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Short reports

Prolonged wheezing and tracheal compression caused by an aberrant right subclavian artery

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Compression of the trachea and the oesophagus by anomalous development of the aorta or its branches is well recognised as a cause of airway obstruction.[1] Right aberrant subclavian artery is one of the anomalies which allegedly does not usually cause any respiratory difficulty.[2 3] We report a patient with right aberrant subclavian artery who had persistent respiratory difficulties from one week of age, in whom bronchoscopy revealed marked tracheal compression.

Case report

The patient was a 6-month-old boy, the only child of a healthy 24-year-old mother and a 25-year-old father who suffers from asthma. He was born at term weighing 3·15 kg after a pregnancy during which the mother suffered from a urinary tract infection and was treated with Ampicillin. There was no respiratory difficulty after birth but at one week of age he was noticed to wheeze and this has continued ever since with exacerbations, for which he had been admitted to hospital four times elsewhere. Between the attacks he had mild persistent wheezing.

He was fully breast fed until the age of 1 month and then started to receive cow's milk. Because of diarrhoea and vomiting, he was suspected of having milk allergy and was changed to a diet excluding milk products, but this had no effect on his wheezing. His weight increased along the twenty-fifth percentile and his psychomotor milestones were normal. After an attack of severe wheezing he was admitted in our department for the first time.

On examination, he was a well-developed infant, with mild tachypnoea when awake (44 breaths per min) but not while asleep (18-24 breaths per min). There was no cyanosis or clubbing. His chest was moderately hyperinflated with mild sternal and intercostal retraction. There was loud wheezing during both inspiration and expiration which was best heard over the sternum, and an expiratory wheeze over the lung fields. The rest of the physical examination was normal.

The chest radiograph was normal. Laboratory investigations showed haemoglobin 10·4 g/dl, no pathogens on throat culture, sweat chloride 11 mmol/l, and normal immunoglobulins, blood gases, and ECG.

Barium swallow showed an oblique filling defect in the oesophagus running cephalad from left to right (fig 1).

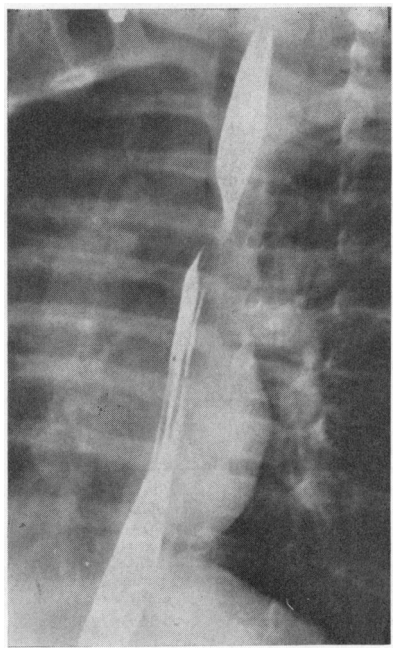

Fig 1 *Barium swallow—antero-posterior view showing a filling defect in the oesophagus running cephalad from left to right.*

On the lateral view there was an indentation on the oesophagus posteriorly (fig 2). These findings are very suggestive of right aberrant subclavian artery.

Lung function tests were carried out in an infant whole body plethysmograph by the method of Stocks *et al.*[4] The results (table) showed moderate hyperinflation and airways obstruction with a small but definite response to the inhalation of nebulised salbutamol.

In view of the persistent symptoms and the barium swallow appearances, bronchoscopy was performed. This showed marked deformation of the lower half of the trachea which was triangular in shape and very floppy (fig 3). The posterior wall bulged inwards and was pulsating in time with the arterial pulse. The right wall also bulged inwards but was not pulsatile. The bronchoscope easily passed below these lesions and the carina

