CASE FOR DIAGNOSIS

"Coffee grounds" through the chest tube

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Case history

A 78-yr-old Saudi male was admitted having had epigastric pain and vomiting for 3 days. The patient was unable to give a clear medical history; however, he described the pain to be severe, colicky, nonradiating and aggravated by food. On the day of admission, he had noticed a small amount of fresh blood in the vomitus. The family indicated that he had had a long-standing history of intermittent abdominal pain, mainly related to food, for the past 25 yrs. Indeed, he had been admitted to the surgical ward 6 yrs previously with similar pain and was suspected to have a perforated duodenal ulcer, but recovered with conservative treatment. A few weeks after discharge he underwent upper gastrointestinal endoscopy, which showed oesophageal and duodenal diverticula and duodenitis. He was treated with ranitidine for 6 weeks with improvement and did not attend any further follow-up until this presentation. The physical examination results were unremarkable apart from pallor and epigastric tenderness.

The haemogram was consistent with severe microcytic hypochromic anaemia. Serum electrolytes, urea, creatinine, amylase and random blood glucose levels were within the normal range. The initial chest radiograph is shown in figure 1. The following morning, the physician on duty was called to see him owing to severe respiratory distress. Examination of the chest showed dull percussion notes on both lung bases and numerous crackles. The chest radiograph showed large bilateral pleural effusions and a right-sided apical pneumothorax. Chest tubes were inserted and drained rusty brown fluid with clots (coffee grounds-like).

Fig. 1. – Frontal chest radiograph.

BEFORE TURNING THE PAGE INTERPRET THE PLAIN CHEST RADIOGRAPH AND SUGGEST A DIAGNOSIS.

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Interpretation

The frontal chest radiograph shows a right-sided pneumomediastinum adjacent to the right side of the trachea and the right heart border (see arrows in figure 2). The film also shows interposition of the transverse colon between the right hemidiaphragm and the liver. The presence of haustral bands of the colon traversing the gas pattern indicates that this is not pneumoperitoneum resulting from a perforated viscous.

The pneumomediastinum progressed to a massive right hydropneumothorax and left pleural effusion the following day (not shown).

Diagnosis: "Spontaneous rupture of the oesophagus, Boerhaave's syndrome" or "hepatodiaphragmatic interposition of the colon, Chilaiditi syndrome".

Hospital course

The diagnosis was suspected the following morning after the appearance of the hydropneumothorax. Confirmation was then obtained *via* radiography using a water-soluble contrast, which showed leakage of the contrast to the right pleural cavity (fig. 3). The patient underwent surgery ~36 h after admission. Through right posterolateral thoracotomy, the tear was identified, its edge

Fig. 2. – Frontal chest radiograph with arrows pointing to the pneumomediastinum.

Fig. 3. – Water soluble contrast study of the oesophagus showing no filling of the retrocardiac part of the oesophagus down to the gastro-oesophageal junction. Extensive contrast extravasation is present, largely at the right hemithorax. An inverted "V" outlined by the contrast represents the pleural reflection. The features are those of right-sided rupture of the oesophagus (Boerhaave's syndrome).

trimmed and closure with an intercostal muscle patch performed. Both pleural cavities were washed and bilateral intercostal drainage tubes were inserted before closure. Postoperatively, he required prolonged mechanical ventilation *via* a tracheostomy tube. A repeat contrast study showed no leak, but there was some stenosis at the site of the surgery. Subsequently, he developed nosocomial pneumonia followed by multiorgan failure, which was the cause of death 10 weeks after surgery.

Discussion

Spontaneous (atraumatic) rupture of the oesophagus after forceful vomiting is also termed Boerhaave's syndrome, after the person who first described it in 1724 [1]. It is of rare occurrence, and case reports and a few retrospective case series represent the majority of publications in this area [2–5].

