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PNEUMOPERITONEUM FOLLOWING PERINEAL AIR INSUFFLATION CAN BE MANAGED CONSERVATIVELY

Mohammad Alabdallat[1], Ammar Almadani[1], Murad Alahmad[1], Ahmad Kloub[1], Ayman El-Menyar[2,3], Sandro Rizoli[1], Hassan Al-Thani[1]

[1] Department of Trauma Surgery, Hamad Medical Corporation, Doha, Qatar
[2] Department of Trauma Surgery, Clinical Research, Hamad Medical Corporation, Doha, Qatar
[3] Clinical Medicine, Weill Cornell Medicine, Doha, Qatar

Corresponding author's e-mail: aymanco65@yahoo.com

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ABSTRACT

Introduction: Pneumoperitoneum is commonly associated with a perforated hollow viscus and often prompts emergency surgical intervention. However, not all cases necessitate operative management. A rare but important cause of pneumoperitoneum is air insufflation through the perianal route, which can lead to extensive subcutaneous emphysema and intra-abdominal free air without evidence of visceral perforation.

Case description: We present a case of pneumoperitoneum following perianal air insufflation managed conservatively after a thorough clinical and radiological assessment revealed no indication for surgery.

Conclusion: This case underscores the importance of distinguishing non-surgical from surgical pneumoperitoneum. Early recognition and appropriate conservative treatment can prevent unnecessary operative interventions and their associated risks.

KEYWORDS

Pneumoperitoneum, trauma, subcutaneous emphysema, air insufflation, perineal injury

LEARNING POINTS

- High-pressure air insufflation through the rectum is a rare but potentially severe form of trauma.
- This can lead to pneumoperitoneum that requires exploratory laparotomy in some cases.
- However, such traumatic pneumoperitoneum can be treated conservatively after excluding the presence of perforation.

INTRODUCTION

High-pressure air insufflation through the rectum is a rare but potentially severe form of trauma, often associated with hollow viscus injury. Patients typically present sudden abdominal pain, distension and signs of peritonitis. The fascial layers facilitate the spread of air between different body cavities, including the abdomen, chest and the pericardium[1]. In severe cases, tension pneumoperitoneum can lead to abdominal compartment syndrome, and respiratory distress and haemodynamic instability[2].

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Pneumoperitoneum in such cases typically requires an exploratory laparotomy. However, the challenge is when clinical assessment does not support surgical intervention. In this case report, we present a perineal air insufflation pneumoperitoneum without clear evidence of rectal perforation and outline the indications for successful conservative management. Flexible sigmoidoscopy is a valuable adjunct to a computerised tomographic scan (CT) in evaluating distal colonic injuries.

CASE DESCRIPTION

A young male presented to the trauma service after an assault involving forced rectal insufflation with an inflation device. Upon arrival, the patient was alert, conscious, haemodynamically stable and complained of perineal and lower abdominal pain. Abdominal examination revealed a soft, lax, non-tender abdomen without signs of peritonitis. Extensive subcutaneous emphysema was noted from the chest wall down to the proximal thighs; scrotal swelling was noticeable.

Digital rectal examination showed a 1.5 cm superficial laceration at 5 o'clock, a few millimetres from the anal verge. Sphincter tone was preserved, and there were no signs of bleeding or internal injury. A chest X-ray demonstrated crescent-shaped free air under both diaphragms *(Fig. 1)*. A CT scan of the abdomen *(Fig. 2 and 3)* and pelvis with rectal contrast showed extensive pneumoperitoneum and surgical emphysema, with contrast tracking up to the ascending colon and no evidence of a leak. The patient was taken to the operating room for examination under anaesthesia. The perineal wound, as described above, was confirmed to be a superficial 1.5 cm laceration located a few millimetres from the anal verge at the 5 o'clock position *(Fig. 4)*. Flexible sigmoidoscopy revealed normal mucosa with no signs of perforation or mucosal disruption.

Based on these findings and the patient's stable condition, the surgical team decided to avoid exploratory laparotomy, recognising the challenge posed by the radiologic evidence of pneumoperitoneum in the absence of clinical or endoscopic signs of perforation. He was admitted for observation, kept 'nothing by mouth', and administered intravenous ceftriaxone and metronidazole. Serial abdominal examinations remained unremarkable, and the patient was discharged uneventfully after five days.

