CASE REPORT

Tension pneumothorax caused by ventilating rigid bronchoscopy for removal of foreign body

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ABSTRACT

Tension pneumothorax during ventilating bronchoscopy for foreign body removal is a rare but life threatening complication, which if not promptly diagnosed and treated can pro ve fatal. We present a case of tension pneumothorax, due to a laceration in the right main bronchus caused by bronchoscope, in a one year old child, who underwent bronchoscopy for removal of foreign body (bead). The child was successfully treated and managed by immediate insertion of 14 gauge IV cannula in the pleural cavity followed by chest tube insertion. The laceration was subsequently repaired and foreign body removed by thoracotomy.

Key Words: Ventilating bronchoscopy; Tension pneumothorax

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INTRODUCTION

Ventilating rigid bronc hoscopy is commonly used for removing foreign bodies from the tracheo-bronchial tree. Foreign body impaction in the airway is a common cause of death in c hildren[1]. Haemor rhage, post-procedure laryngeal oedema and trac heo-bronchial lacerations can occur during v entilating bronc hoscopy[2]. T ension pneumothorax is the most serious consequence of rigid bronchoscopy[3,4]. T his occurs when a one w ay v alve mechanism dev elops because of trac heo-bronchial instrumentation leading to a rent allowing the air to enter the pleural cavity during positive pressure ventilation but not allowing it to leave during expiratory phase. As the air builds up in the pleural space, ipsilateral lung is compressed followed b y mediastinal shift and compression of contralateral lung and intrathoracic vasculature. This leads to sev ere hypoxemia and cardio vascular compromise. Tension pneumothorax should be suspected in mechanically ventilated patients who suddenly decompensate [5]. Early diagnosis and prompt manag ement are essential for an optimum outcome. Therefore, this complication must be kept in mind and should be ruled out whenever ventilation is impaired and there is sudden cardiovascular compromise during anaesthetic manag ement for v entilating bronchoscopy[6].

CASE REPORT

A one year old female child, weighing 11 kg, was admitted through ER department with a one day history of foreign body inhalation followed by severe bouts of cough and dyspnea. Pre-operative examination sho wed a health y female child with symmetrical chest expansion, reduced air entry on the right side and SpO_2 of 100%. She was not dyspneic and was normothermic at the time of inspection, without any other medical problem. Pre-op c hest x-ray showed a foreign body in the right main bronchus (Fig 1).

Without any premedication, anaesthesia w as induced intravenously with inj. propofol 2mg/kg IV and supplemented by sevoflurane 3-4 MAC with 100% oxygen. Inj. atropine 0.2mg w as given IV and m uscle relaxation was obtained with a small 5-10mg dose of suxamethonium. Rigid bronchoscope was inserted by otolaryngologist and

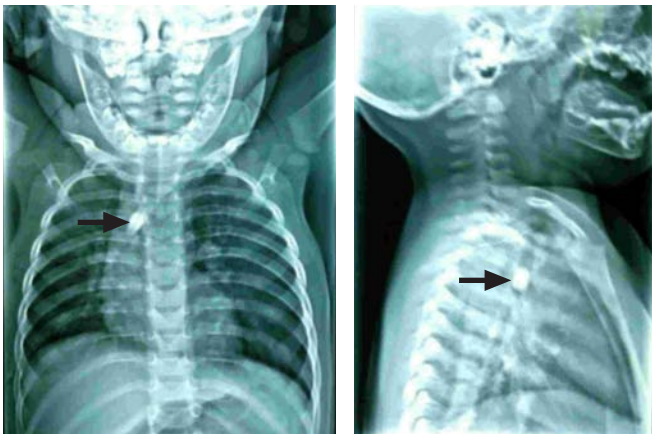

Fig 1: Pre-operative chest x-ray showing a foreign body in the right main bronchus (arrows)

attempts were made to get hold the foreign body with the forceps. 30 minutes after starting the procedure patient's SpO_2 started falling down to 40%, with cyanosis. Heart rate went upto 200 beats/minute. Child's abdomen was distended and on auscultation no breath sounds could be heard over the right hemithorax. The surgeon was asked to stop the procedure and an uncuffed endotracheal tube (size 4.0 ID Endosoft) was put in the trachea under direct laryngoscopy and the patient was manually ventilated with 100% oxygen. High airway resistance was encountered with only a slight improvement in SpO_2, upto 80%. Still no breath sounds were audible on the right side on auscultation. Immediate portable chest x-ray was requested, which showed a massive right sided pneumothorax with depression of right hemidiaphragm and shifting of trachea and mediastinum to the left with compression of the left lung (Fig 2).

