

Spontaneous Pneumoperitoneum-Role of Diagnostic Laparoscopy: Case Report and Review of Literature

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Abstract

Objective: Spontaneous pneumoperitoneum is a rare condition. It presents a challenge to the surgeon as the clinical presentation and radiological findings mimic perforated viscus resulting in unnecessary surgical intervention. The aim of this article is to describe a case of a spontaneous pneumoperitoneum in an elderly patient who underwent diagnostic laparoscopy and review of literature.

Case presentation: A 77-year-old female with multiple comorbidities presented to the emergency department with productive cough, shortness of breath, vomiting and abdominal pain. On examination she had tenderness in epigastric region. Chest X-ray and CT showed free air and fluid in peritoneal cavity.

Results: The patient underwent diagnostic laparoscopy that did not reveal any gastrointestinal perforation.

Conclusion: Spontaneous pneumoperitoneum is frequently mistaken for perforated viscus. If the patient presents with features of peritonitis, diagnostic laparoscopy has a vital role as it prevents unnecessary midline laparotomy.

Keywords: Spontaneous pneumoperitoneum; Laparoscopy

Introduction

Pneumoperitoneum is defined as free air within the peritoneal cavity [1]. Most cases of pneumoperitoneum are caused by perforated viscus. However, in 10-15% of the cases, other causes have been identified. These include intrathoracic, intrabdominal, gynecological and idiopathic [2,3]. Perforated viscus requires emergency surgical intervention as delay is associated with significant morbidity and mortality [4]. Generally, if any patient is referred to surgeon with pneumoperitoneum on imaging, the surgeons tend to have a low threshold for operative intervention for suspected perforated viscus. The patients might undergo unnecessary surgical intervention, adding the morbidity to the already ill patients. So, it is of paramount importance that the surgeons are aware of this rare entity and in cases where there is high suspicion of perforated viscus, laparoscopy provides a good diagnostic and therapeutic tool if needed. We describe a case of an elderly patient with spontaneous pneumoperitoneum who underwent diagnostic laparoscopy and intra-operatively no pathology or perforation was found.

Case Presentation

A 77-Year-old Female patient, known to have hypertension, hypothyroidism, dementia and bed-ridden, presented to the emergency

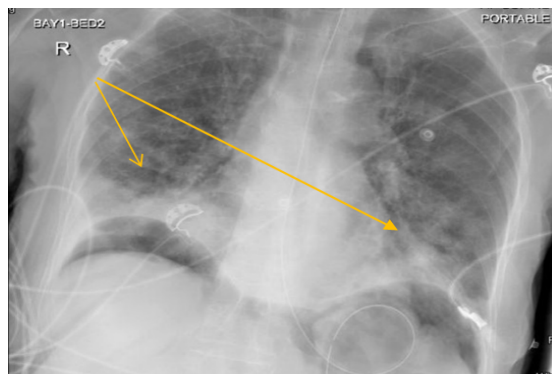


Figure 1: Chest X-ray with gas under diaphragm.

department with history of productive cough, shortness of breath and fever for 4 days. She also had history of vomiting of food particles. The family reported that she had history of intermittent abdominal pain for 1 to 1-1/2 months. The pain increased after the food and associated with vomiting occasionally. There was no history of recent travel or any sick contacts.

On Examination, she was febrile with Temp of 37.5°C, Heart Rate of 145 bpm, respiratory Rate 31 br/min, Blood Pressure 134/77 mmHg and O₂ saturation of 92%. Abdomen was tender in epigastric region; rest of the abdomen was non-tender and non-distended. Her Labs revealed WBC: 3.8. Rhinovirus PCR +ve, Procalcitonin: 25 and Lactic acid of

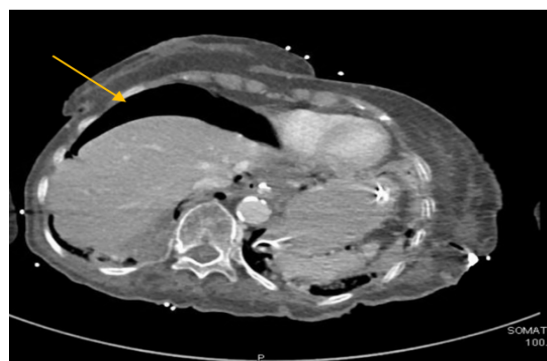


Figure 2: CT scan with contrast showing significant pneumoperitoneum.

