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PHOTO QUIZ

A patient with subdiaphragmatic air

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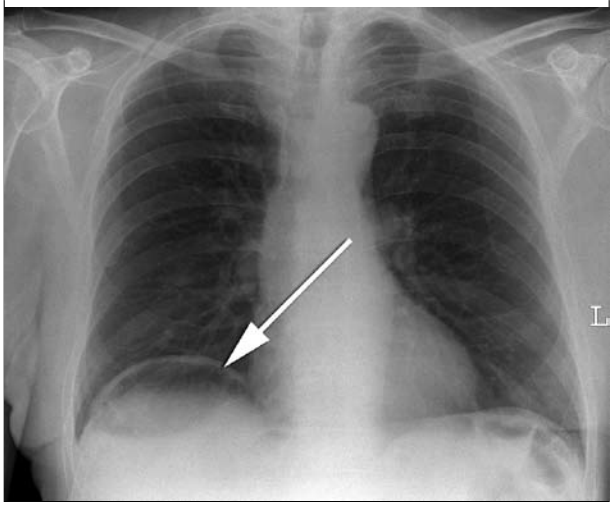
CASE REPORT

A 66-year old man presented to the Emergency Department with fever of three days' duration and nausea. He was being treated with combined radiotherapy and chemotherapy for a recently diagnosed locally advanced hypopharyngeal carcinoma. Two weeks before admission, a percutaneous endoscopic gastrotomy (PEG) tube was inserted as a routine procedure to ensure adequate nutrition during chemoradiation. The procedure was uncomplicated, but a 2-cm large gastric ulcer was diagnosed. Proton pump inhibiting drugs were prescribed and an appropriate feeding regimen was started.

On presentation, careful history taking did not provide clues to the focus of his fever. Examination of the abdomen was unremarkable. A review of the operation site demonstrated that the tube was firmly anchored in position with no evidence of leakage. Blood chemistry revealed a neutrophil count of 9.9 x 10^9/l two weeks after the first dose of cisplatinum chemotherapy (100 mg/m^2). C-reactive protein was 311 mg/l. A posterior-anterior chest radiograph was suggestive of free intraperitoneal air under the right hemidiaphragm (*figure 1*).

Figure 1. *Posterior-anterior chest radiograph, suggestive of free intraperitoneal air under the right hemidiaphragm*



WHAT IS YOUR DIFFERENTIAL DIAGNOSIS?

See page 90 for the answer to this photo quiz.

ANSWER TO PHOTO QUIZ (ON PAGE 89)

A PATIENT WITH SUBDIAPHRAGMATIC AIR

DIAGNOSIS

Air observed under the diaphragm on standard chest radiograph can have many aetiologies, some of which require urgent surgical intervention. In our patient, the combination of fever, nausea, leucocytosis, and elevated C-reactive protein made us consider the possibility of perforation of his previously diagnosed gastric ulcer. In the absence of specific abdominal symptoms consistent with peritonitis, however, other causes were explored.

Pneumoperitoneum is a recognised early complication of PEG tube insertion and was included in our differential diagnosis. This complication is seldom diagnosed, although its prevalence is reported at up to 25% if specifically looked for.[1] Free air usually resolves spontaneously in one or two days and surgical intervention is rarely required. A single case report, however, has described pneumoperitoneum developing more than six weeks after PEG tube insertion, with vomiting as initial presenting symptom.[2]

Demetrius Chilaiditi first described interposition of the transverse colon between the liver and the diaphragm.[3] This finding could be mistaken for pneumoperitoneum resulting in unnecessary exploratory laparotomy. Distinction between free air and air in a loop of bowel can be made based on visible haustra or plicae circulares.[4] Also, changing the position of a patient with Chilaiditi's sign will not change the position of the abdominal air. Abdominal radiographs in lateral position or abdominal computed tomography can thus be used to distinguish both entities. To verify the presence of free intraperitoneal air in our patient, an abdominal radiograph in left lateral position was taken (*figure 2*). This examination did not show any evidence of free air. Thus, the diagnosis of Chilaiditi's sign was made. In addition, our patient showed evidence of concomitant urinary tract infection which was treated with antibiotics.

Chilaiditi's sign may coincide with symptoms such as nausea, vomiting, distension, abdominal pain, and constipation, but is often asymptomatic. Treatment, if required, consists of bowel decompression. Thus, pneumoperitoneum on chest radiograph can be an indication for immediate surgical exploration, but it is important to realise that air observed under the diaphragm on chest radiograph may have other aetiologies that do not mandate urgent intervention. Chilaiditi's sign must be included in the differential diagnosis in these patients, especially in the absence of specific abdominal symptoms consistent with peritonitis.

Figure 2. *Abdominal radiograph in left lateral position, to verify the presence of free intraperitoneal air*

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