A Rare Cause of Pneumoperitoneum

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Introduction

Pneumoperitoneum is most commonly associated with a perforated viscus. When abdominal free air is appreciated on imaging, the most common course of action is an emergent exploratory laparotomy. However, pneumoperitoneum may not always be indicative of a perforated bowel. In the case described below, we will discuss a patient who developed acute peritonitis and pneumoperitoneum after undergoing chest compressions during cardiopulmonary resuscitation (CPR) and positive pressure mechanical ventilation.

Case Presentation

A 40-year-old female with a history of asthma and polysubstance abuse was found unresponsive and cyanotic in the field after intravenous injection of fentanyl. The patient had no history of abdominal procedures or recent trauma. Upon arrival to scene, emergency medical services (EMS) initiated chest compressions and administered Naloxone. Although the patient initially exhibited some increased responsiveness, she was found to be hypoxic on arrival to the emergency department (ED) and was intubated. Approximately twenty-four hours later, the patient was successfully extubated. Shortly after respiratory support was removed, the patient began exhibiting signs and symptoms consistent with acute abdomen. She began complaining about significant abdominal distension and tenderness. A stat computed tomography (CT) of the abdomen revealed diffuse, massive pneumoperitoneum of unknown etiology. Emergent exploratory laparotomy was performed to decompress the abdomen. During surgery, no evidence of free fluid or viscus perforation along the gastrointestinal tract was found. The uterus was also identified intraoperatively and was noted to be intact without evidence of perforation. The patient's post-operative course was benign with complete resolution of abdominal symptoms. The patient was discharged and continued to be asymptomatic at follow up two weeks later.

Imaging

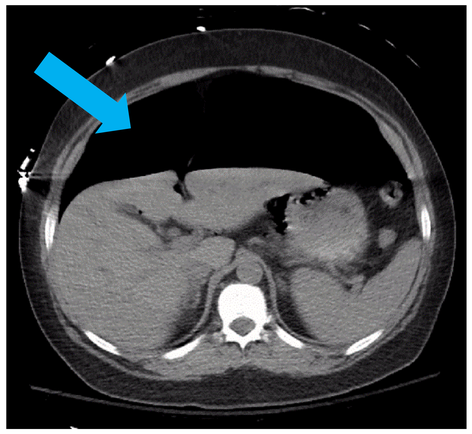

Figure A. Transverse imaging at the level of the liver illustrates massive pneumoperitoneum without evidence of stomach or bowel distension, perforation of focal inflammation.

Figure B. Sagittal imaging does not illustrate diaphragmatic perforation or tearing. There is no evidence of intraabdominal or pelvic free fluid, pelvic masses or uterine perforation.

Discussion

In approximately 90% of cases, pneumoperitoneum is caused by a perforation of the gastrointestinal tract. Intrathoracic, gynecologic, or iatrogenic etiologies account for other uncommon causes of intraabdominal free air.[1] In the case described, the cause of pneumoperitoneum was not definitively linked to a gastrointestinal source. The findings may have been secondary to blunt force trauma from chest compressions and positive pressure ventilation. One possibility is that free air originated in the thorax and migrated through an opening in the diaphragm.[2] Autopsy studies have shown that pneumoperitoneum can be seen in a small number of patients who received chest compressions. In these patients, exploratory laparotomy did not reveal any perforations along the gastrointestinal tract.[3] For patients with spontaneous pneumoperitoneum and no evidence of bowel perforation, conservative management may be a reasonable treatment course. Parenteral feedings and bowel rest are proposed options to treat viscerally intact patients. Patients that develop intraabdominal free air from rare etiologies may not exhibit signs of acute peritonitis.[4] When free air is not readily explained by a perforated viscus, a comprehensive history and physical exam may be helpful in identifying an atypical cause of pneumoperitoneum.

References

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