Case Report

Emergency Airway Management of a patient with Mediastinal Mass

Anwar ul Huda, Khalid Maudood Siddiqui, Fazal Hameed Khan
Department of Anaesthesiology, Aga Khan University Hospital, Karachi.

Abstract

Appropriate airway management is an essential part of anaesthesiologist's role. Extrinsic airway compression by rapidly growing mediastinal masses represents a therapeutic challenge to anaesthesiologists. We report a case of successful airway management in a patient with obstructed airway. The patient was a middle aged female who presented with severe respiratory distress secondary to a huge mediastinal mass. CT scan showed widened superior mediastinum with circumferential narrowing of trachea and left main bronchus. Her condition continued to deteriorate during her hospital admission, so emergency intubation and tracheostomy was planned. She was intubated with the help of a bougie using size 6 microlaryngoscopic tube after inhalational induction and mediastinal tracheostomy was done. Intraoperatively, there were few episodes of hypotension and desaturation, otherwise rest of intraoperative course remained uneventful.

Introduction

Appropriate airway management is an essential part of the anaesthesiologist's role. Extrinsic airway compression caused by rapidly growing mediastinal masses represents a therapeutic challenge to anaesthesiologists.[1] Anaesthesia in these cases is needed primarily for diagnostic biopsies and staging of neoplasms but also occasionally for relief of acute airway obstruction. These patients require special attention to the relevant anatomy and physiology. A strategy needs to be developed in order to anticipate and manage such patients. This includes identifying the potential problems, considering different options and selection of an appropriate plan in the particular scenario of the individual patient. The patient should be informed about the options and the advantages and disadvantages of each. Finally, there should be alternative plans in case of failure of the initial one.[2]

Case Report

A 59 years old female with history of neck swelling for 15 years presented with complaint of increasing shortness of breath, right sided neck pain, right sided headache, swelling of face, cough with mucopurulent sputum and dysphagia initially to solid then liquid for one week. These symptoms gradually worsened with development of stridor on presenting to emergency room. She has a history of weight loss, night sweat and weakness. On examination, she was in respiratory distress with stridor. She was tachycardic, normotensive and afebrile with oxygen saturation of 85 to 95% on oxygen 10 litres per minute via nasal cannula because she was not tolerating a face mask. There was fullness of supraclavicular fossa and palpable lymph nodes in the region of cervical, submandibular and right axilla. She had bilateral wheezing with occasional crepitation on chest auscultation. There was a swelling of 4 by 5 inches in anterior part of neck. Swelling did not move with deglutition and was soft to firm in consistency and slightly tender on right side. On airway assessment, it was found that she was mallampatti class II. Flexible laryngoscopy showed good glottic view but there was sluggish movement of right vocal cord. Chest X-ray showed widening of superior mediastinum with circumferential narrowing of trachea with reduction of caliber of more than 50%. Left main bronchus appeared to be circumferentially narrowed (Figure 1). Computerized tomography scan showed heterogeneously enhanced mass lesion in the right lobe of thyroid gland with associated cervical and mediastinal lymphadenopathy and thrombosis of internal jugular, brachiocephalic and proximal superior vena cava.

Biopsy was taken under local anaesthesia because of expected difficult intubation and ventilation. It was benign but histopathologist was unable to give a confirmed diagnosis due to inadequate biopsy sample. Her condition continued to deteriorate as there were frequent episodes of desaturation. She was at times in severe respiratory distress and oxygen saturation fell to 80% on 10 - 15 litres per minute oxygen via nasal canula. She was conservatively managed because of expected difficulty in intubation and ventilation. Radiotherapy was not considered an option because diagnosis was not certain and also it could give rise to oedema and thyroiditis. Tracheostomy under local anaesthesia was not considered an option in this case because of anticipated distorted anatomy associated with huge size of neck swelling. Additionally, patient had full blown superior vena caval syndrome and was only able to breath with difficulty while sitting. Ultimately, it was decided to do intubation and then tracheostomy in operation theatre in emergency.

Patient was induced in sitting position with 100 percent oxygen and Sevoflurane 8%. On attaining adequate depth of anaesthesia, she was made supine. She maintained oxygen saturation on spontaneous breathing. She was

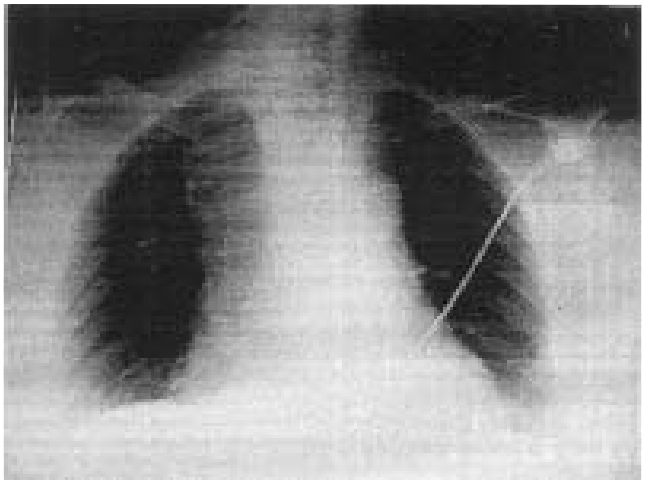
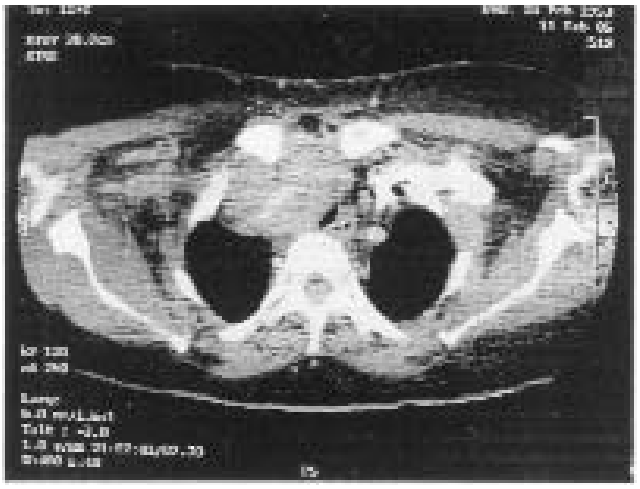


Figure 1. Chest X-Ray.



