



## DIFFICULT AIRWAY IN A LARGE CASE OF MULTI NODULAR GOITER WITH RETRO-STERNAL EXTENTION: CHALLENGES & MANAGEMENT

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### ABSTRACT

**Introduction:** Enlarged thyroid is endemic in northern parts of India. This enlarged gland can lead to airway compromise and difficult tracheal intubation. Retro-sternal extension further increases the challenges for an anaesthesiologist. Many techniques are available for securing such airways depending upon individual familiarity and expertise. We describe here the presentation, diagnosis and peri-operative management of the patient who was managed with an awake fiberoptic intubation.

**KEYWORDS :** Retro-sternal extension, fiberoptic intubation.

### Case Report:

We present a case report of a 50 yr old, 83 kg, patient who was admitted to our hospital with a very large swelling in the neck since 10 years. The swelling extended between the chin and the sternum with retro sternal extension. The swelling was initially small in size and increased progressively with subsequent change in voice and hoarseness. He also complained of shortness of breath and dysphagia suggesting compression. Gradually the patient developed dyspnoea in lying down position. The patient was comfortable in upright position.

On examination the patient was sitting on his bed. The swelling was present anteriorly and on both the sides of the neck. It was lobulated and cystic on palpation. It was associated with retro-sternal extension with tracheal deviation on the left side. There was no obvious resting tremor, no lid lag, no exophthalmos and no palpable lymph nodes. His PR was 105bpm, BP 140/80 mm Hg, RR 20 per min and height was 169 cm.

He also had a history of hypertension, diabetes, chronic liver disease with portal hypertension (Child Pugh class B). Patient was on Tb. Amlodipine 5mg OD, Glycomet SR 500mg BD and neomecazole 10 mg BD. CT scan showed 8.1x9.5x9.2 cm mass extending from the neck upto the bifurcation of the trachea. Tracheal deviation to the left was present. ENT consultation showed bilateral normal vocal cord movement.

He was diagnosed as a case of multi nodular goiter with retro-sternal extension and tracheal deviation and was advised surgery for the same. Surgery was deferred as the patient could not be intubated despite multiple attempts. He subsequently presented in our hospital and was taken up for surgery after obtaining clearances from cardiologist, gastro-enterologist and ENT specialist. A team of CTVS surgeons and perfusionists were informed and were requested to be at stand by for a femoro-femoral cardiopulmonary bypass in the event of inability to maintain airway or any cardiovascular event. Difficult intubation cart was kept ready with rigid bronchoscope and jet ventilation.

Patient was kept fasting for 6 hours before OT. Anti-hypertensive and anti-thyroid medications were continued till morning of surgery. Ranitidine 150 mg was given with a small sip of water on night before and morning of surgery. No preoperative sedation was prescribed. The patient was shifted to the OT. Standard monitors (SpO<sub>2</sub>, ECG, and NIBP) were attached, and the baseline vitals were recorded.

Two wide bore i.v cannulas were secured. Right femoral arterial and venous sheath was inserted under local anesthesia. Left radial arterial cannulation was also done under local anesthesia. Awake fiberoptic intubation was preferred mode of intubation in our patient. The procedure was explained in detail and written informed consent for procedure and publication was taken from the patient. Inj. glycopyrrolate 0.2 mg i.v. was administered. Xylometazoline was then instilled in both the nostrils for vasoconstriction of nasal passage to facilitate passage of fiberoptic bronchoscope (FOB) without mucosal injury. The patient's airway was anesthetized by application of lignocaine 2% jelly in the nostrils, lignocaine viscous 2% gargles and 4

ml of lignocaine 4% nebulization. Oxygen was administered via facemask at a rate of 5 L/min. Dexmedetomidine infusion was started. Flexometallic tube 7.0 mm ID was lubricated and loaded on Karl Storz fiberscope. Fiberscope was advanced and when larynx was visualized, topical anesthesia was applied using 'spray as you go technique'. Fiberscope was advanced into the larynx and the trachea upto the level of carina. Flexometallic tube was railroaded and ETT was confirmed via fiberscope, chest auscultation and capnogram after attaching the breathing circuit. Patient was induced using 80 mg of propofol and 100 mcg of fentanyl. Total lignocaine dose was less than 4.5 mg/kg. Patient was maintained on atracurium, fentanyl and sevoflurane/oxygen/air mixture.

Total thyroidectomy with extraction of retrosternal goiter was performed. The patient remained hemodynamically stable throughout the procedure. Post-procedure, patient was not extubated in view of probable tracheomalacia.

Pain was managed using multi modal analgesia. Patient was shifted to ICU post surgery. On postoperative day 1, after patient was maintaining blood gases on "T - piece trial," tracheal tube cuff was deflated and leak test was performed. Leak was demonstrated around tracheal tube after deflation, so it was considered safe to extubate the patient. A trolley for emergency intubation with rigid bronchoscope was kept ready. Patient was extubated and kept in post-operative area for 24 hours before being discharged to ward.

