Gas-containing Liver Abscess Mimicking Pneumoperitoneum

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Abstract
Gas under the diaphragm or pneumoperitoneum, is often a sign of grave intra-abdominal pathology. It can be due to either of surgical or non-surgical etiology. Here we present a case of gas under right dome of diaphragm caused by a non-surgical cause i.e. secondary to aspiration of liver abscess.

Introduction
Acute pain abdomen is a common condition in the emergency department. It is necessary to investigate and treat it without delay. Gas under the diaphragm or pneumoperitoneum, is often a sign of grave intra-abdominal pathology. It can be because of surgical or non surgical etiology e.g. as a result of post-surgery, endoscopy or laparoscopy, peritoneal dialysis or intestinal perforation secondary to perforation of a viscous like peptic ulcer perforation or small or large bowel perforation as a result of inflammatory bowel diseases, diverticulitis or carcinoma, and can be a penetrating or blunt injury, female genital tract trauma (intercourse, douching, insufflations) etc.

Gas containing liver abscess is also one of the causes of gas under diaphragm. Iatrogenic gas containing liver abscess is a rare cause of non-surgical gas under diaphragm and, hence, we report such case.

Case Report
A 22 year-old male presented with fever, chills, pain in right upper abdomen and non-productive cough for 3 days, vomiting and generalized weakness for 2 days. A fortnight back a solitary liver abscess containing >1000 ml pus had been percutaneously drained under ultrasound guidance and the aspirate was anchovy sauce-like in nature. He had no history of systemic disease. He was chronic smoker and alcoholic. Following drainage and intensive therapy with anti-amoebic drugs, the patient’s condition improved and he was discharged.

Two week later, he was re-admitted with above complaints. On arrival to hospital, vital signs were heart rate of 98 beats/min, blood pressure of 110/70 mmHg, body temperature of 37.5℃ and respiratory rate of 20 breaths/min. Physical examination revealed fine crackles over the right lower lung field; and there was localized tenderness in right upper quadrant.

Laboratory investigations showed Hb 8.4 gm%, white blood cell counts 15000/mm3 with 66% neutrophils, ESR 90 mm/ 1st hr. Blood sugars, renal and liver profile were normal except for slight hypoalbuminemia and A:G ratio reversal. First look of the upright chest X-ray, PA view (CXR) showed gas under right dome of diaphragm with obliterated right costophrenic angle (Figure 1). Ultrasound abdomen revealed hepatomegaly with large sized liver abscess >1000 ml, splenomegaly (13 cm) and right side pleural effusion. The CT scan abdomen (Figures 2 and 3) revealed the evidence of hypodense lesion with attenuation area equivalent to that of air in the liver predominantly involving the right lobe suggestive of liver abscess showing air-fluid level. The abscess was drained again and the anchovy sauce like aspirate which was found to be sterile on culture. The gas shown under the diaphragm was presumed to be accidently injected during aspiration of liver abscess previously. In fact, it was not a true pneumoperitoneum, rather it was gas in the liver abscess cavity. The patient was managed conservatively and follow up radiological tests showed disappearance of gas shadow.

Discussion
Gas under diaphragm or Pneumoperitoneum usually can be detected by upright chest X-ray or CT scan is more sensitive.1 In 5 to 15% of cases, pneumoperitoneum does not reflect intra-abdominal visceral perforation. This result from another source and such a situation is termed spontaneous pneumoperitoneum (SP) or non-surgical pneumoperitoneum (NSP).2,3 Most cases of NSP occur as a procedural complication or as a complication of medical intervention. The most common sources of NSP are from thoracic route.4,5 When abdominal pain and distension are minimal and peritoneal signs, fever, and leukocytosis are absent, NSP should be considered. Intra-thoracic causes include trauma, pneumothorax and others, and these can be associated with pneumomediastinum or pneumocardium. There is also an association with mechanical ventilation in intensive care unit in patients following cardiopulmonary resuscitation. Air can enter the abdomen via the vagina, uterus and salpinx. Pneumoperitoneum via a gynaecological route has been reported

Fig. 1: X-ray chest PA view showing gas under right dome of diaphragm with obliterated costophrenic angle

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following coitus and Jacuzzi usage, as well as vaginal douching.\textsuperscript{2,3}

Air can be iatrogenically introduced to the peritoneum via endoscopic procedures such as oesophageal-gastro-duodenoscopy and colonoscopy and other procedures.\textsuperscript{5-7}

The intra-abdominal causes of pneumoperitoneum are better recognized as they are more common. Most of these causes are surgical in nature, and it is reported that over 90\% of cases of pneumoperitoneum is the result of perforation of an intra-abdominal viscous.\textsuperscript{8} Rapid surgical intervention/exploration becomes necessary not only to find the offending perforation but also to limit the degree of intra-abdominal contamination.

The most appropriate treatment for liver abscess is antibiotic therapy and percutaneous drainage under ultrasound guidance if indicated.\textsuperscript{9}

This was a complicated presentation mimicking gas under diaphragm or pneumoperitoneum. It posed a challenge in diagnosis and management.

Though, the presentation of gas under diaphragm or pneumoperitoneum is often suggestive of significant surgical pathology, there are instances when gas shown under diaphragm is not a pneumoperitoneum but it could be a pseudo-pneumoperitoneum and it can be managed conservatively and thereby avoiding the risks of undergoing a laparotomy. Despite its initial clinical presentation and radiographic findings, in the absence of cardiovascular instability it is possible to monitor these patients closely, investigate and manage them conservatively.

In conclusion, in some of the cases of Gas under diaphragm or pneumoperitoneum, the physicians cannot make a proper diagnosis until surgical intervention. Gas under diaphragm or pneumoperitoneum with acute abdominal pain is mostly secondary to hollow organ perforation, but there are still some other causes which present with similar clinical features. Gas containing liver abscess is a rare such one and can mimic intra-abdominal visceral perforation. When physicians meet patients who have gas under diaphragm or pneumoperitoneum with acute abdominal pain and the clinical clues of liver abscess or history of liver abscess drained previously or any other procedure done previously must be obtained. Further abdominal ultrasonography, even abdominal CT scan is needed to establish the proper diagnosis for immediate and definite managements.

References