Unexpected Pneumoperitoneum: A Case Report

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Research Article

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Abstract

Background:

Pneumoperitoneum is usually the result of visceral perforation requiring urgent surgical repair. In rarer cases, no perforation is found despite the present of free intra-peritoneal air. This is otherwise known as “spontaneous pneumoperitoneum”.

Case presentation:

We present a case of an 18-year old male who had upper abdominal pain but who otherwise was not peritonitic and had normal blood results. He was concerned about the cause of the pain as he had previously had an admission to a different hospital with similar symptoms. A chest x-ray revealed unexpected pneumoperitoneum. Subsequent imaging revealed no identifiable perforation and the patient was managed without proceeding to an emergency laparotomy.

Conclusion:

This case demonstrates the importance of considering an erect chest x-ray in patients presenting with upper abdominal pain, with otherwise normal parameters, to avoid missing rarer diagnoses. Furthermore it demonstrates how such cases of spontaneous pneumoperitoneum can be managed conservatively, avoiding unnecessary surgery.

Introduction

Pneumoperitoneum refers to the abnormal presence of gas within the peritoneal cavity. The vast majority of cases are caused by perforation of a peptic/duodenal ulcer, or less commonly perforation following abdominal trauma or a diverticular rupture[1]. Patients normally show signs of an acute abdomen, including peritonitis. In rarer circumstances, pneumoperitoneum is present without perforation, otherwise known as “spontaneous pneumoperitoneum” (SP). Patients may not be peritonitic on examination and often can be managed with a conservative approach. In this case, a young male patient was managed as “spontaneous pneumoperitoneum” after a previous admission to hospital with similar symptoms but no identifiable cause.

Case Presentation

An 18 year old male patient presented to the emergency department with a 12 hour history of central abdominal pain. Seven months previously he had presented to a central London hospital with severe abdominal tenderness. He was found to be Rovsing’s positive with raised inflammatory markers. Appendicitis was expected and he underwent an emergency appendicectomy. The intra-operative findings showed questionable inflammation at the tip of the appendix and no signs of perforation. He stayed as an inpatient for 8 days post-operatively for rising inflammatory markers and ongoing abdominal pain

with distention. An abdominal-pelvic computerised tomography (CT) scan was done that showed free air in the abdomen, out of keeping with normal post-operative pneumoperitoneum, and a pelvic collection, which was not amenable to drainage. He was treated conservatively with antibiotics with which he improved clinically, and was discharged home.

Unfortunately he was re-admitted 10 days later for increasing left sided abdominal pain. He had a further CT scan that showed a persistent collection with a large amount free intra-abdominal air. He underwent an emergency laparotomy and drainage of a left sub-phrenic collection as well as an on-table gastroscopy and flexible sigmoidoscopy which were both normal. However, no site of perforation was seen to explain the free air. Post-operatively he was treated with antibiotics. He was discharged 12 days later after repeat imaging had showed a resolving pneumoperitoneum and improving bloods. He had a repeat outpatient gastroscopy and colonoscopy which were normal and remained stable when he was later reviewed in an outpatient clinic 2 months later.

He had no other past medical history other than acne vulgaris for which was he prescribed oral Isoretinoin. This was changed to topical Isoretinoin following his first admission to hospital, to aid the healing process post-operatively. He was a non-smoker and drank alcohol only occasionally. There was no known family history of inflammatory bowel disease or bowel cancer.

Clinical Findings

On this occasion, the abdominal pain had developed gradually, was stabbing in nature and of 5/10 severity. He had experienced no vomiting, had opened his bowels with no peri-rectal bleeding and had no urinary symptoms. He was eating and drinking well and there was no history of trauma to the abdomen. On examination he looked dehydrated, his abdomen was soft with some tenderness in the left upper quadrant and the left loin area with some localised guarding. He was not peritonitic, and was psoas and Murphy's negative.

Timeline:

A full blood count, renal profile, liver function tests and c-reactive protein were requested, and all results were within normal limits (specifically; haemoglobin 14.6g/dL; white blood cells 7.2 x 10^3µl; c-reactive protein 5.8mg/L; lactate 1.4mmol/L). Given this, and the small localised area of pain, with no features of an acute abdomen on examination, it was believed that this could have been a simple case of gastritis. However, a chest X-ray was requested for completion. The chest x-ray came back surprisingly showing air under the diaphragm. A CT of his abdomen and pelvis with contrast was therefore requested. This showed a large volume of free intraperitoneal air but no exact perforation site was demonstrated.

Given his otherwise stable clinical status, the patient was not sent for emergency surgery. The patient was admitted for observation and treated with intravenous co-amoxiclav and metronidazole (eight hourly.) The following day, the patient remained stable and was pain free. A contrast study was performed in order to site a perforation, but it showed no bowel leak. The patient remained an inpatient

for 5 days to allow for monitoring and observation. He was stepped down to oral antibiotics and he remained stable.

Upon discharge, he was booked for a gastroscopy and colonoscopy as an outpatient and followed up in clinic thereafter. The gastroscopy showed a normal oesophagus and duodenum but mild non-erosive gastritis in the antrum of the stomach (for which is was prescribed omeprazole 20mg). His colonoscopy was normal. He remained stable and symptom free and was discharged from our care following this encounter.

Conclusion

SP can be the result of abdominal, gynaecological, thoracic, and iatrogenic causes. Abdominal causes can be the result of infection such as a ruptured hepatic abscess or SP bacterial peritonitis. Pneumatosis cystoides intestinalis (gas in the intestinal wall) can be idiopathic or as a result of multifactorial causes and is the most common cause of abdominal SP[2]. Thoracic trauma/surgery, bronchoperitoneal fistulas, pneumothoraxes, mechanical aspiration, pulmonary sepsis and in rare very rare cases, scuba diving, have all been associated with thoracic causes of SP[3,4]. Various other gynaecological causes of SP have been reported in women[1,5].

