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Case Report

Spontaneous idiopathic pneumoperitoneum with acute abdomen

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ABSTRACT

Pneumoperitoneum is often caused by visceral perforation, and usually manifests with symptoms of peritonitis requiring surgical intervention. Non-surgical spontaneous pneumoperitoneum (ie. not associated with organ perforation) is a rare entity due to intrathoracic, intra-abdominal, gynecologic, iatrogenic or other reasons, and is usually treated conservatively. Idiopathic spontaneous pneumoperitoneum is even rarer than visceral perforation or other causes of free intra-abdominal air. In this report, we present a case of idiopathic spontaneous pneumoperitoneum. A seventy-five-year-old female patient presented with acute abdominal pain, low-grade fever, and nausea. Her abdominal examination findings were vague, and she did not have leukocytosis. Free intra-abdominal air was detected on plain X-ray, she was followed-up with cessation of oral intake, nasogastric tube, fluid resuscitation and prophylactic antibiotics for one day. There were no signs of acute abdomen except diffuse abdominal tenderness by deep palpation on the first day examination. There was a mild leukocytosis with a shift to the left in leukocytes, and pneumoperitoneum on abdominal X-ray. The abdominal computed tomography revealed free intra-abdominal air and minimal free fluid in Douglas pouch. Her past medical history revealed cholecystectomy (10 years ago) with no chronic diseases, regular medications, smoking, or alcohol consumption. The patient underwent emergency laparotomy. Despite lack of an identifiable cause and uncertainty of etiology, the patient was discharged on postoperative day 5. A thorough medical history, appropriate laboratory tests and radiological techniques and physical examination should be combined for identification of patients with non-surgical pneumoperitoneum, and avoid unnecessary laparotomy, while minimally invasive techniques such as laparoscopy should be considered as part of evaluation.

Keywords: Idiopathic pneumoperitoneum, spontaneous pneumoperitoneum, acute abdomen

INTRODUCTION

More than 90% of pneumoperitoneum occur as a result of gastrointestinal perforation (1). Gastric or duodenal perforations due to peptic ulcer are the most common causes of pneumoperitoenum. Pneumoperitoneum may also occur following abdominal trauma or diverticular perforation (1). The most common presentation is a patient with signs of peritonitis and free air on chest X-ray. Most cases require urgent exploration and intervention.

However, sometimes pneumoperitoneum is not associated with visceral perforation and is called spontaneous pneumoperitoneum (SP) or nonsurgical pneumoperitoneum. SP is associated with intrathoracic, intra-abdominal, gynecologic, iatrogenic or various other reasons (1). Generally, SP is not complicated by peritonitis, is benign and can be treated conservatively (1-4). Idiopathic SP is a very rare condition of unknown etiology, which can only be identified by exclusion of visceral perforation and other causes leading to presence of intra-abdominal free air (1, 5-7). SP diagnosis is usually made following a negative laparotomy. Presence of vague signs of peritonitis and pneumoperitoneum prior to laparotomy is especially challenging for the surgeon.

CASE PRESENTATION

A 75-year-old female patient presented with acute abdominal pain and nausea for the last 24 hours. Her past medical history was uneventful except cholecystectomy performed 10 years ago with no chronic disease, drug use, smoking, or alcohol use. The patient's facial expression was depressed. Her blood pressure was 110/70 mm-Hg, heart rate: 90 beats/min, and body temperature: 37.6°C. There was no abdominal tenderness. The WBC count was 7000 leukocytes/mL, and neutrophil ratio was 72%. Subdiaphragmatic free air was detected on posteroanterior chest radiograph, without air insufflation by nasogastric tube (Figure 1a, b).

The patient's oral intake was restricted, and was observed for a day with intravenous fluids and prophylactic antibiotic therapy. The next day there was mild leukocytosis (10,500/mL); neutrophils 78%, with blood pressure: 100/70 mm-Hg, heart rate: 92 beats / minute, and body temperature: 37.8°C. The abdominal examination revealed tenderness on deep palpation in all four quadrants.