Prompt diagnosis is important, because patients who undergo early surgery are likely to have fewer complications [3–5]. One of the problems encountered with this syndrome, however, is that misdiagnosis can occur, with a variety of conditions such as myocardial infarction, peptic ulcer disease, pulmonary embolism, pancreatitis and cholecystitis being diagnosed. Symptoms such as those

seen in our patient including vomiting, abdominal pain and haematemesis are neither sensitive nor specific. Makler's triad consists of vomiting, chest pains and subcutaneous emphysema, and is seen in only 7–33% of cases [1, 5].

Also, radiological signs, such as early pneumomediastinum or a small pneumothorax, are frequently overlooked, which is what happened in our and other cases [5–7]. When frank hydropneumothorax is seen, a case is already advanced. Contamination of the pleural cavity has occurred as well as oedema of tissues, making surgery more difficult and the postoperative period more complicated. For an early diagnosis, it is important, therefore, that physicians exercise a high index of suspicion in patients presenting with gastrointestinal or pulmonary symptoms.

Definitive diagnosis can best be made by oesophagogram, which is diagnostic in >90% of cases [4]. The tear usually occurs vertically on the left posterolateral part of the distal oesophagus, presumably because this area is weaker and is first to give way when the intra-oesophageal pressure is raised [1]. In our patient, however, the leak occurred on the right, which has been reported rarely [2, 4], except in the series of WALKER *et al.* [5], in which the incidence was equal on both sides. This could be caused by a diseased oesophagus, as suggested by the presence of a diverticulum seen on endoscopy 6 yrs previously. Other diagnostic modalities include computed tomography or pleural fluid analysis of food content and pH. ABBOTT *et al.* [2] described the character of the pleural fluid, which appears serous or serosanguineous prior to rupture of the mediastinal pleura and changes to brown or rusty brown following the rupture. They considered the latter to be a clue to the diagnosis and that failure to appreciate this led to diagnostic delay in their series. In our patient, rusty brown fluid, which presumably was blood altered by gastric acid and infection, came through the chest tube. In one patient with negative computed tomography and oesophageal contrast study results, DRURY *et al.* [8] managed to diagnose oesophageal perforation by finding undigested food particles on pleural fluid cytology.

Another unusual feature in this patient was the associated interposition of the colon between the liver and the right hemidiaphragm. This condition was first described in 1865 by Cantini, but named after Chilaiditi, a German radiologist who described it in more detail in 1910 [9, 10]. On routine plain films of the chest it is seen in 0.14–0.25% of cases and is usually an incidental finding [9]. Nausea, vomiting, anorexia and abdominal pain have been attributed to this syndrome in some patients. In addition, abdominal catastrophes have been reported on occasion including gastric volvulus, intestinal obstruction, suprahepatic appendicitis and others [10]. Chilaiditi syndrome may well be responsible for the bout of abdominal pain and vomiting that precipitated rupture of the oesophagus in our patient, and is the first reported association to our knowledge. He had also shown endoscopic evidence of duodenitis 6 yrs previously, and this may be a contributory factor to the symptoms. Peptic ulcer disease is known to occur in some patients with Boerhaave's syndrome [2, 3]. Complete endoscopic evaluation was not possible in our case because of the development of an

oesophageal stricture, but contrast studies did not show evidence of peptic ulceration.

As mentioned above, for best results, early surgical intervention is recommended. Surgery should aim to seal the leak, drain the associated empyema and establish good drainage to the contaminated areas [4]. Ancillary measures include antibiotics and nutrition through feeding jejunostomy or parentally.

In conclusion, the presented case of Boerhaave's syndrome demonstrated two unusual features; first, the occurrence of oesophageal rupture on the right, and, secondly, association with Chilaiditi syndrome. Since symptoms, signs and chest radiography are neither highly sensitive nor specific, physicians need to bear this syndrome in mind when evaluating patients with unexplained acute abdominal or thoracic symptoms.

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Keywords: Boerhaave's syndrome, Chilaiditi's syndrome, pneumomediastinum

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