CASE FOR DIAGNOSIS

A preoperative consultation for a patient with chronic cough and wheeze

A.F. Mobeireek

Case history

A preoperative pulmonary consultation was requested for a 58 yr old female patient, who was admitted electively for cholecystectomy and thought to have asthma. She had experienced intermittent dry cough for over 40 yrs, which was described as irritating and barking. It was associated with dyspnoea and wheeze, and was usually triggered by upper respiratory tract infections (URTI) and exercise, but not by smells, dust or other irritants.

There was no history to suggest nasal disease, gastrooesophageal reflux or dysphagia. The patient had been seen many times in general and chest clinics and emergency departments and given different diagnostic labels, including asthma, bronchitis, chronic cough and URTI. Treatment had usually included short courses of bronchodilators, antibiotics, cough mixtures and sometimes steroids, but the symptoms took their course, lasting 3–8 weeks before improvement. There was no history to suggest other atopic disorders and no family history of atopy. The past medical history was significant for diabetes mellitus and hypertension controlled with diet and nifedipine tablets. The patient was a lifetime nonsmoker.

On preoperative examination, blood pressure (BP) was 160/90 mmHg and the patient looked comfortable. Examination of the chest and other systems was unremarkable. Investigations showed that complete blood count, differential and serum electrolytes were within the normal range. Chest radiographs are presented in figure 1.

Spirometric values were: forced expiratory volume in one second (FEV1) 1.72 L (90% of predicted); forced vital capacity (FVC) 2.19 L (95% pred), FEV1/FVC 79%; peak expiratory flow rate (PEFR) 2.91 L·s⁻¹ (53% pred) and maximal midexpiratory flow rate at 25–75% of FVC (MMEF25–75) 1.68 L·s⁻¹ (59% pred). The flow-volume loop (FVL) at a maximum inspiratory and expiratory manoeuvre is presented in figure 2.

Correspondence: A.F. Mobeireek, Dept of Medicine (38), College of Medicine, King Saud University, P.O. Box 2928, Riyadh 11461, Saudi Arabia Fax: 00 966 14672686
Interpretations

The frontal chest radiograph shows a right-sided aortic arch. The lateral projection shows narrowing of the trachea at the level of the aortic arch.

PEFR, which is considered a sensitive index for upper airway obstruction (UAO), was significantly reduced, whilst FEV1 and FVC were within the range of predicted values. The FVL shows the characteristic shape of fixed UAO.

DIAGNOSIS: "Upper airway compression associated with right-sided aortic arch".

Hospital course

The patient underwent computed tomography of the chest, which confirmed the findings on the plain film. The anaesthetist was alerted to the possibility of development of UAO during surgery. With judicious use of intravenous fluids and postoperative respiratory care, the patient had an uneventful recovery.

Discussion

Congenital anomalies of the aorta occur in embryonic life as a result of failure of formation of the bronchial arches. Some of these anomalies, such as the double aortic arch or the right-sided aortic arch (RAA) with an aberrant vessel and a constricting ligamentum arteriosum, can cause compression of the trachea and oesophagus [1]. This usually manifests in infancy with respiratory distress or dysphagia in association with other cardiac malformations and requires surgical correction [2, 3].

Adults with RAA are occasionally seen, but, because a constricting ring is uncommon, reports of respiratory difficulties are extremely rare. BEVELAQUA et al. [4] reported the case of a patient who had a picture that was thought to be exercise-induced asthma. It was suggested that during exercise extratracheal pressure, turbulence and connective acceleration were accentuated, which worsened the UAO. BOSE et al. [5] reported the case of a patient with a long-standing history of respiratory symptoms, who developed UAO during surgery. It was shown that the supine position and intravenous fluids further added to the obstruction. Finally, Looi et al. [1] reported a series of 28 patients with symptomatic anomalies of the aorta that included two adults, but the details of their clinical presentation were not given.

The patient reported here had longstanding history of intermittent respiratory symptoms that led to many diagnostic labels, including asthma, bronchitis and chronic cough. The clinical picture was not compatible with these diagnoses, and no other cause for chronic cough, such as rhinosinusitis or gastro-oesophageal reflux was evident. During a maximum inspiratory and expiratory manoeuvre, the FVL showed the characteristic shape of fixed UAO. The FVLs and the radiological picture of this patient and the two patients reported by BEVELAQUA et al. [4] and BOSE et al. [5] are similar. The clinical presentation was somewhat different; symptoms were usually triggered by respiratory tract infections. It is likely that the narrow airway is further compromised by oedema and secretions, as well as the increased respiratory demand associated with the infection. Similar clinical pictures have been described in children [4, 6], but not, to my knowledge, in adults at this older age.

Although upper airway obstruction associated with right-sided aortic arch is rare, recognition is important as surgery may offer relief to a patient with severe symptoms. Division of the taut ligamentum arteriosum is usually required. In older patients, however, dissection of other vascular structures may also be necessary [7]. Moreover, precautions should be taken during anaesthesia to avoid aggravating the obstruction. The patient discussed above had symptoms that were intermittent and not severe, and she presented at an older age, so that surgery was not indicated. Gall bladder surgery and the postoperative course were uneventful, in this patient.

Keywords: Asthma, chronic cough, right-sided aortic arch, upper airways obstruction.

References