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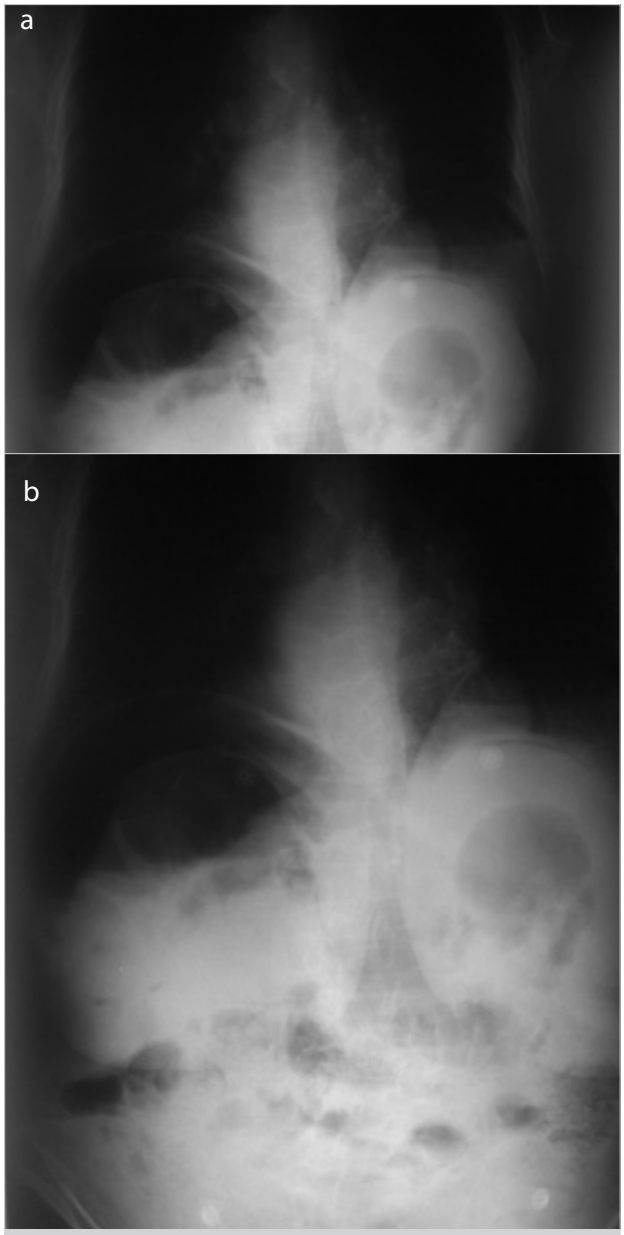

Figure 1. a, b. Sub-diaphragmatic free intraabdominal air

The abdominal computed tomography (CT) showed intra-abdominal free air and minimal free fluid in Douglas pouch (Figure 2, 3, 4, 5).

The patient underwent emergency laparotomy for suspected gastrointestinal perforation. There were adhesions in the upper abdomen due to the previous cholecystectomy, and approximately 100 cc serous free fluid in Douglas pouch. The stomach and duodenum were fully mobilized, and "Bursa omentalis" was explored. There was no evidence of perforation in the distal esophagus, stomach and duodenum. All the small intestine, colon and rectum were explored. However, there was no evidence of any etiologic factors. The cause of pneumoperitoneum could not be identified, the abdominal cavity was irrigated with 1000 ml of saline, and a surgical drain was inserted in Douglas pouch.

The patient was discharged on postoperative day 5. The patient underwent abdominal CT, upper and lower gastrointestinal endoscopy one month after the operation. There was no pathology.

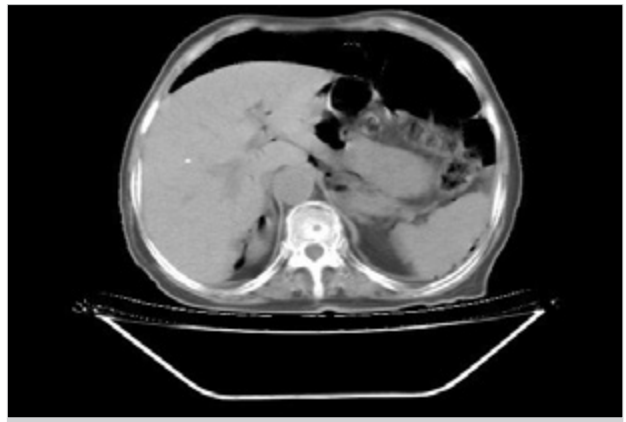

Figure 2. Free intra-abdominal air on upper sections of abdominal computed tomography