DISCUSSION

Pneumoperitoneum is defined as extra-luminal 'free' air found on diagnostic imaging[3]. Traditional medical understanding is that pneumoperitoneum typically requires surgical intervention due to visceral perforation in over 90% of cases. However, recent studies suggest that conservative management may be an option in some cases. This presents a surgical dilemma that requires a thorough assessment through detailed history-taking, physical examination and radiographic evaluation[4].

Abdominal surgeries (open or laparoscopic), in addition to trauma, represent 90% of pneumoperitoneum cases, while the remaining causes include spontaneous reasons such as pneumatosis cystoides intestinalis, which leads to pneumoperitoneum. In females, pneumoperitoneum can occur from retrograde air migration through the genital tract, particularly via the fallopian tubes[5].

In 90% of cases, it indicates a surgical emergency because of perforation of an intra-abdominal viscus requiring urgent surgical intervention[3]. In the study by Shamim and colleagues to evaluate the incidence of non-therapeutic laparotomy (NLP) in the trauma population in the US, they observed that NLP was significantly associated with increased mortality, with an odds ratio (OR) of 4.5 (95% confidence interval 2.1–9.7). Additionally, NLP was associated with a higher rate of complications (OR 2.2; 95% confidence interval 1.4–3.3) and a longer hospital stay (OR 2.7; 95% confidence interval 2.1–3.5). Furthermore, NLP