1Figure 2. Computed tomogram of thorax.

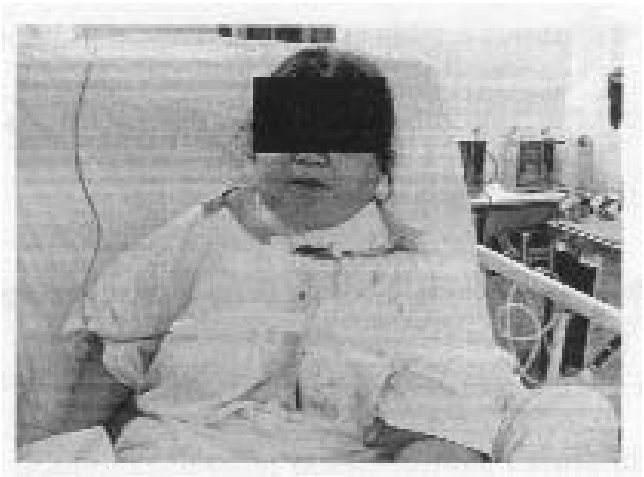


Figure 3. In recovery room after tracheostomy.

intubated with the help of bougie using size 6 microlaryngoscopic tube. Mediastinal tracheostomy was done and as ordinary tracheostomy tube could not be passed due to increased distance of mediastinal trachea from skin so a size 7 endotracheal tube was cut and inserted. Maintenance was done with 100% Oxygen and sevoflurane 2 to 3% throughout the procedure. There were 2 to 3 episodes of hypotension, which were treated by Injection Phenylephrine 50 micrograms doses. Rest of intraoperative course remained uneventful apart from few episodes of desaturation off and on. Postoperatively, on awakeneing the patient was fully oriented and haemodynamically stable. Endotracheal tube was connected to T piece with 6 to 8 litres of oxygen per minute in the recovery room (Figure 2). Around three hours after shifting to recovery room, she dropped her conscious level, went into type II respiratory failure, so was put on to ventilator in ICU. Later, Non Hodgkin Lymphoma was diagnosed on histopathology report and she was started on CHOP+R chemotherapy. On the sixth postoperative day, she was put on continuous positive airway pressure and shifted to special care unit.

Discussion

Patients with anterior mediastinal masses are prone to develop certain potentially life threatening complications due to pressure of these masses on neighbouring structures.[3] The first step in preoperative assessment of such patients is to determine the anatomic location of the mass. The main anaesthetic considerations for patients with anterior mediastinal masses involve three complications including tracheobronchial tree obstruction, superior vena cava syndrome and compression of heart and pulmonary artery.[1] Our patient also had tracheobronchal obstruction as evident on Chest X-ray and CT scan, especially of the left main bronchus, which was circumferentially narrowed because of the mass. That is why, she was unable to lie supine and there was a strong possibility of airway collapse on induction of general anaesthesia or administration of paralytic agent.

She also had got superior vena cava syndrome which was indicated by dyspnea, coughing and swelling of the face, neck, upper trunk and extremities. Physical signs that were noted on presentation included neck vein and thoracic vein distension, oedema of the face or upper extremities, plethora and tachypnea.[4] Almost 95% of SVCS cases described in the published modern series are due to cancer; the most common ones being small cell bronchogenic carcinoma, followed by squamous cell carcinoma and adenocarcinoma of the lung, non-Hodgkin's lymphoma, and large cell carcinoma of the lung.[5] The severity of syndrome depends on the rapidity of onset of obstruction and its location. The more rapid the onset, the more severe the symptoms because the collateral veins do not have time to distend to accommodate an increased blood flow.[6] The airway problems encountered in patients with anterior mediastinal mass are often underestimated.[3] Patient history information (especially symptoms when supine) is a strong indication. That, together with a CT scan of thorax and a Chest X-ray provide most important information. Differences between sitting and supine flow volume loops can test for intrathoracic or extrathoracic obstruction. Fibreoptic bronchoscopy

also evaluates dynamic airway obstruction. Finally, patients asymptomatic while awake may obstruct their airway during anaesthesia. In emergency situations, where there is no time for a more complete assessment, increased emphasis must be placed on the clinical findings, especially signs and symptoms in supine position.

Other options for airway management to consider in our case included awake Fibreoptic bronchoscopy[7], checking for dynamic airway collapse and maintenance of spontaneous breathing throughout (as muscle relaxants may lead to airway loss) but it was not possible because the patient was extremely anxious.

Tracheostomy would prove futile if the obstruction is distal to the trachea. Moreover, the use of general anaesthesia for tracheostomy may adversely enhance the effect of the extrinsic compression as a result of the reduction in lung volume, relaxation of bronchial smooth muscles, and a reduced transpleural pressure gradient. This may lead to a total airway obstruction and cardiopulmonary arrest.

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