

Case Report

Rare cause of pneumoperitoneum: perforated appendicitis mimicking upper gastrointestinal perforation

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ABSTRACT

Pneumoperitoneum is seen in perforated hollow viscus but is a rare presentation in cases of perforated appendicitis. It accounts for 0-7% of patients with pneumoperitoneum. We report on a 24 year old male with epigastric pain for 4 days, demonstrating air under diaphragm on an erect chest X-ray. This case highlights that perforated appendicitis although rarely associated with pneumoperitoneum, must be considered in the differential diagnosis of patients presenting with acute abdomen.

Keywords: Pneumoperitoneum, Acute abdomen, Perforated appendicitis

INTRODUCTION

Free intraperitoneal gas also described as pneumoperitoneum is most often associated with a perforated hollow viscus.¹ Pneumoperitoneum can be demonstrated by radiological findings from an erect chest X-ray that shows free air under the hemidiaphragm.² It is infrequently encountered as a radiological feature associated with perforated appendix.³ This is largely due to appendix having a small lumen and insignificant amount of air to produce free gas under hemidiaphragm.⁴ Here we present a case of pneumoperitoneum on erect chest X-ray with intraoperative finding of perforated appendicitis.

CASE REPORT

A 26 year old male, with history of methamphetamine use. He came to the emergency department with complaints of epigastric pain which started 4 days ago. The pain was sharp in nature. The epigastric pain was constant and did not radiate. The pain was not relieved by analgesics. He also presented with vomiting episodes

associated with the pain. There was no hematemesis episodes. He also denied any intake of non-steroidal anti-inflammatory drugs or traditional medications.

He was tachycardic on presentation. Clinically, the abdomen was tender with evidence of peritonism. There was no abdominal mass palpable. Digital rectal examination was unremarkable. His blood parameters were within normal range. His electrocardiogram did not demonstrate any ischaemic cardiac activities. An erect chest X-ray was performed, and it demonstrated air under right subdiaphragmatic region (Figure 1). His abdominal X-ray did not demonstrate any bowel dilatation (Figure 2).

With his history of methamphetamine usage, abdominal, and chest X-ray findings, a diagnosis of gastroduodenal perforation was made. His delayed presentation to the emergency department with 4 days of symptoms suggest for an immediate surgical intervention. The operation theatre was prepared and he was managed with an exploratory laparotomy. Intraoperatively, pus was noted within peritoneal cavity, the stomach was normal. Kocherization of the duodenum was done and there was

no perforation site seen over the stomach or the duodenum. The lower abdominal region was explored, noted the caecum was adhered to the lateral abdominal wall. A retrocaecal appendix was discovered with perforation at its tip. The surgical team decided for a peritoneal washout and appendicectomy was performed successfully. Histopathological examination of the specimen came back as a perforated gangrenous appendix. Postoperatively the patient recovered well and was discharged from the hospital

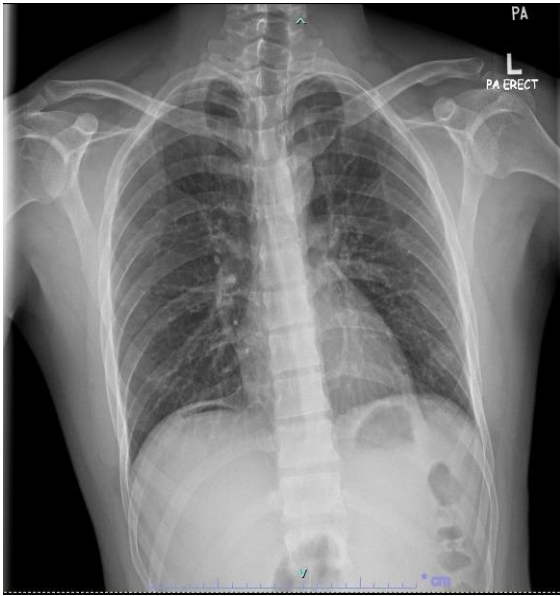


Figure 1: Chest Xray erect demonstrated air under diaphragm, signifying pneumoperitoneum.



