Case Report

Anesthetic Challenges of Extrinsic Trachea-bronchial Compression due to Posterior Mediastinal Mass: Our Experience with a Large Esophageal Mucocele

Abstract

Large posterior mediastinal masses may lead threatening complications such as critical tracheobronchial compression. Airway management in these individuals is a challenge and being a lower airway obstruction; rescue strategies are limited. We encountered one such case of a large esophageal mucocele causing extrinsic tracheobronchial compression. We have described the anesthetic management of this case using awake fiber-optic assessment followed by intubation. Close communication with the surgical team, meticulous planning of airway management, and early drainage of the mucocele are the cornerstones of management in such patients.

Keywords: *Esophageal mucocele, posterior mediastinal mass, tracheobronchial compression*

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Introduction

Anesthetic management of mediastinal masses is challenging. Anterior mediastinal masses often prove to be more difficult to manage, whereas posterior mediastinal masses seldom lead to airway complications.[1] We have described the management of one such rare case, where we encountered a large esophageal mucocele presenting as a posterior mediastinal mass leading to significant compression of the trachea-bronchial tree.

Case Report

A 14-year-old girl presented to the emergency with progressive breathlessness for 1 month, now present even at rest. Her breathlessness got aggravated when supine, and hence she was nursed in lateral position. She had tachycardia and was tachypneic with accessory muscles of respiration in use. Auscultation of the chest revealed reduced air entry in the left apical zone. Rest of the general and systemic examination was normal. Chest skiagram showed mediastinal widening. Computed tomography (CT) scan of the chest revealed a massive esophageal mucocele extending from D1 to D7 vertebrae (14 cm × 3.5 cm × 4 cm) which was causing critical compression in the distal part of the trachea very close to the carina and both the main stem bronchi [Figure 1a].

The patient had undergone a cervical esophagostomy with feeding jejunostomy as a treatment for corrosive esophageal stricture 1 year back. She was now being planned for esophageal reconstruction surgery. Due to the above-mentioned unforeseen complication, she had to be taken up urgently in OT for emergency right posterolateral thoracotomy and excision of the mucocele.

To secure the airway, we planned to perform awake fiber-optic airway assessment followed by fiber-optic intubation with the patient in lateral decubitus position. As a rescue option, preparation for emergency initiation of femorofemoral bypass was done. During fiber-optic assessment, on reaching a depth of 25 cm from the incisors, critical narrowing of the distal trachea was observed, with the walls fully approximating with each inspiration. This segment was carefully negotiated and bypassed, and at 27 cm depth, we found ourselves just beyond the narrowest part and just above the carina. The two main stem bronchi were visualized, each demonstrating a slit-like opening instead of the well-formed round opening seen in normal bronchi [Figure 1b].

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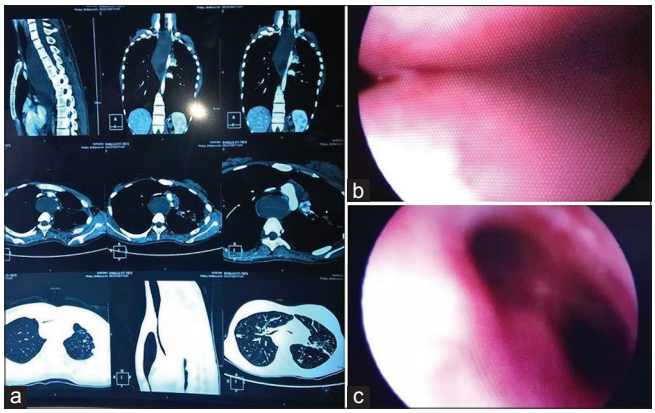

Figure 1: (a) Computed tomography scan showing massive esophageal mucocele; (b) fiber-optic view of narrowest segment of trachea; (c) fiber-optic view of trachea and main stem bronchi after mucocele excision

Based on this assessment, we decided to intubate her with an undersized 5.5 mm ID armored endotracheal tube (ETT) which was railroaded over the bronchoscope such that its tip crossed the narrowest part of trachea and was positioned just above the carina. Following this, midazolam 1mg and fentanyl 75 μg were given, and anesthesia was induced using propofol 60 mg intravenously. Vecuronium bromide 4 mg was used for muscle relaxation, and anesthesia was maintained with sevoflurane 2%–3% in air-oxygen mixture (1:1). Peak airway pressures at this time were between 35 and 40 cmH_2O. The surgeons then proceeded with the thoracotomy with the incision in the right 5^{th} intercostal space. They retracted the right lung to access the massive mucocele and drained 120 ml of thick mucus fluid with a wide-bore needle. As soon as the mucocele was decompressed, there was an immediate reduction in peak airway pressure, with the airway pressures now ranging between 15 and 20 cmH_2O. A complete resection of the mucocele was subsequently performed uneventfully.

At the end of the surgery, the absence of tracheomalacia was confirmed by a cuff-leak test and a repeat fiber-optic evaluation [Figure 1c]. The ETT was then gradually withdrawn, and trachea was extubated uneventfully. The patient was nursed in propped up position with oxygen supplementation in the postanesthesia care unit, now with no difficulty.

Discussion

Esophageal mucocele is a rare complication of esophageal diversion procedures. It is uncommon in children and has been described more often in adult thoracic esophageal resection for malignancy.[2] These procedures lead to the formation of a blind esophageal loop, and persistent secretions from the mucosa lead to the development of mucocele. Being a self-limiting process, the mucocele usually remains asymptomatic.[3] Rarely, however, it may enlarge, causing mass effect on adjacent vital structures in the mediastinum.[4] Plain skiagram of the chest may show mediastinal widening, but it is diagnosed definitively by its high-intensity signal in T2-weighted magnetic resonance imaging and by a "cystic" regular mass on CT scan.[5] Management includes percutaneous techniques such as CT-guided pigtail drainage or absolute alcohol ablation of the cavity, but this was not possible in our case due to the large size of mucocele occupying a major portion of posterior mediastinum in close proximity to vital structures. More definitive methods ensuring minimal recurrence include complete surgical resection of the mucocele, which our patient underwent.

The biggest challenge for us was induction and maintenance of anesthesia in a patient with critical airway compression at risk of fatal obstruction. Being a lower airway obstruction, rescue strategies were limited, and preparations for an emergency cardiopulmonary bypass in the form of femorofemoral bypass were necessary.[6]

Negotiating the tip of ETT beyond the critically narrowed segment to provide adequate ventilation was our priority. Awake fiber-optic assessment and intubation using an ETT of smaller diameter was an obvious first choice. It allowed us to visualize the compression, determine whether it was dynamic or static with respiration and ensured that we crossed beyond it successfully.[7]

Perhaps the most crucial and remarkable step in the entire procedure was the drainage of the massive mucocele, thereby abolishing the extrinsic tracheal compression. This led to immediate improvement in all the ventilatory parameters.

By the end of the surgery, the only concern we had before extubation was that of any underlying tracheomalacia. Posterior mediastinal masses have rarely been reported to produce this complication.[1] We anticipated a low possibility of tracheomalacia in our patient and were successful in extubating the trachea on table uneventfully.

Conclusion

Our case illustrates that critical airway compromise can be precipitated by a large esophageal mucocele which presents as a posterior mediastinal mass. Providing general anesthesia to these patients is a challenge. Close communication with the surgical team, meticulous planning of airway management, and early drainage of the mucocele are the cornerstones of management in such patients.

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Conflicts of interest

There are no conflicts of interest.

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