics (based on culture sensitivity), mechanical ventilation, and supportive measures were continued. The TLC decreased to 41,000 on day 2. The patient developed septic shock after 4 days and died on day 7. The authors certify that they have obtained all appropriate patient consent forms.

Discussion

The lateral decubitus position is recommended to maintain patency of the airway, decrease the risk of aspiration, and relieve airway obstruction in the supine position. In a study, Isono *et al*. found that altering the position from supine to lateral enlarged the retroglossal and retropalatal airways and decreased the closing pressures at both sites in anesthetized and paralyzed patients with obstructive sleep apnoea. They postulated that in the supine position, the impact of gravity on the

Figure 1: The patient is placed in the right lateral position on a ramp

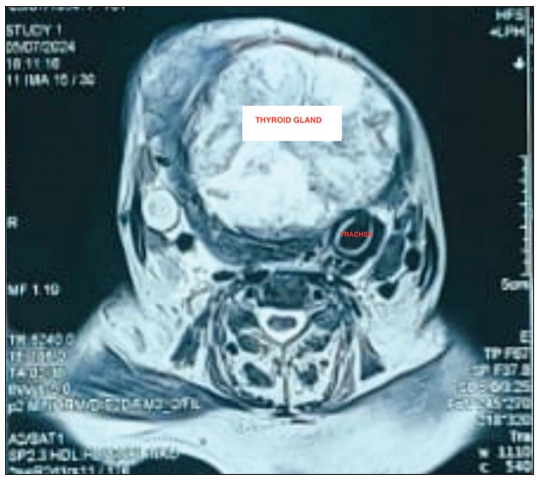

Figure 2: Magnetic resonance imaging neck showing trachea shifted to the left

anterior pharyngeal wall, as well as the larger mass of the soft tissue structures like the tongue, anteriorly override the pharyngeal airway, produces greater tissue pressure (tissue pressure-determined by the difference between the size of bony enclosures and the amount of the soft tissues). On the contrary, the amount of soft tissues located laterally is small when the patient is in a lateral position. Hence, a smaller tissue pressure may be produced onto the lateral pharyngeal airway wall.[2] The left lateral position is also recommended in adult basic life support as it prevents the laryngeal structures from collapsing.[3] Intubation in the lateral decubitus position can facilitate gravitational drainage of oral secretions.

Awake fiberoptic intubation is the safest approach in patients with difficult intubation. The 2022 ASA practice guidelines for managing the difficult airway have included awake airway management in patients with suspected difficult intubation.[1] Among the two routes, the nasal route is more comfortable in awake patients.

A study by Adachi *et al*. found that visualizing the glottis through the fibreoptic bronchoscope was easy in 82% of patients in the semi-lateral position compared to the supine position, where it was impossible in 88% of patients.[4]

A study by Ababneh *et al*. in severely obese patients found that awake nasal fiberoptic intubation in the lateral position required significantly less time (mean time of 188 s) for securing the airway than in the supine position (mean time of 214.5 s).[5] The reduction in intubation time is considered a vital element of advanced airway management, more so in patients with anticipated difficult intubations and a high risk for hypoxemia.[6] This reduction in time while securing the airway in a lateral position may be attributed to decreased airway collapsibility and the relief of airway obstruction compared to the supine position.[7,8]

A ramp in this maneuver further helped improve lung compliance, increased functional residual capacity, and enhanced ventilation, thus minimizing the risk of hypoxia from prolonged intubation attempts.[9]

Conclusion

We conclude that the ramped-up lateral position is feasible and beneficial for awake fiberoptic intubation in patients with anticipated difficult airways.

Author contributions statement

NS: review and editing (equal); writing – original draft (equal). JS: Conceptualization (lead); writing – original draft (lead); writing – review and editing (equal). JK: writing – review and editing (equal); writing – review and editing (equal). AG: Conceptualization (supporting);); Writing – review and editing (equal). All authors have reviewed the manuscript.

Conflicts of interest

None Declared.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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