

Is the conservative treatment the choice for the spontaneous pneumoperitoneum?

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ABSTRACT

Introduction: The most common cause of a pneumoperitoneum is a perforation in the gastrointestinal tract. However, in 5–14% of the cases it presents without perforation, and is called spontaneous pneumoperitoneum or nonsurgical pneumoperitoneum. The spontaneous pneumoperitoneum may occur without systemic disruption, pain, or laboratory abnormality. In these cases, the conservative treatment is an option. **Case Series:** We present three patients diagnosed with spontaneous pneumoperitoneum treated conservatively in Hospital del Mar (Barcelona). All three patients presented a proper evolution with the conservative treatment, without any complications, and without requiring a surgery. **Conclusion:** The conservative treatment for the spontaneous pneumoperitoneum is a feasible, secure and the first choice when no hemodynamic instability, pain, leukocytosis, fever or peritonism is present.

Keywords: Iatrogenic disease, Intestinal perforation, Laparotomy, Pneumonia, Pneumoperitoneum

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INTRODUCTION

Most of the cases of pneumoperitoneum (90%) [1] result from a perforation of the gastrointestinal tract; peptic ulcer is the most frequent etiology and emergency surgery is the treatment of choice. There is no perforation in the 5–14% [2] of the cases, this situation is called spontaneous pneumoperitoneum (SP) or nonsurgical pneumoperitoneum. The SP is due to intra-thoracic, intra-abdominal, gynecological, iatrogenic and idiopathic causes. These cases can present as a benign situation and without hemodynamic instability. A therapeutic dilemma arises as they can and respond to a conservative treatment.

CASE SERIES

We present three cases of SP treated at our institution between 2000 and 2014, which were treated conservatively with satisfactory results. Informed consent was obtained from all patients for being included in this article.

Case 1: A-81-year-old female with a history of penicillin allergy, hypertension, poliomyelitis, osteoporosis and appendectomy. The patient was

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admitted for presenting hypoxemia (SO_2 89% FiO_2 21%) on the sixth postoperative day of a total hip replacement. The patient received some enemas three days before. The patient was normotensive, without tachycardia (86 beats per minute and afebrile). The abdomen was distended, tympanic, slightly painful and without peritonitis. The blood biochemistry did not reflect alterations (6850 cells/uL) but the chest radiograph showed bilateral subdiaphragmatic massive pneumoperitoneum (Figure 1). Computed tomography (CT) scan did not identify suspicious injuries to be the origin of pneumoperitoneum, nor free liquid (Figure 2). NPO, oxygen therapy and antibiotic therapy with aztreonam and metronidazole was prescribed for five days. The patient remained hemodynamically stable with progressive improvement in oxygen saturation. After ten days of admission and an obvious decrease of pneumoperitoneum in the radiological control (Figure 3), the patient was discharged.

Case 2: A 68-year-old male with a history of chronic obstructive pulmonary disease, hypertension and type II diabetes mellitus. He was discharged 12 days before for a community-acquired pneumonia, and in the control chest radiography, a pneumoperitoneum (Figure 4) was observed. The patient was asymptomatic, afebrile, hemodynamically stable and eupneic. The abdomen was depressible, tympanic, with normal peristalsis without peritoneal irritation or tenderness. The blood biochemistry was normal. CT confirmed pneumoperitoneum predominantly anterior and omental extraluminal air, with distended transverse colon and sigmoid, but without free fluid or leakage after administering contrast enema (Figure 5). Treatment was started with cefotaxime and metronidazole, remaining stable, asymptomatic and tolerating oral intake. On the seventh day of admission, there was no change in pneumoperitoneum in the chest X-ray. The patient requested a voluntary discharge. He remained asymptomatic in the ambulatory control.

Case 3: A 91-year-old female with a history of cholelithiasis, hypertension, heart failure and atrial fibrillation presented with vomiting and right upper abdominal quadrant pain of 12 hours of evolution. Blood pressure was 150/66 mmHg and heart rate 39 bpm. The abdomen was depressible, with right upper quadrant pain and hepatomegaly but negative Murphy's sign and without peritonitis. In the blood analysis highlighted creatinine: 2.1 mg/dL and leukocytosis: 12000/uL with neutrophilia (88.5%). Plain radiography showed minimal subphrenic pneumoperitoneum, aerobilia and increased aeration of the small intestine. Abdominal CT scan showed perihepatic gas and inside the falciform ligament without observing perforation. Another tomography findings were cholelithiasis and a 6.5 cm hypodense, focal tumor in the spleen. NPO, nasogastric tube and empiric coverage with amoxicillin-clavulanic was established. The patient progressed satisfactorily with normalization of renal function and leukocytosis, and he was discharged after seven days of admission.

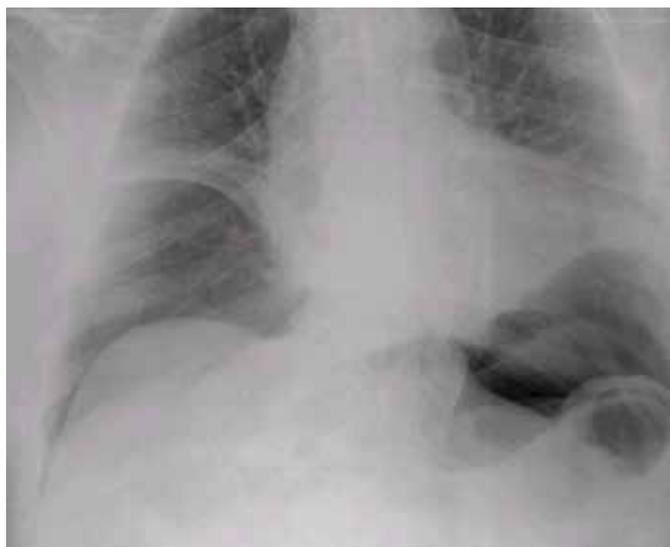


Figure 1: Initial spontaneous pneumoperitoneum.