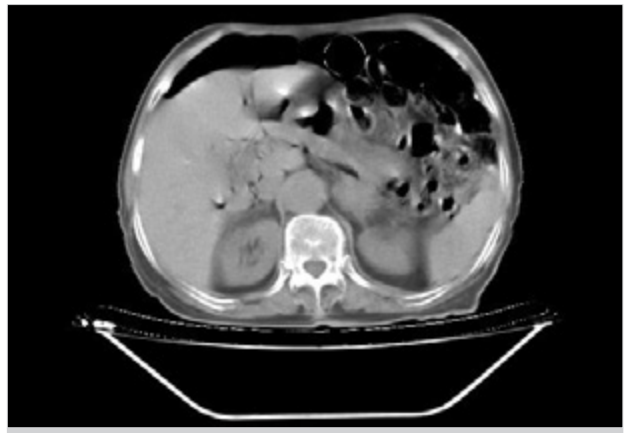

Figure 3. Generalized free intra-abdominal air on abdominal computed tomography

DISCUSSION

Spontaneous peritoneum is associated with intrathoracic, intra-abdominal, gynecologic, iatrogenic, and other reasons (1, 2). Trauma (including barotrauma), pneumothorax, and severe thoracic diseases such as broncho-peritoneal fistula can be complicated with SP (1). The co-existence of pneumopericardium and pneumomediastinum with SP has been reported, due to positive end-expiratory pressure (PEEP) in mechanical ventilation, (1). Pneumatosis cystoides intestinalis is the most common intra-abdominal cause of SP (1). Rare causes of SP include emphysematous cholecystitis, spontaneous bacterial peritonitis, ruptured liver abscess and perforated pyometra in women (1). It has been reported that air may reach the intraabdominal cavity through the endometrium or salpinx after rough sexual intercourse or use of hot tubs leading to pneumoperitoneum (1). Laparoscopic and endoscopic (colonoscopy) procedures may cause iatrogenic SP (1).

The underlying reason for and clinical symptoms of pneumoperitoneum dictates whether surgical treatment is required or not. While surgery is inevitable in the presence of signs and symptoms of acute abdomen, conservative treatment is indicated for mild symptoms without peritonitis (2). A detailed history and physical examination may be helpful in the differentiation of surgical and non-surgical pneumoperitoneum,

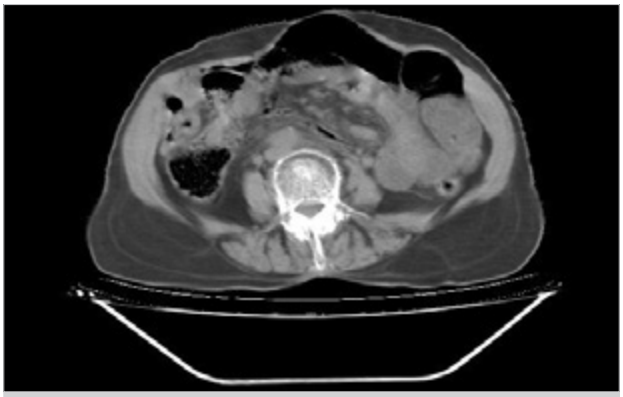

Figure 4. Free intraabdominal air on lower sections of abdominal computed tomography

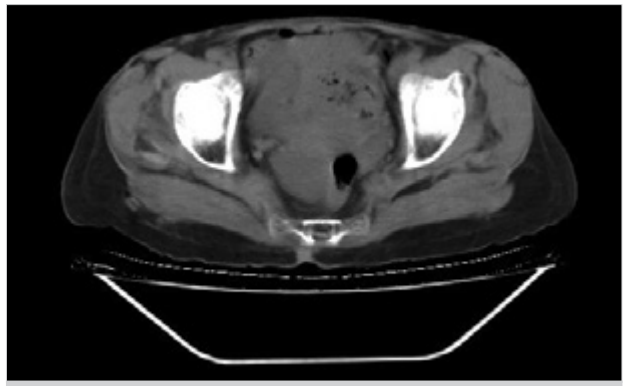

Figure 5. Minimal free fluid in the pelvic sections of abdominal computed tomography

