Images in Emergency Medicine

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Colonic high-pressure barotrauma with tension pneumoperitoneum

Running title: Colonic high-pressure barotrauma

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CAPSULE SUMMARY

What is already known

Pneumoperitoneum is commonly due to a peptic ulcer, benign intestinal ulcer, gastrointestinal tumor, or bowel trauma. These often cause intestinal perforation leading to pneumoperitoneum.

What is new in the current study

Intestinal barotrauma due to air compressor injury is rare and often leads to tension pneumoperitoneum. It occurs due to accidental injury or misuse in industrial areas.
A 22-year-old male patient with a history of alcohol consumption and no known comorbidities presented to the emergency department with a complaint of severe abdominal pain after accidentally sitting over an air vent and experiencing high-pressure air insufflation per rectum. Physical examination revealed a grossly distended abdomen with diffuse tenderness, rigidity, and absent bowel sounds. Baseline investigations were normal. Abdominal radiography and computed tomography showed tension pneumoperitoneum (Fig. 1), leading to a diagnosis of colonic high-pressure barotrauma.

Emergency surgery was performed, revealing mid-transverse colon perforation and multiple serosal tears and contusions over the caecum and other parts of the colon (ascending, transverse, descending, and descending sigmoid colon). Primary closure of the perforation and diversion ileostomy were performed, followed by a 10-day stay in the intensive care unit. The patient was ultimately discharged with follow-up instructions. This case illustrates the potential dangers of air compressor injuries and emphasizes the need for prompt recognition and surgical intervention in cases of high-pressure intestinal barotrauma to prevent serious complications.

Intestinal barotrauma resulting from compressed air is a rare occurrence that typically arises due to accidental or sexual injury in industrial areas. The injury results when a high-pressure air jet column penetrates the anal sphincter barrier, leading to intestinal barotrauma upon burst pressure. The severity of the injury depends on various factors, such as air pressure, airflow velocity, anal resting pressure, and the distance between the source and the anus [1]. Tension pneumoperitoneum differs from simple pneumoperitoneum due to the presence of enormous tension in the peritoneal space, which can lead to fatal hemodynamics (inferior vena cava and splanchnic circulation) and respiratory compromise (elevation of the diaphragm) [2]. While injuries can range from mild to moderate (such as cat scratch colon) or severe (such as perforation or blowout) [3], injuries above and at the rectosigmoid junction are more common, while those distal to the rectosigmoid junction are seldom reported.

Expectant management is appropriate for individuals without clinical or radiological signs of peritonitis. In contrast, patients with peritonitis symptoms require surgical intervention, such as rectal tube decompression, intraoperative bowel decompression, resection of severe injuries, and perforation repair with proximal diverting colostomy or enterostomy if the bowel integrity is questionable [4].
such cases, emergency physicians play a vital role in promptly diagnosing the condition, converting a tension pneumoperitoneum into an open pneumoperitoneum, and reducing the delay in surgical intervention. Death can occur due to complications such as air embolism, fat embolism, respiratory failure, acute heart failure, and hyperacute abdominal compartment syndrome, highlighting the importance of prompt diagnosis.

ETHICS STATEMENTS
Informed consent for publication of the research details and clinical images was obtained from the patient.

CONFLICT OF INTEREST
No potential conflict of interest relevant to this article was reported.

FUNDING
None.

AUTHOR CONTRIBUTIONS
Conceptualization: S Mahalingam, GR, S Muthusamy, SK, MG, VA; Data curation: S Mahalingam, GR, MA, MG, VA; Methodology: S Mahalingam, GR, S Muthusamy, SD; Writing–original draft: S Mahalingam, GR, S Muthusamy, SK; Writing–review & editing: all authors. All authors read and approved the final manuscript.

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REFERENCES


Fig. 1. TITLE. (A) Abdominal radiography demonstrating massive tension pneumoperitoneum (asterisk). (B) Computed tomography showing massive tension pneumoperitoneum (asterisk).