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8.4. Chest X-ray revealed Bilateral basal consolidation and gas under diaphragm as shown in Figure 1. CT was requested which showed Pneumoperitoneum with free fluid in pelvis (Figure 2).

The decision was taken for diagnostic laparoscopy for suspected perforated viscus. Intraoperatively, no perforation identified in any of the hollow viscus. Minimal fluid was aspirated. After exploration, she was kept intubated due to poor breathing effort. Her clinical condition improved and two days later, she was extubated. She was started on her diet and was kept under medical care due to viral pneumonia. Later, she was discharged home.

Discussion

Pneumoperitoneum commonly results due to perforation of hollow viscus. Mostly it is due to perforation of peptic ulcer, Meckel's diverticulum, necrotizing enterocolitis, toxic megacolon, inflammatory bowel disease and perforation of bowel due to trauma or tumors [3].

However not all perforations in hollow viscus result in pneumoperitoneum. Winek et al. described that only 69% of the cases of gastroduodenal perforation had pneumoperitoneum on preoperative imaging [4]. This happens because the perforations heal or get sealed spontaneously resulting in minimal gas leakage. In the same way, not all pneumoperitoneum is caused by perforated viscus. Such cases in literature are described as non-surgical pneumoperitoneum or spontaneous pneumoperitoneum [2,5]. The etiology of spontaneous pneumoperitoneum can be divided into intrathoracic, abdominal, pelvic and idiopathic.

Thoracic

Intrathoracic causes include mechanical ventilation with PEEP, pleuroperitoneal fistula, pneumothorax, pneumomediastinum, thoracic trauma, barotrauma. cardiopulmonary resuscitation and pneumonia.

Abdominal

Abdominal causes include pneumatosis cystoides intestinalis, which is the most common cause of spontaneous pneumoperitoneum. This disease is characterized by gas filled submucosal or sub-serosal cysts mostly found in terminal ileum. Other abdominal causes include gastrointestinal endoscopy, emphysematous cholecystitis and post-surgical pneumoperitoneum.

Gynecological

These causes include pelvic inflammatory disease, postpartum knee chest exercises, vaginal douching and coitus [2-8].

Management

The management of spontaneous pneumoperitoneum is

challenging as most cases are misdiagnosed as perforated viscus resulting in inadvertent laparotomy. Review of literature reveals that authors have advocated for conservative management if peritoneal signs are absent. Whereas if peritoneal signs are present, laparotomy is warranted. This was based on the fact that patients who had spontaneous pneumoperitoneum underwent negative exploratory laparotomies [6-10]. Karaman et al. described a management algorithm for such cases [11]. However, the role of diagnostic laparoscopy is quite scarce in literature. We propose that if the patient is hemodynamically stable and there are features of peritonitis, laparoscopy provides a good diagnostic as well as a therapeutic tool. It prevents unnecessary midline incision, which would otherwise add to the morbidity of already sick patients.

Conclusion

Spontaneous pneumoperitoneum is a rare disease. It should be included in the differential diagnosis, If the patient has no peritonitis and imaging shows pneumoperitoneum. Conservative treatment is considered if the patient is hemodynamically stable without peritonitis, whereas if there are features of peritonitis and the patient is unstable, laparotomy is warranted. In cases, where the patients are stable and have features of peritonitis, diagnostic laparoscopy should be considered.

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