therefore, avoiding unnecessary laparotomy (2). Radiological imaging prior to and after insufflation of air into the stomach through a nasogastric tube (pneumo-gastrography), can be used for the diagnosis or confirmation of upper gastrointestinal visceral perforation (8). Although plain chest and abdomen X-ray are common investigation tools in the diagnosis of even small amounts of intra-abdominal air, abdominal CT is more sensitive for identification of pneumoperitoneum and differential diagnosis of acute abdomen (9, 10).

It is suggested that in some cases of sub-clinical intestinal perforations, only air may leak without leakage of intestinal contents causing pneumoperitoneum (1). Other unknown reasons may also cause idiopathic pneumoperitoneum (1).

Only few patients are diagnosed with idiopathic pneumoperitoneum, nevertheless, most of them undergo surgical exploration. Van Gelder et al. (5) reported six pneumoperitoneum patients with acute abdominal symptoms and without any detectable cause on laparotomy. Chandler et al. (11) reported the rate of laparotomy in non-surgical pneumoperitoneum patients as 28%. Mularski et al. (12) identified 11 cases who underwent laparotomy out of 36 (31%) non-surgical pneumoperitoneum patients.

CONCLUSION

A thorough medical history, appropriate laboratory tests and radiological techniques and physical examination are valuable tools to identify patients with non-surgical pneumoperitoneum, and to avoid unnecessary laparotomy. Despite similar success rates of both laparoscopy and laparotomy in the diagnosis and treatment of pneumoperitoneum, minimally invasive surgery may be preferred due to its advantages.

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REFERENCES

1. Mularski RA, Ciccolo ML, Rappaport WD. Nonsurgical causes of pneumoperitoneum. West J Med 1999; 170: 41-46.
2. Karaman A, Demirbilek S, Akin M, Gürünlüoğlu K, Irşi C. Does pneumoperitoneum always require laparotomy? Report of six cases and review of the literature. Pediatr Surg Int 2005; 21: 819-824. [CrossRef]
3. Omori H, Asahi H, Inoue Y, Irinoda T, Saito K. Pneumoperitoneum without perforation of the gastrointestinal tract. Dig Surg 2003; 20: 334-338. [CrossRef]
4. Eslick GD, Chalasani V, Salama AB. Idiopathic pneumoperitoneum. Eur J Intern Med 2006; 17: 141-143. [CrossRef]
5. van Gelder HM, Allen KB, Renz B, Sherman R. Spontaneous pneumoperitoneum. A surgical dilemma. Am Surg 1991; 57: 151-156.
6. Fick TE, van Oorschot FH, Mallens WM, Kitslaar PJ. Pneumoperitoneum without peritonitis. Neth J Surg 1988; 40: 152-154.
7. Breen ME, Dorfman M, Chan SB. Pneumoperitoneum without peritonitis: a case report. Am J Emerg Med 2008; 26: 841. [CrossRef]
8. Lee CW, Yip AW, Lam KH. Pneumogastrogram in the diagnosis of perforated peptic ulcer. Aust N Z J Surg 1993; 63: 459-461. [CrossRef]
9. Stapakis JC, Thickman D. Diagnosis of pneumoperitoneum: abdominal CT vs. upright chest film. J Comput Assist Tomogr 1992; 16: 713-716. [CrossRef]
10. Ng CS, Watson CJ, Palmer CR, See TC, Beharry NA, Housden BA, et al. Evaluation of early abdominopelvic computed tomography in patients with acute abdominal pain of unknown cause: prospective randomised study. BMJ 2002; 325: 1387. [CrossRef]
11. Chandler JG, Berk RN, Golden GT. Misleading pneumoperitoneum. Surg Gynecol Obstet 1977; 144: 163-174.
12. Mularski RA, Sippel JM, Osborne ML. Pneumoperitoneum: a review of nonsurgical causes. Crit Care Med 2000; 28: 2638-2644. [CrossRef]