Often, SP can present without signs of an acute abdomen. In this case, the patient only showed signs of mild upper abdominal pain with no other significant examination findings. His observations were normal and his blood results were all within the accepted range. It would therefore have been easy to forego further imaging and to discharge the patient with safety netting advice. This case highlights the importance of considering an erect chest x-ray in the context of upper abdominal pain in order to identify rarer pathology such as SP which can then be further investigated.

Unfortunately, it remains unclear as to why he developed this episode of SP. Perhaps this case was the result of a small, sub-clinical perforation, not detectable on CT or contrast swallow and was able to self-close without surgical intervention. Indeed, such cases have been proposed in the literature[1]. Our patient was further complicated by the fact that 6 months previously, he had undergone an emergency laparotomy for an abdominal collection, despite not finding any source of perforation from his recent appendicectomy to explain this.

Overall this case demonstrates a rare case of SP with no apparent surgical cause. It highlights the importance of a comprehensive history and examination with appropriate investigations, which allowed us to avoid unnecessary further surgery.

Declarations

Informed Consent

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Ethics: No ethics committee approval was required for this case report.

Availability of data and materials: Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

Competing interests: The authors declare that they have no competing interests.

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Figures

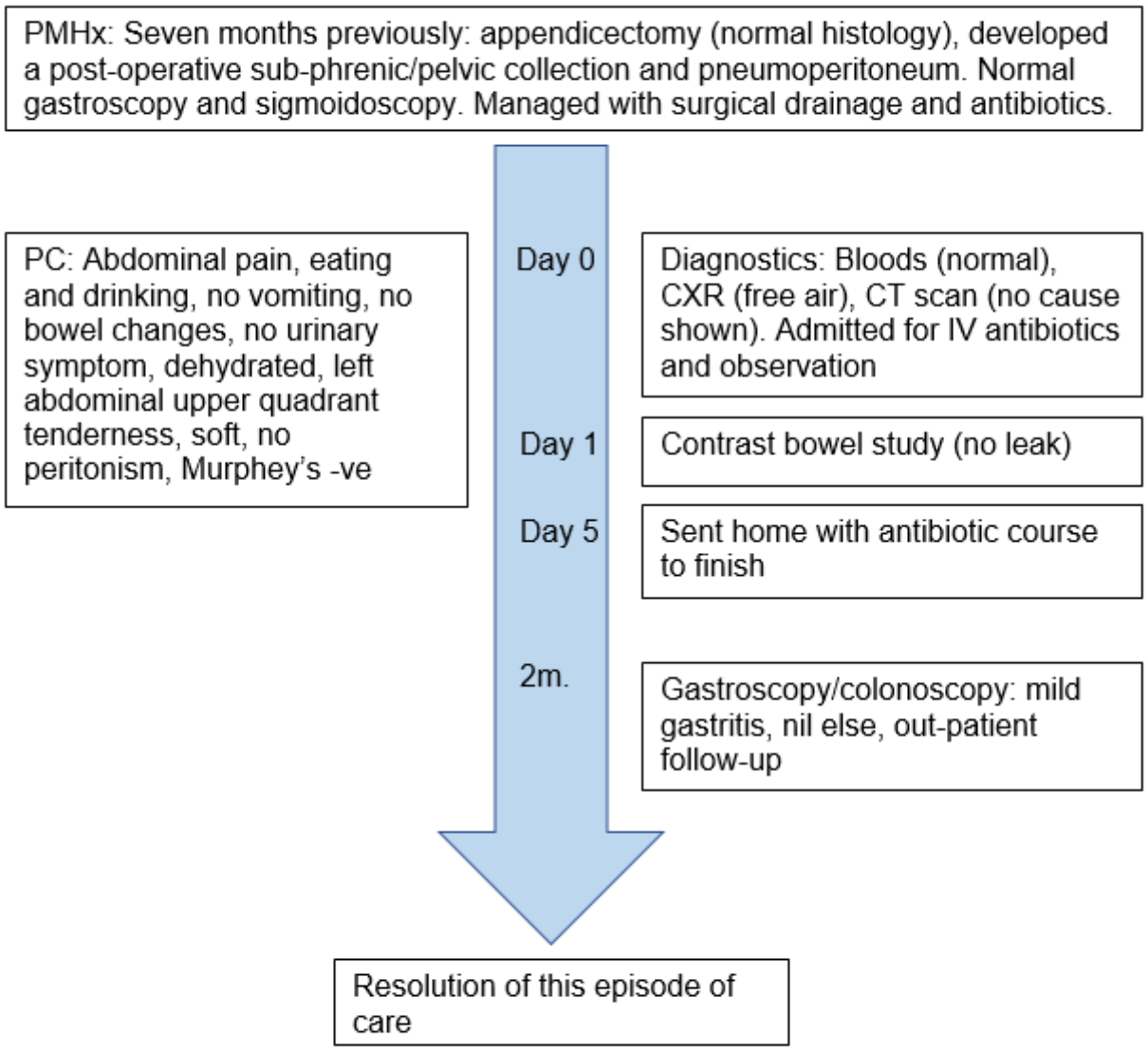

Figure 1

Timeline of Events (PMHx - past medical history, PC - presenting complaint, CXR - chest x-ray, 2m. – 2 months)

Supplementary Files

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