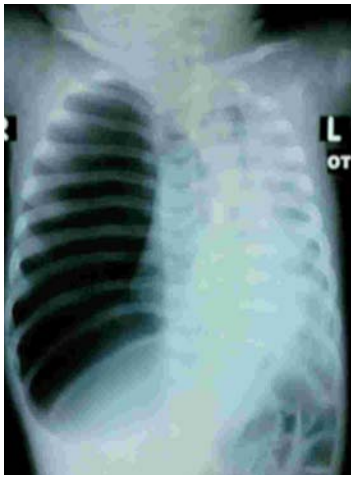

Fig 2: Chest x-ray showing a massive right sided pneumothorax with depression of right hemidiaphragm and shifting of trachea and mediastinum to the left with compression of the left lung

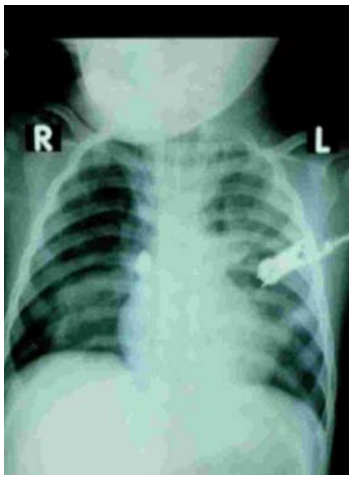

Fig 3: Post-op chest x-ray showing re-expansion of the right lung

A 14 gauge IV cannula was immediately inserted in the 2nd intercostal space in the midclavicular line. A gush of air leaked out through the cannula and ventilation became easier. Within a few minutes SpO_2 rose to 100%. Subsequently, another size-14 cannula was passed in the midaxillary line in the 5th intercostal space and connected by an IV infusion set to a temporary under-water seal after removing the 1st cannula. Repeat chest x-ray showed marked improvement with re-expansion of the right lung and mediastinal shift back to its position. (Fig 3)

A chest tube was placed in the right pleural cavity by the thoracic surgeon followed after a day by right thoracotomy which showed a small 0.7mm rent in the right main bronchus through which foreign body was removed and the rent was sutured. Child showed uneventful recovery and was discharged after a few days.

DISCUSSION

Ventilating rigid bronchoscopy has inherent risks and complications such as bleeding, laryngeal trauma, laryngeal oedema, laryngospasm, bronchospasm, infection, hypoxemia, tracheobronchial lacerations and tears leading to pneumothorax[2], pneumomediastinum and surgical emphysema of the chest wall and neck.

Tension pneumothorax is a rare but life threatening complication[3,4]. Rothmana and Boeckman[7] reported that the probability of developing pneumothorax during rigid bronchoscopy for the removal of foreign body is approximately 1 in 100 cases. It usually results from direct trauma to tracheobroncaheal tree. Therefore, the possibility of pneumothorax should always be kept in mind when

ventilation worsens during ventilating bronchoscopy[8]. An early diagnosis of pneumothorax during anaesthesia, however, is not so easy as the symptoms may be masked by anaesthesia[6]. Full monitoring is essential to alert the anesthesiologist of a worsening situation. Tension pneumothorax during surgery may manifest itself by a fall in oxygen saturation, a rapid increase in airway pressure, hypotension and tachycardia[9]. In our case, bronchial laceration caused by rigid bronchoscope was responsible for tension pneumothorax. Immediate intervention to release the built up pressure in the pleural cavity can be achieved by a large bore IV cannula and is life saving, to be followed by chest tube insertion. Vigilance is the price of safety.

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