

Tension Pneumoperitoneum in a Female Patient Misdiagnosed as a Case of Congestive Cardiac Failure: a Case Report

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Abstract

Pneumoperitoneum is the accumulation of free air in the abdominal cavity, and a well-known consequence of gastrointestinal perforation, mechanical ventilation and abdominal operations.

Tension pneumoperitoneum is a rare surgical emergency characterized by accumulation of free intraperitoneal gas under pressure leading to abdominal compartment syndrome (ACS).

This is a 32-year-old female who was referred for a chest radiograph on account of congestive cardiac failure. The chest radiograph was done and we included the abdomen which revealed severe air under both diaphragms. There is marked medial and downward displacement of the liver; the “saddle bag” sign of severe pneumoperitoneum, the spleen was also medially displaced. The demonstrated bowel loops appear distended with ground-glass opacity inferiorly suggestive of free intraperitoneal fluid. We present the radiologic findings of tension pneumoperitoneum in this patient who was misdiagnosed as a case of congestive cardiac failure with no known cause.

Keywords: pneumoperitoneum, tension, female, cardiac. failure

Introduction

Tension pneumoperitoneum (TP) is a rare surgical emergency characterized by accumulation of free intraperitoneal gas under pressure leading to abdominal compartment syndrome (ACS) [1, 2].

Abdominal compartment syndrome is characterized by respiratory failure due to compression of the diaphragm, and obstructive shock as a result of compression of the intra-abdominal veins [1].

Tension pneumoperitoneum is a severe form of pneumoperitoneum with concomitant hemodynamic instability and respiratory failure, it is a variant of ACS causing an abrupt increase in intra-abdominal pressure [3].

Pneumoperitoneum is a well-known consequence of gastrointestinal perforation, mechanical ventilation and abdominal operations [4].

Pneumoperitoneum in vast majority of cases, about 90% follows an intra-abdominal viscus perforation often requiring acute surgical intervention [5, 6].

Spontaneous or nonsurgical pneumoperitoneum are not following viscus perforation, and do have varying etiologies that include intrathoracic, intra-abdominal and gynecologic cause [5, 7, 8].

The mechanism of tension pneumoperitoneum is thought to be a ball-valve effect allowing one way accumulation of gas resulting in elevation and splinting of the diaphragm reducing lung volumes, and compression of intra-abdominal veins like inferior vena cava resulting in reduced venous return and decreased cardiac output [2, 9].

Tension pneumoperitoneum may lead to hypoxic shock, and if not detected and treated early may lead to cardiopulmonary arrest and death [10].

Surgical intervention which includes decompression using needle or catheter and exploratory laparotomy are the main treatment modalities in TP which if instituted promptly will improve the clinical condition of these patients [11, 12].

The aim of this article is to describe the radiographic features of tension pneumoperitoneum in female misdiagnosed as a case of congestive cardiac failure.

Case Report

This is a 32-year-old female who was referred for a chest radiograph from a primary health centre in one of the local areas of the state. She came with a working diagnosis of congestive cardiac failure with an known cause.

The patient presented with easy fatigability, restlessness, dyspnea, swollen and tender abdomen, rapid pulse, rapid breathing, sweating with diminished pulse volume and a systolic blood pressure of about 80mmHg.

The chest radiograph was done and we included the abdomen which revealed severe air under both diaphragms with marked elevation of the diaphragms and subsequent reduced chest volume bilaterally. The cardiac size was normal. There is marked medial and downward displacement of the liver; the “saddle bag” sign of severe pneumoperitoneum, the spleen was also medially displaced. The demonstrated bowel loops appear distended with ground-glass opacity inferiorly suggestive of free intraperitoneal fluid (figures 1a &b).

Complimentary abdominal ultrasonography that demonstrated free intraperitoneal fluid, distended bowel loops and free intraperitoneal air raising a strong suspicion of a perforated viscus.

A diagnosis of tension pneumoperitoneum with acute compartment syndrome following a viscus perforation from the radiographic findings and the patient’s clinical presentation was established.

The patient was immediately discharged to her referral centre for immediate medical and surgical intervention to save her from further debility and subsequent demise.

The patient had a successful exploratory laparotomy, uneventful hospital admission, and subsequent discharge, all in the peripheral healthcare center.

