Case 1691

Eurorad

Congenital H-type tracheo-oesophageal fistula

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Section: Paediatric radiology
Case Type: Clinical Cases
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Patient: 3 months, male

Clinical History:

Chesty during feeds.
Imaging Findings:

The patient presented to the casualty department with a history of feeding problems. He was a full-term, normal-delivery baby and, despite a decreasing interest in feeds, appeared "well" and was gaining weight. His mother reported he coughed at times during feeds and had been commenced on an H2 antagonist by his GP.
A barium swallow was performed and mild gastro-oesophageal reflux was the only initial abnormality demonstrated. However, in view of the condition suspected on clinical grounds a tube oesophagram was performed which confirmed the diagnosis.

Discussion:

Congenital tracheo-oesophageal fistula (TOF) without associated atresia is a rare anomaly, representing about 5% of all tracheo-oesophageal fistulae. This so-called H-type fistula is in fact N shaped, passing from the oesophagus up to the trachea above the level of the carina, usually between C7 and T2 vertebral levels.
The classical triad of symptoms is cough, choking or cyanosis precipitated by feeding, gaseous distension of the gastro-intestinal tract due to air passing from the trachea into the oesophagus via the TOF and recurrent chest infections due to aspiration of stomach contents. The prevalence of recurrent chest infections indicates the serious nature of the clinical problem and the importance of early diagnosis to prevent permanent lung damage. If the diagnosis remains unsuspected during the first 3 to 4 months, symptoms improve on solid feeds and presentation may be further delayed until chronic lung damage supervenes. It is not necessary for all symptoms to be present before the diagnosis is suspected clinically.

The diagnosis of the H-type fistula is usually suspected on clinical grounds, but may be difficult to demonstrate radiologically as the TOF is inconstantly patent. Indeed, constant patency may be incompatible with life (Essentials of Caffey's Pediatric X Ray Diagnosis). A contrast study should be done in the true lateral position with attention to the first swallows to exclude aspiration of contrast through the larynx. When clinically suspected, if the fistula is not demonstrated on a contrast oesophagram, then a tube oesophagram must be performed. The tube oesophagram involves injecting contrast with controlled pressure during withdrawal of a feeding tube through the oesophagus. In our institution the baby is placed on their right side. If the fistula is not demonstrated in the true lateral position, it is occasionally useful to inject with the baby in a prone position and perform lateral fluoroscopy. Some authors find barium paste useful since a small amount of paste may lodge in the oesophageal opening of the fistula and increase

detection. Bronchoscopy may also help to correctly establish the diagnosis, particularly when the tube oesophagogram fails to demonstrate the fistula; oesophageal endoscopy is less reliable, however selective trans-oesophageal catheterisation may help in localising the fistula at surgery. Direct sagittal CT is useful particularly in neonates too ill for contrast studies. This involves placing the baby transversely in the CT scanner, that is with head to the right and feet to the left, to perform direct saggital CT scanning. This allows visualisation of the trachea and fistula to the oesophagus in the saggital plane. In addition, sensitivity may be increased by injecting 50mls of air via an infant feeding tube placed in the upper oesophagus during scanning. Air has the advantage over liquid contrast in minimising the problem of aspiration pneumonia and can be administered in larger amounts allowing small collapsible tracts to be demonstrated. Newer imaging techniques including three-dimensional computed tomography and virtual bronchoscopy are likely to be of value in difficult situations, in those too ill for contrast studies and the older child in whom initial diagnosis has been missed. The images will also aid the surgeons pre-operative evaluation and surgical planning.

Conventional radiographs are useful to evaluate associated abnormalities, most commonly the VACTERL(Vertebral abnormalities, Anal atresia, Cardiac abnormalities, Tracheo-oesophageal fistula and/or Oesophageal atresia, Renal agenesis and dysplasia, and Limb defects) association. An increased incidence of right-sided aortic arch with TOF is surgically important since such infants should have left rather than right thoracototomy for repair. There is an increased incidence of TOF reported in premature infants and those with Down's Syndrome.

Remember negative contrast studies do not exclude the diagnosis.

Differential Diagnosis List: Congenital H-type tracheo-oesphageal fistula

Final Diagnosis: Congenital H-type tracheo-oesphageal fistula

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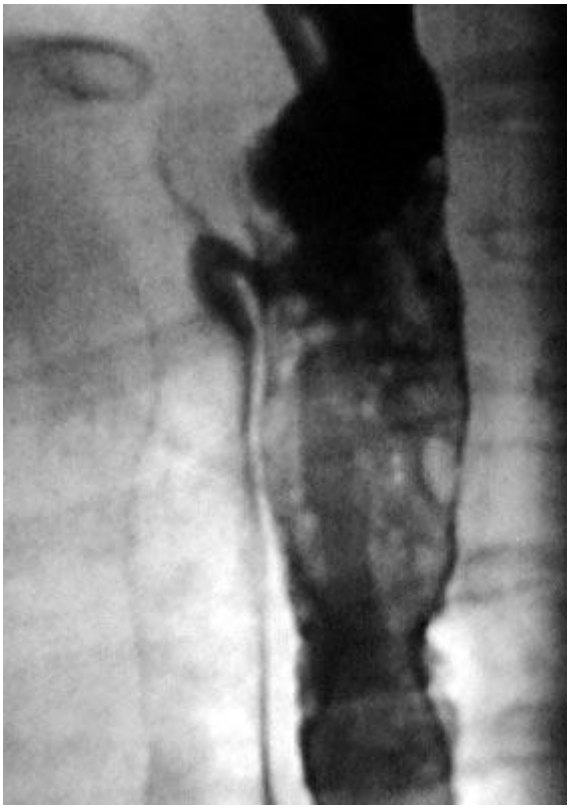
Figure 1

a

Description: This image from the tube oesophagogram demonstrates contrast passing into the trachea via the oesophageal fistula. **Origin:**

b



Description: The oesophagus is filled with contrast injected via a feeding tube; as this is slowly withdrawn, contrast passes into the tracheo-oesophageal fistula. **Origin:**