### Discussion:

An enlarged thyroid gland may cause difficulty in intubation due to tracheal deviation, compression or both.<sup>1,2</sup> Although classical predictors of difficult airway like mouth opening <35mm, Mallampati grade of III or IV, restricted neck movements and thyromental distance are reliable, the anesthetic management in such cases depends on size of goiter, vascularity, compression of surrounding structures and retero-sternal extension.<sup>3,4</sup> Hence, we require careful pre anesthetic assessment with thorough airway examination, control of disease, blood investigations and imaging studies.

WHO classifies goiter as Class 0-palpable mass within neck structure, Class I- visible, palpable and undermines the curves and neck line and Class II as large goiter with reterosternal extension with tracheal deviation, compression or both. Our patient had Class II goiter.<sup>5</sup> FOI is the gold standard to secure airway in such cases. However, in our case, there was a history of failed intubation. Induction of anesthesia was risky as it can precipitate complete airway closure and make mask ventilation and tracheal intubation nearly impossible.

Malhotra and Sodhi<sup>6</sup> have reported an airway management strategy for thyroid patients if preoperative assessment shows increased concerns regarding the airway. This includes: Inhalation induction using sevoflurane in a semi-supine or semi-sitting position, awake FOI, tracheotomy, or ventilation using a rigid bronchoscope.

Inhalation induction with sevoflurane was not an option as patient could obstruct his airway after losing consciousness.<sup>6</sup> Also, over-

sedation with the agent could lead to respiratory distress, and a 'cannot intubate cannot ventilate' situation might arise. Many problems such as failure to visualize the glottis, bleeding, trauma and laryngospasm have been reported with FOI.<sup>7</sup> However, compared with inhalation induction, the risk of losing the airway is less.

Performing tracheotomy in an awake patient with a large neck mass prior to induction of general anesthesia is debatable, due to the displaced anatomy produced by a large neck mass.<sup>8</sup> Since many airway problems are encountered with thyroid disease, thyroidectomy under local anesthesia was suggested by few anesthesiologists.<sup>9</sup> However, a patient with huge thyroid causing compromised airway is a major limiting factor for this technique too.

Use of cardiopulmonary bypass for maintaining tissue oxygenation has also been described in cases of difficult airway with huge, compressive thyroid masses where airway maintenance was difficult.<sup>10</sup>

The safest options of airway management left in our case were either an awake FOI or ventilation using rigid bronchoscopy. Since ventilation through a rigid bronchoscope is more helpful in patients with mid to lower tracheal obstruction and when endotracheal intubation is not possible, we chose FOI for our case.<sup>8</sup> Emergency femoro-femoral bypass was kept ready as a backup in any event of severe airway compromise or cardio-respiratory event. Eldawlatly *et al.*<sup>11</sup> had reported a case of an obese female with huge goiter having difficult airway. The trachea was successfully intubated using FOB and locosedative technique. They used 5% lignocaine paste on the posterior third of the tongue along with lignocaine nebulization using 4% lignocaine. Intravenous sedation using midazolam 2 mg and sufentanyl 5 mcg was used. The combined use of local anesthesia with mild sedation provided a calm and relaxed patient and a smooth intubation without significant respiratory compromise. However, this technique too is not free of flaws. Complete airway obstruction during awake FOI has been reported where use of local anesthetic precipitated acute loss of the airway, and urgent surgical intervention was required.<sup>12</sup> Also, in patients with pre-existing stridor and respiratory compromise, even mild sedation or sedative premedication is avoided to prevent further compromise.<sup>3</sup> Evaluating all the pros and cons, we decided to go for FOI. We used lignocaine 2% jelly in the nostrils, lignocaine viscous 2% gargles and 4 ml of lignocaine 4% nebulization. Propofol and fentanyl were used. The patient tolerated the procedure well.

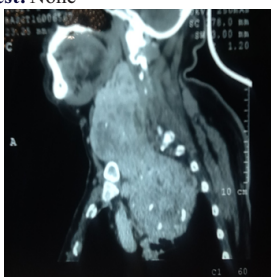
Patient was electively kept intubated for 36 hrs in view of chances of tracheomalacia. He was extubated after cuff deflation demonstrated adequate leak around the tracheal tube while the patient was awake and breathing spontaneously.

#### Conclusion:

In conclusion, a single universal technique of intubation may not be favorable in all circumstances. However, FOB intubation is the first choice in selected group of patients having compromised airway. It also carries a low failure rate. Presence of video-assisted airway devices and ECMO increase the safety profile during anesthesia if prepared in advance. Proper preoperative airway assessment, preparation and timely decision and skillful management reduce the morbidity and mortality in difficult airway cases involving thyroid enlargement. Proper planning and discussing the problems with the patient and surgeon are important for safe outcome. Further, practicing different modalities for airway management should be carried out in either daily practice, or simulation sessions, thus ensuring a higher success rate of difficult intubation when actually needed.

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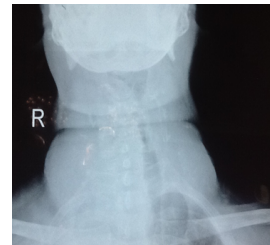
Conflicts of interest: None



CT scan showing goiter with retro-sternal extension in lateral view.



CT Scan showing thyroid enlargement in AP view.



X-Ray showing thyroid enlargement with tracheal deviation to left.

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