

UNUSUAL PRESENTATION OF ACUTE UPPER AIRWAY OBSTRUCTION CAUSED BY AN ANTERIOR MEDIASTINAL MASS

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SUMMARY

We report an unusual case of acute upper airway obstruction. Inhalation of a foreign body caused choking in a 5-yr-old child, but subsequent investigations revealed a large anterior mediastinal tumour, externally compressing the trachea and the main bronchi. Such a presentation may be deceptive and is important, as general anaesthesia may result in complete airway obstruction with fatal consequences.

KEY WORDS

Airway: acute obstruction, mediastinal tumour.

Acute airway obstruction is a serious emergency. Infections and inhalation of foreign bodies comprise the majority of such cases in children, who may be confidently diagnosed by clinical history and examination. General anaesthesia may be required either for tracheal intubation to bypass the obstruction or to remove the foreign body. A less common cause in children is compression of trachea and bronchi by mediastinal tumours. Up to 60% of children with mediastinal masses may present with respiratory symptoms [1]. General anaesthesia in these patients is contraindicated, as relaxation of the tracheal musculature may cause collapse and complete obstruction, with fatal consequences.

CASE REPORT

A 5-yr-old girl developed a chest infection which was treated successfully with penicillin. Five days later, while eating an apple, she choked suddenly, developed marked stridor and became cyanosed. Her father applied Heimlich's manoeuvre and back blows which cleared the airway, but within a few minutes she obstructed again and was brought

to the hospital. The intermittent nature of the obstruction was very deceptive. On arrival of the child at the hospital, the casualty Senior House Officer noted that she had marked inspiratory and expiratory stridor, was very restless, deeply cyanosed and had a tachycardia of 140 beat min⁻¹. However, a Consultant Anaesthetist examined the patient 15 min later and found the patient relaxed, calm and pink with no signs of obstruction. In view of this intermittent improvement, she was taken to the x-ray department for the radiographic examination of the neck and chest. The neck radiograph showed a post-cricoid swelling caused by the foreign body. A postero-anterior chest radiograph was taken, but before the film could be developed the patients's airway obstructed again. It was decided therefore, to proceed with bronchoscopy under general anaesthesia and the child was transferred to an operating theatre. Anaesthesia was induced with increasing concentrations of halothane in 100% oxygen. Bronchoscopy showed no foreign body and a normal trachea to a distance of 15 cm from the teeth, but marked narrowing beyond that. It was possible to pass the bronchoscope into the right main bronchus with difficulty, but the lumen of the left main bronchus was obliterated almost completely by external compression.

The chest radiograph showed a widened mediastinum (fig. 1) and a large mediastinal tumour mimicking upper airway obstruction was thought likely. Further surgical intervention was not

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FIG. 1. Chest x-ray showing widening of the mediastinum.



FIG. 2. CT scan of the chest at the level of the third thoracic vertebra, showing tracheal compression by the anterior mediastinal mass.

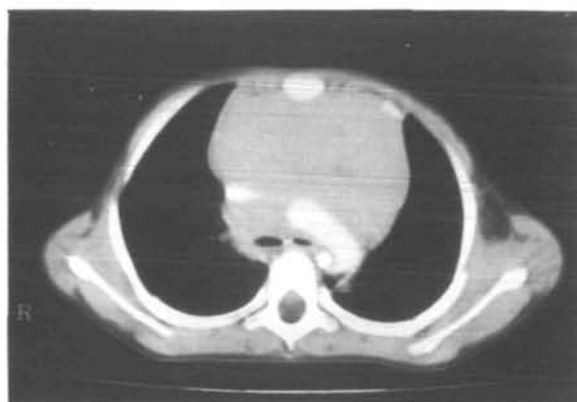


FIG. 3. CT scan of the chest at the level of the fifth thoracic vertebra, showing marked bronchial compression.

ography (CT) of the chest was carried out and showed a large anterior mediastinal mass compressing the trachea (fig. 2) and main bronchi (fig. 3). A diagnosis of acute T-cell lymphoblastic leukaemia was made on bone marrow examination. The tumour responded to steroid and cytotoxic chemotherapy and the mass decreased rapidly in size and was almost invisible on the chest radiograph by the 5th day of treatment. The patient was weaned easily from the ventilator and the trachea was extubated on the 6th day. She was transferred to the haematology ward on the 7th day and was discharged home after successfully completing the first course of chemotherapy.

DISCUSSION

Approximately 60 % of children with mediastinal masses present with respiratory symptoms [1]. These tumours may be neoplastic (Hodgkin's lymphomas, teratoma, lymphoblastic leukaemia) or benign (cystic hygroma, bronchogenic cyst). A large tumour mass may cause external compression of the trachea and bronchi or infiltrate the lumen. Intermittent airway obstruction may be caused by the movement of the heart during the cardiac cycle [2], but is usually caused by compression of the trachea. Symptoms are worse with lying supine, as the compression increases; patients prefer sitting up. Structures adjacent to the trachea (superior vena cava, pulmonary arteries and myocardium) may also be involved [3] and in severe cases local compression may drastically reduce right ventricular output, which may lead to cardiac arrest and death [4]. If biopsy for a tissue diagnosis is required, it should be

necessary and anaesthesia was discontinued, precipitating a bout of coughing and total respiratory obstruction. The trachea was re-intubated and manual ventilation attempted, but it proved impossible to inflate the lungs and the patient became very cyanosed. The application of an increased positive airway pressure and a change to the lateral position allowed re-establishment of ventilation, and the patient was transferred to the Paediatric Intensive Care Unit.

Controlled mechanical ventilation with a positive end-expiratory pressure (PEEP) of 15 cm H₂O was required to maintain airway patency and to prevent distal air trapping. Computed tom-

performed under local anaesthesia. General anaesthesia in these patients may be fatal [5], and ideally should be performed only when efforts to shrink the size of the tumour with appropriate treatment have been successful [6].

A history of progressive dyspnoea, chest infection and inability to lie flat should alert the anaesthetist to the possibility of complete airway obstruction on induction of anaesthesia. A chest CT scan quantifies the degree of airway compression, which is not always obvious on plain x-ray of the chest or conventional tomography [7, 8]. A 35% decrease in the diameter of the tracheal lumen is associated with ventilatory symptoms, while a greater than 50% decrease may be associated with complete obstruction during anaesthesia [1]. Cardiac investigations should include electrocardiogram and echocardiography [9].

Anaesthesia may have to be induced with the patient in the sitting position, which poses problems of access. A gaseous induction with halothane in oxygen and avoidance of neuromuscular blocking agents help to preserve a patent airway. If obstruction develops during anaesthesia, turning the patient to the semi-prone position may relieve obstruction by reducing the weight of tumour on the trachea [10]. Direct laryngoscopy also has been reported to relieve complete obstruction, presumably by putting the trachea under tension, thereby straightening it [11]. A rigid bronchoscope may pass the obstruction and may prove life saving. In the most extreme cases, femoro-femoral cardiopulmonary bypass may have to be considered [12].

The above case report illustrates a difficult clinical situation in which a mediastinal tumour in a child mimicked inhalation of a foreign body. The history, clinical examination and lateral neck x-ray proved misleading. The clinically deteriorating condition of the patient necessitated general anaesthesia, which should be avoided in

patients with mediastinal tumours. Under general anaesthesia, the patient developed complete obstruction which was relieved with great difficulty using continuous positive airway pressure and changes in posture.

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