Double Trouble: Airway Management in a Patient with a Massive Anterior Mediastinal Tumor Complicated by a Thyroid Mass

The Editor,

Large anterior mediastinal masses can be quite challenging for the anesthesiologists. They can cause catastrophic effects on induction of general anesthesia due to compression on the heart, great vessels, and the intrathoracic airway. Presence of a large thyroid mass may further complicate the airway management.

Presented here is a case posted for excision of a massive anterior mediastinal mass causing severe cardiorespiratory compromise in a patient along with a large goiter. A 55-year-old, 53 kg female with a large anterior mediastinal mass and severe respiratory symptoms presented for sternotomy and excision of the mass. The patient was unable to lie supine due to dyspnoea. She also had a large left thyroid mass.

She had reported to the outpatient department with complaints of cough, breathlessness, and heaviness in chest. She was sitting with a forward inclination and unable to speak complete sentences. She was able to lie down only in right lateral decubitus position. Her pulse rate was 92 beats/min, blood pressure was 170/100 mm of mercury, respiratory rate was 40 beats/min, and her jugular venous pressure was raised. Clinically and biochemically, she was euthyroid.

Transthoracic echocardiography in the right lateral decubitus position revealed that the cardiac apex had shifted to the left midaxillary line and the pulmonary artery systolic pressure was 51 mmHg. On making her supine, gradual compression of the ventricles was observed along with supine BP dropping to 104/60 mmHg.

Apart from a hemoglobin value of 8.5 g/dL, her other routine hematologic investigations were within normal limits. Her ECG showed sinus tachycardia.

A computed tomography scan revealed a right sided heterogeneously enhancing solid mass lesion measuring 13.5 cm × 8.5 cm occupying the mediastinum and compromising the airway [Figure 1a]. It also showed a left thyroid mass 8.0 cm × 7.0 cm in size [Figure 1b].

Indirect laryngoscopy revealed her vocal cord shifted to the left with normal movements. X-ray of neck [Figure 1c] confirmed a shift to the left of the upper part of trachea. There was a marked narrowing of the distal trachea apparently due to compression from the large mediastinal mass.

General anesthesia with spontaneous ventilation and inotropic support was planned.

Airway Management

Routine monitoring in the form of ECG, invasive arterial pressure, pulse oximetry, capnography, temperature, and urine output were instituted and a triple lumen central venous pressure catheter was inserted via the right femoral vein. Anesthesia was induced with the patient in right lateral position with fentanyl 100 µg, ketamine 50 mg, and 5% sevoflurane in oxygen. We opted for an induction dose of 1 mg kg⁻¹ of ketamine along with 2 µg kg⁻¹ of fentanyl. It has been advocated that spontaneous ventilation under ketamine anesthesia preserves airway patency by maintaining a normal transpleural pressure gradient.[1] Ketamine is also recommended in patients with anterior mediastinal masses causing cardiovascular compression as its sympathomimetic properties help in maintaining the hemodynamics in these patients.[2]

On laryngoscopy, the glottic opening was seen shifted to the right. The weight of the thyroid mass on the left was...
now pushing the airway to the opposite side under the influence of gravity, as the patient was lying in right lateral position. Intubation could be performed with 7.5 mm ID cuffed tracheal tube after an assistant helped by retracting the thyroid mass towards left.

The patient was positioned supine in a graded fashion after starting and titrating intravenous infusion of dobutamine [3 µg/kg/min] and noradrenaline [0.06 µg/kg/min]. When finally positioned supine with head end of the table up, her heart rate was 96 BPM and blood pressure was 96/66 mmHg. Anesthesia was maintained with intermittent fentanyl, 2--4% sevoflurane with 50% O₂ in air and gentle manual ventilation till sternotomy. Following assessment of adequate manual ventilation thereafter, atracurium was used for neuromuscular blockade. Surgical excision of the mass was accomplished. Estimated blood loss of 2 L was replaced with five units each of packed red cells and fresh frozen plasma. The patient was transferred to the intensive care unit with tracheal tube in situ for postoperative ventilatory and other management.

This patient presented with two conditions influencing the airway management. After clinical and radiological assessment, the airway management was planned. Considerations for mediastinal mass were given priority because of potential cardiorespiratory risks even after an uneventful and straightforward intubation.

During induction of patients with mediastinal mass, spontaneous ventilation should be preserved till sternotomy to maintain transpulmonary pressure gradient and reduce risk of major airway compression. Head elevation reduces cephalad displacement of diaphragm and reduction in functional residual capacity.

Plan for resuscitation after intubation and before sternotomy should be in place. Turning the patient back to right lateral position, increasing the dose of vasopressors, switching off sevoflurane, application of graded CPAP, and quick sternotomy for decompression of the mass were the options in case of catastrophic compression of airways and heart.[3] Alternatives, if available, in such cases include establishing extracorporeal membrane oxygenation or cardiopulmonary bypass prior to induction of anesthesia.

In conclusion, patients presenting with such tumors should be induced in the position in which the patient has least distress, with preserved spontaneous ventilation, following proper evaluation of airway distortion due to the thyroid mass. Surgical positioning can be achieved by a gradual stepwise approach along with vasopressors, guided by the hemodynamic parameters. Preparedness for improvisation and resuscitative strategies are the key to management.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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