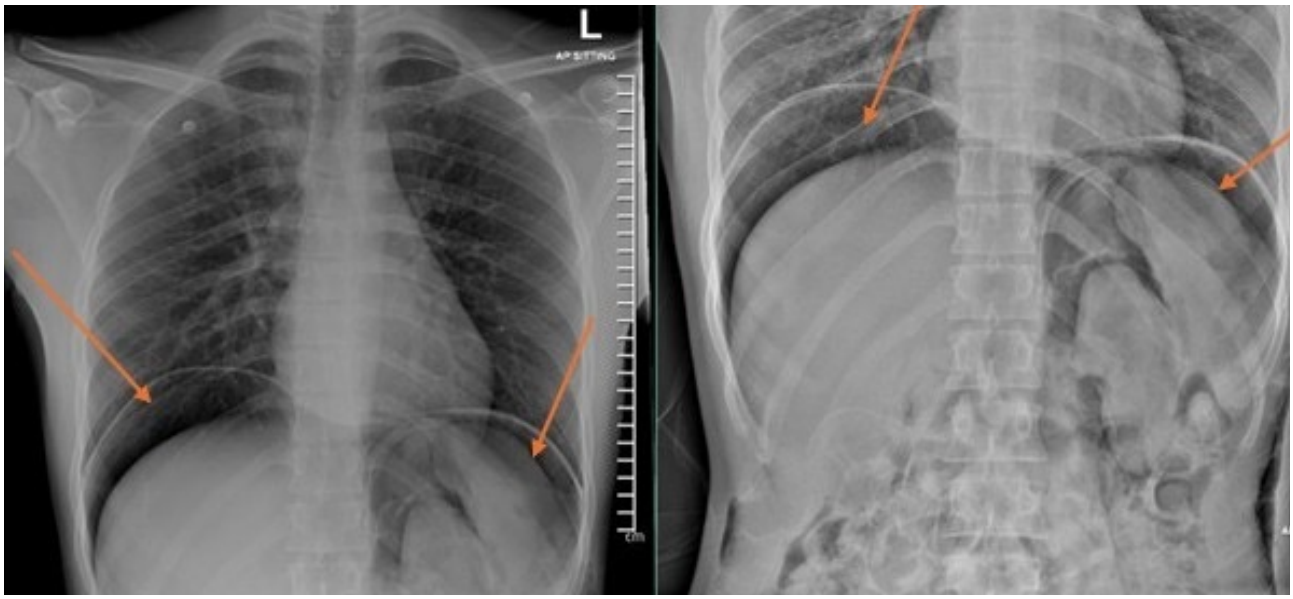


Figure 1. *Chest X-ray shows air under the diaphragm.*

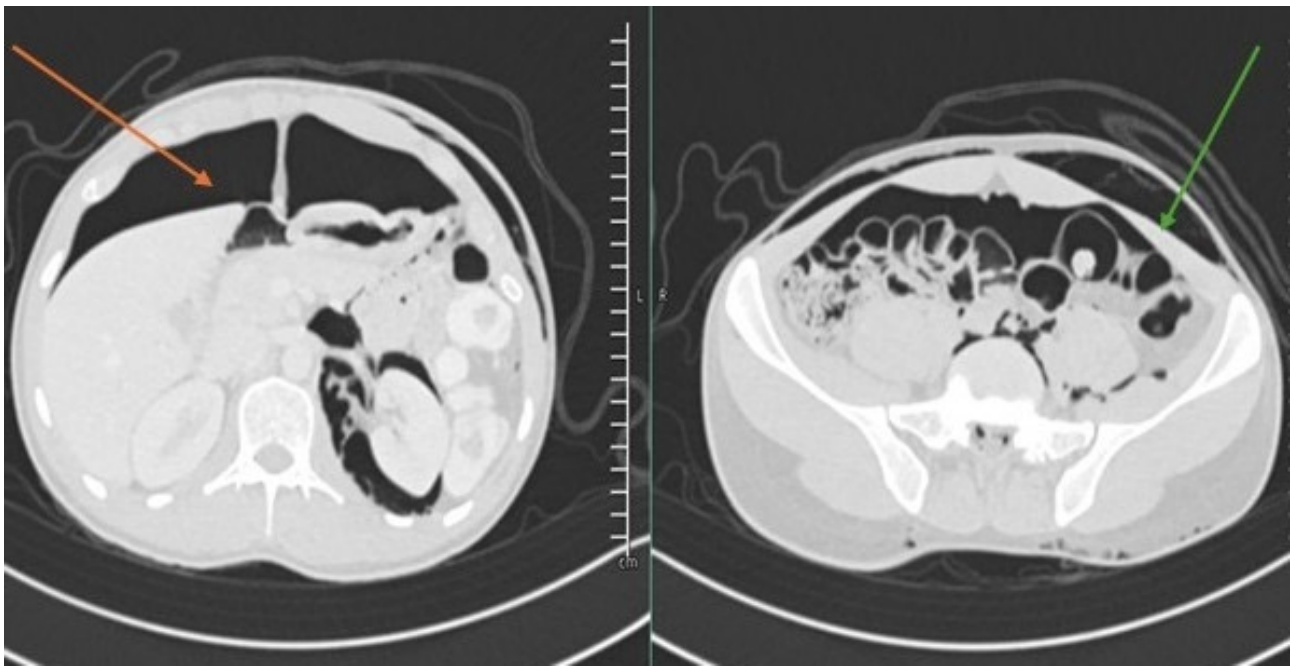


Figure 2. Abdomen CT scan shows pneumoperitoneum and surgical emphysema.