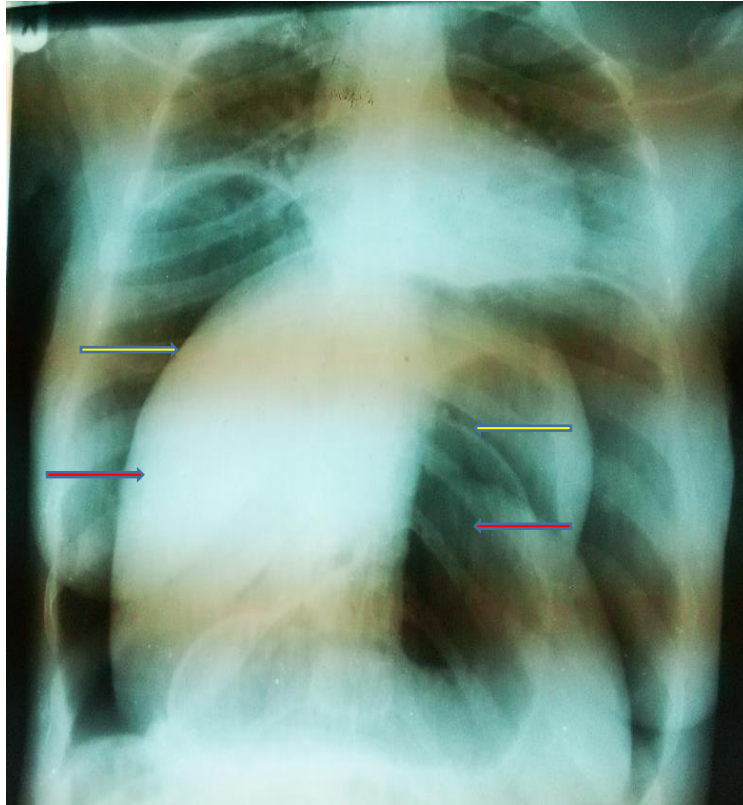


Figure 1a: Plain radiograph of the chest including part of the abdomen (Erect posterior-anterior view) showing severe pneumoperitoneum as lucencies under both diaphragms tracking inferiorly (right and left yellow arrows) elevating the diaphragms causing reduction in the thoracic craniocaudal diameter, displacing the liver downward and medially; the saddlebag sign (right red arrow). The spleen is also displaced medially (left red arrow).

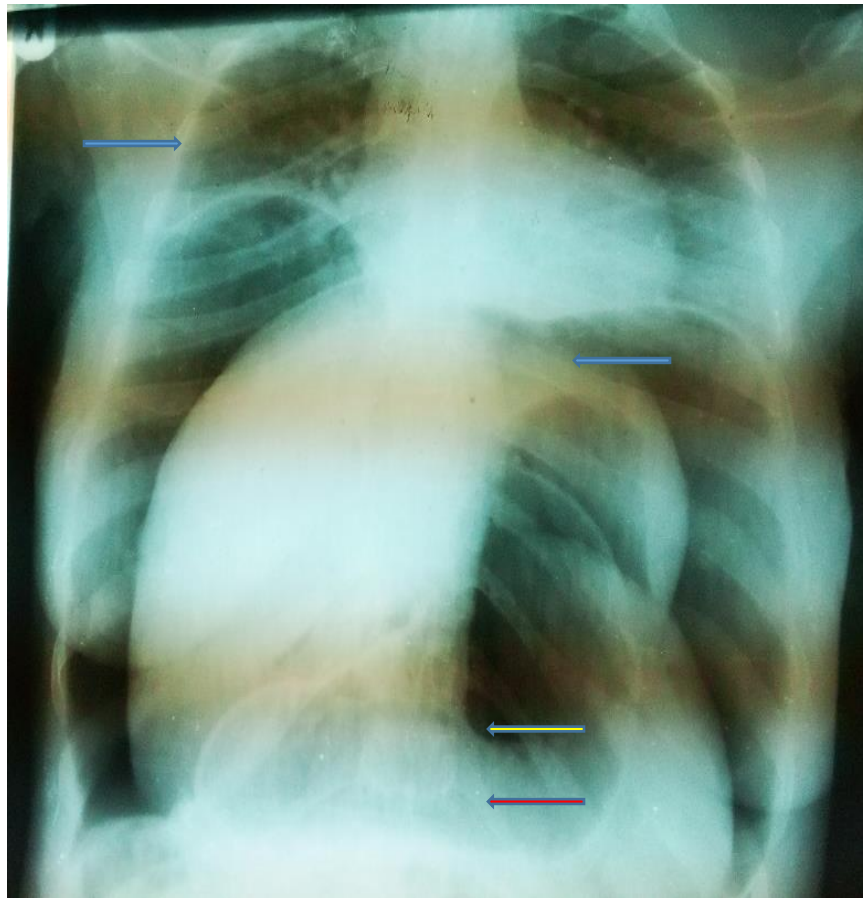


Figure 1b: Plain radiograph of the chest including part of the abdomen (Erect posterior-anterior view); the diaphragms appear elevated (right and left blue arrows) more marked on the right causing compression of the lungs and mediastinum most likely increasing the intrathoracic pressure. Distended bowel loops (left yellow arrow) are also demonstrated with ground-glass opacity inferiorly (left red arrow).

Discussion

Tension pneumoperitoneum (TP) is the accumulation of massive intraperitoneal air under pressure causing features of acute compartment syndrome with the patient presenting with features of cardiopulmonary compromise [1-3]; these findings are those documented in the literature and were the features also observed in the index case.

Most cases of pneumoperitoneum are from perforation of a hollow viscus and surgical operations [4-6], the index case had features of bowel perforation following plain radiograph and a complimentary abdominal ultrasound.

The patients with TP usually present with abdominal fullness, tenderness, distant bowel sounds and dyspnea [13, 14], the index case also had similar presentations, thereby conforming to most literatures.

Tension pneumoperitoneum (TP) leads to abdominal compartment syndrome (ACS), which is a sustained intra-abdominal pressure of greater than 20mmHg with evidence of organ dysfunction and manifested by respiratory failure following compression of the diaphragm and obstructive shock, which is the result of compression of the intra-abdominal veins [1]. The index case had no feature of organ dysfunction, but presented with dyspnea and respiratory distress most likely from compression of intra-abdominal veins following compression of the hemi-diaphragms bilaterally, though the intra-abdominal pressure was not measured due to lack of facility.

The plain radiographic findings of massive air under the diaphragms, marked splinting of the hemi-diaphragms with subsequent reduction in the thoracic diameter which may lead to increased intrathoracic pressure, the saddle bag sign of severe pneumoperitoneum, displacement of the spleen medially, were most of the common features of TP documented in the literature [13, 15]; these features were also documented in the index case.

Surgical intervention is the modality of treatment as documented in most literatures [11, 12]; the index case had similar treatment conforming to that documented in the literature.

Conclusion

Tension pneumoperitoneum is rare complication of pneumoperitoneum and may be life threatening, patients with features of bowel perforation should be closely monitored clinically and should have routine radiographic examination to prevent morbidity and subsequent mortality.

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