Figure 2: Abdominal Xray no bowel dilatation.

DISCUSSION

The appendix when perforated rarely presents with pneumoperitoneum or in such case findings of air under diaphragm on an erect chest X-ray. Incidence of pneumoperitoneum in cases of perforated appendix is found about 4.1% only.⁵ The pathogenesis of appendicitis involves obstruction of appendiceal orifice by commonly fecoliths, or lymphoid hyperplasia. This leads to increase in intraluminal pressure, causing congestion and ischaemia of appendiceal wall. All these factors in to facilitate in appendiceal perforation.⁶

Patients with suspected gastroduodenal perforation and signs of peritonitis, initial diagnostic tool is a contrast enhanced computed tomography imaging of abdomen. However, in our case, air under diaphragm was diagnostic and surgical exploration is warranted.⁷ In addition, a delayed presentation of 4 days in our case, suggest immediate surgical intervention was justifiable.⁸

There are some theories to postulate and explain the relationship of such case of pneumoperitoneum and perforated appendicitis. First theory involves leakage of luminal air through perforation site when there is loss of luminal obstruction, which is suspected in our case as well. Some cases were shown that perforation of appendix near its base gives the impression that free air came out from the caecum⁹ but in our case the perforation was at the appendix tip. Usually, cases of appendicitis will have the appendiceal lumen obstructed by fecoliths or lymphoid hyperplasia, preventing air to escape. Another theory involves gas forming anaerobic bacteria forming peritoneal abscess, which leads to intraperitoneal air formation.¹⁰

CONCLUSION

Spontaneous pneumoperitoneum is rarely encountered as a radiological finding in association with a perforated appendicitis. This may lead to diagnostic errors of which every surgeon should be aware. Hence a high index of suspicion is warranted when encountering cases like this. Computed tomography imaging or diagnostic laparoscopy should be within our arsenal of options to support our diagnosis.

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REFERENCES

1. Sahu S, Husain M, Sachan P. Spontaneous pneumoperitoneum: a surgeon's dilemma. *Internet J Surg.* 2013;15(2).
2. Jashari HJ, Hyseni N, Kelmendi B, Hyseni F, Kola I, Vokshi V, et al. Perforated neonatal appendicitis with massive pneumoperitoneum: a case report. *Arch Clin Med Case Rep.* 2020;4:754-9.

3. Cizmeli MO, et al. Acute appendicitis associated with pneumoperitoneum. *Br J Clin Pract.* 1990;44(12):646-7.
4. Jay L, Rune P, Daudi W, Adnan S, Patrick A, David M, et al. Perforated appendix in a neonate: a review of literature and a case report from Northern Tanzania. *Ann Afr Surg.* 2021;18(2):115-8.
5. Makki AM. The pattern of causes of pneumoperitoneum-induced peritonitis: results of an empirical study. *J Microsc Ultrastruct.* 2017;5(1):28-31.
6. Appendicitis. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2020.
7. Søreide K, Thorsen K, Søreide JA. Strategies to improve the outcome of emergency surgery for perforated peptic ulcer. *Br J Surg.* 2014;101(1).
8. Tarasconi A, Coccolini F, Biffl WL, Tomasoni M, Ansaloni L, Picetti E, et al. Perforated and bleeding peptic ulcer: WSES guidelines. *World J Emerg Surg.* 2020;15:3. (Shënim: Mbi 6 autorë, prandaj u përdor formati et al.)
9. Wong CS, Naqvi SA. Appendicular perforation at the base of the caecum, a rare operative challenge in acute appendicitis: a literature review. *World J Emerg Surg.* 2011;6:36.
10. Dosseh DJE, Ayite AE, Attipou K. Perforated appendicitis—a rare cause of pneumoperitoneum. *S Afr Med J.* 2007;97(3):186-8.

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