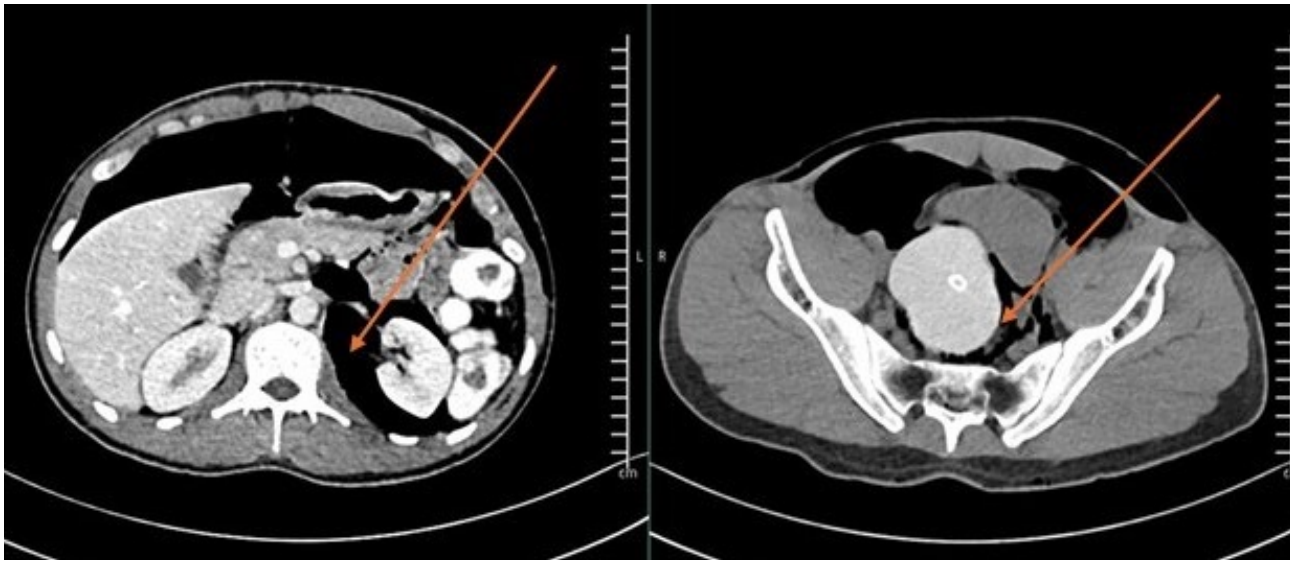


Figure 3. Abdomen CT scan shows fascial layers facilitating the spread of air between different body cavities.

was correlated with elevated rates of pneumonia, venous thromboembolism, acute respiratory distress syndrome and cardiac arrest[6].

In our case with pneumoperitoneum, the patient was completely asymptomatic from an abdominal standpoint, which poses a significant challenge for our team, given the initial concern of a perforated viscus. Many of these patients may undergo unnecessary negative laparotomies, exposing them to various surgical and anaesthetic risks.

We performed a triple assessment, in which we relied on a detailed history and a complete clinical examination that revealed no signs of peritonitis. The second step was radiological evaluation, in which contrast-enhanced CT scan can predict the location of a potential perforation with 86% accuracy[7]. However, in our case the perforation of viscous was excluded. We took the patient to the theatre for proctosigmoidoscopy and possible laparotomy; proctosigmoidoscopy ruled out perforation.

Conservative management with close observation was the choice in this case. Treatment methods such as intravenous antibiotics, bowel rest, serial examinations and repeat imaging have been documented in the literature with success[3].

In a recent update from the World Society of Emergency Surgery guidelines on blunt and penetrating bowel injury, the recommendation was that non-operative management can be effectively performed at specialised centres for patients with penetrating abdominal trauma. This is provided that the patient is haemodynamically stable and cooperative and may also be more suitable for stab wounds compared to gunshot wounds. The approach requires at least 48 hours of serial clinical examinations conducted by consistent specialists or consultants, along with continuous monitoring of vital signs and serial testing

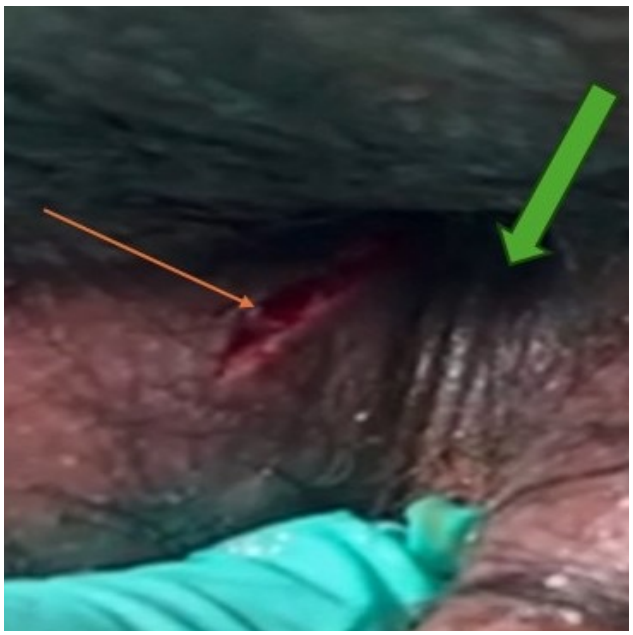


Figure 4. Perianal wound few millimetres away from the anus.

of inflammatory markers[8]. It is essential to recognise that clinical deterioration may warrant surgical intervention. In summary, if there are no clinical signs of peritonitis a thorough history, examination and radiological assessment can help minimise the risk of unnecessary laparotomy.

CONCLUSION

This case demonstrates that traumatic pneumoperitoneum can be treated conservatively when clinical, radiologic and endoscopic findings do not support the presence of perforation. Careful patient selection and close monitoring are essential.

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