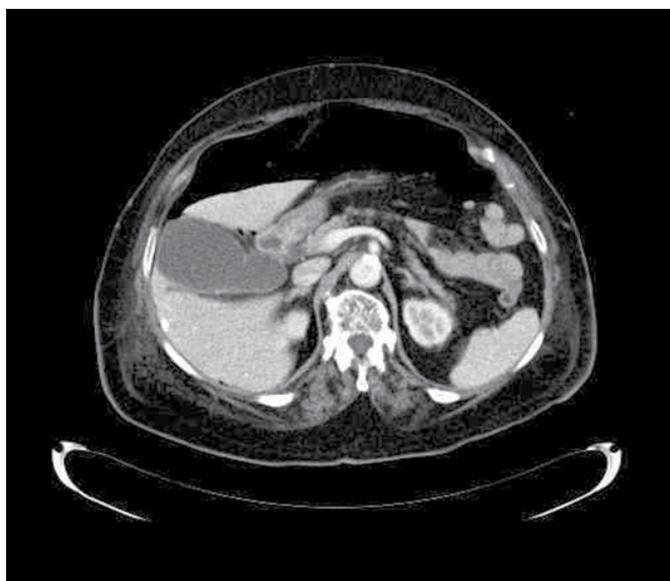


Figure 2: Computed tomography scan showing extensive spontaneous pneumoperitoneum.

DISCUSSION

The first step when there is a pneumoperitoneum, is to suspect a perforation and once discarded, you can look for other etiologies [3]. A 0.1% of the endoscopic procedures are complicated with pneumoperitoneum, resulting from air insufflation, handling or postpolypectomy syndrome. Pneumoperitoneum can also occur without macroscopic drilling in high pressures in fecal impaction or diverticulosis through microperforations [1, 2]. In Case 1, enemas could be the cause of SP. Among the intra-thoracic injury, mechanical ventilation, trauma, cardiopulmonary resuscitation or septic processes are involved factors [1]. The air reaches the abdominal cavity and retroperitoneum through microscopic pleural or



Figure 3: Spontaneous pneumoperitoneum after 10 days of conservative treatment.

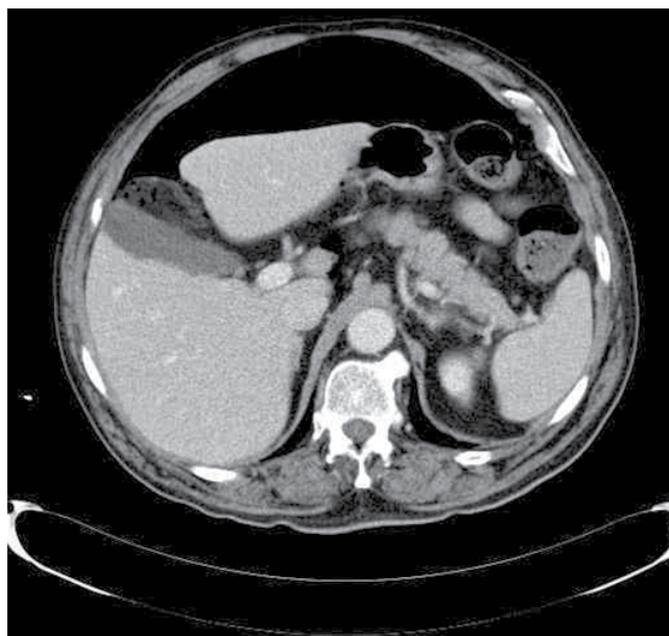


Figure 5: Extensive pneumoperitoneum in a computed tomography scan.



Figure 4: Massive bilateral spontaneous pneumoperitoneum.

diaphragmatic defects, or through the mediastinum following the perivascular connective. In pneumonia, as in Case 2, the formation of small abscesses and necrosis of the alveolar walls can cause interstitial emphysema and secondarily pneumoperitoneum [1], by the above described mechanism. The coexistence of pneumoperitoneum, pneumomediastinum and / or pneumothorax suggests SP, without excluding perforation.

Although the SP courses without peritonitis or hemodynamic instability, many patients undergo surgical exploration without showing perforation [2, 4–8]. Chandler et al. [4] reported a laparotomy rate of 28%, while Mularski et al. reviewed 196 cases of SP of which 23% underwent surgical exploration without finding the cause [5].

A proper history and physical examination, combined with blood and imaging tests, should identify those patients who can benefit from a conservative treatment

[6, 9, 10] and avoid the complications of an unnecessary laparotomy. In SP, medical treatment is safe and effective if match: 1) hemodynamic stability, 2) pain and/or mild abdominal distension, 3) absence of peritonism, 4) normal leukocyte count, and 5) apirexia [5, 6, 8]. Despite this, a close monitoring and re-evaluation is mandatory in all patients to detect any deterioration in the clinical evolution. Laparoscopic approach can be a good option for doubtful cases.

CONCLUSION

The most common cause of pneumoperitoneum is a perforation in the gastrointestinal tract and surgery is the indicated treatment. However, in some cases pneumoperitoneum is due to intra-thoracic, intra-abdominal, gynecological, iatrogenic and idiopathic causes, and it presents without hemodynamic instability or peritonism. A thorough history and physical examination, and an appropriate assessment of the laboratory and imaging studies, should permit to detect these patients who can be managed conservatively.

Author Contributions

Enric Sebastian Valverde – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Estela Membrilla Fernández – Substantial contributions to conception and design, Acquisition of data, Analysis

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Núria Argudo Aguirre – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

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Juan J. Sancho Insenser – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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