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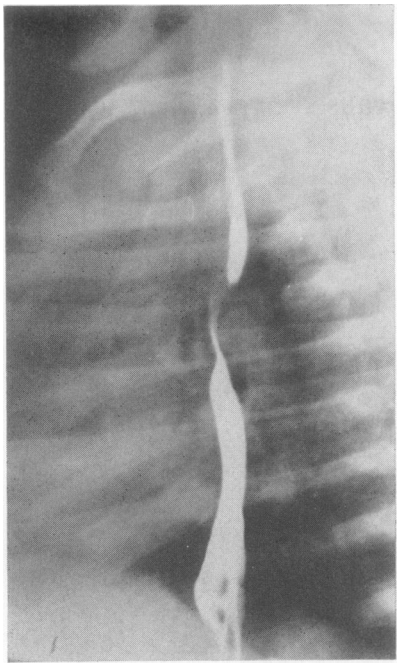

Fig 2 *Barium swallow—lateral view showing an indentation on the oesophagus posteriorly.*

Table *Whole body infant plethysmograph lung function results*

	Before inhalation of salbutamol	*After inhalation of salbutamol*	*Expected*
Thoracic gas volume (ml)	385	382	230
Airway resistance ($KPa\ l^{-1}\ s$)	7·5	5·1	1·0
Specific airway conductance ($KPa^{-1}\ s^{-1}$)	0·35	0·50	2·54
Heart rate (min^{-1})	120	135	—

and the rest of the bronchial tree were entirely normal.

The diagnosis was made of partial tracheal obstruction caused by the combination of an aberrant right subclavian artery and tracheomalacia. The child is being managed conservatively.

Discussion

Wheezing in the first year of life is most commonly a functional condition without structural basis. Wheezing from anatomical causes may result from congenital anomalies such as lobar emphysema, bronchial stenosis or bronchomalacia, vascular rings of various types, and cardiac disease.[5] Rarely at this age foreign bodies or

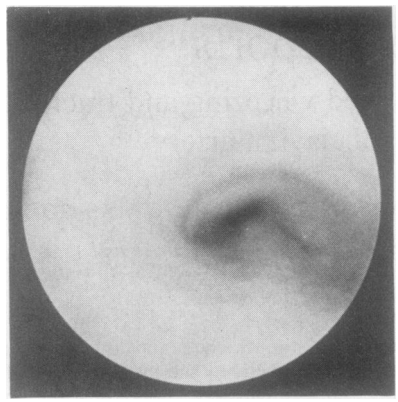

Fig 3 *View of the trachea through the bronchoscope showing deformation of the lower half of the trachea which is triangular in shape.*

tumours such as haemangioma may cause obstruction. The clinical pattern is extremely variable depending on the nature of the malformation and the severity of the obstruction. Our patient presented just as many other wheezy infants do and indeed the history and lung function tests suggested the possibility of reversible airways obstruction. The barium study of the oesophagus suggested the correct diagnosis of a right aberrant subclavian artery compressing the oesophagus and trachea.

According to Swischuk,[2] the vascular rings which most often cause respiratory obstruction are double aortic arch, right aortic arch with right descending aorta and with left ductus arteriosus, left aortic arch and left descending aorta with right ductus arteriosus or vascular sling (aberrant left pulmonary artery). Occasionally anomalous innominate artery and anomalous left common carotid artery cause symptoms. The right aberrant subclavian artery is usually asymptomatic,[2 3] and our patient was unusual in this respect, but in view of the bronchoscopic finding there can be no doubt of the source of the obstruction. It is possible that the tracheal wall was weak (tracheomalacia) as well as compressed by the aberrant vessel.

References

[1] Gross RE, Neuhauser EBD. Compression of the trachea or esophagus by vascular anomalies. *Pediatrics* 1951;7:69-83.

[2] Swischuk LE. *Radiology of the newborn and young infant*. Baltimore: Williams and Wilkins Company, 1973:222-7.

[3] Nadas AS, Fyler DC. *Pediatric cardiology*. Third edition. New York: WB Saunders Company, 1972.

[4] Stocks J, Levy NM, Godfrey S. A new apparatus for the accurate measurement of airway resistance in infancy. *J Appl Physiol* 1977;**43**:155-9.

[5] Moss AJ, McDonald LV. Cardiac disease in the wheezing child. *Chest* 1977;**71**:187-92.