

A Case Report of Tension Pneumoperitoneum Secondary to Self-harm

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ABSTRACT

Introduction: Tension Pneumoperitoneum is a rare and fatal form of abdominal compartment syndrome. It causes an abrupt rise of intra-abdominal pressure and leads to hemodynamic instability and multi-organ failure. Tension pneumoperitoneum can be caused generally by sepsis, severe abdominal trauma, and gastric perforation. It is extremely rare to see this tension pneumoperitoneum in a case of self-harm.

Case report: We present a case report of a 37-year-old male with abdominal injury with intent to self-harm. He presented to the emergency department in Al-Sader teaching hospital in Al Najaf city in Iraq, with hemodynamic instability. He was promptly diagnosed with tension pneumoperitoneum with the aid of x rays and clinical judgment. After decompression, patient was successfully treated with laparotomy, bowel resection and stoma formation.

Conclusion: Although it is rare to see tension pneumoperitoneum due to self-harm, early diagnosis and management are vital to prevent mortality and morbidity in similar cases.

Keywords: Pneumoperitoneum, Self-Harm, Sigmoid Perforation, Laparotomy

INTRODUCTION

The presence of free intraperitoneal gas, known as pneumoperitoneum, usually indicates an underlying disease process such as hollow viscus perforation but does not pose itself a threat to the patient. On the contrary, the massive accumulation of intraabdominal air under pressure known as tension pneumoperitoneum (TPP) is potentially life-threatening, because it can lead to the development of acute abdominal compartment syndrome. Various causes of TPP include positive-pressure ventilation, gastric rupture due to improper cardiopulmonary resuscitation, gastric or duodenal ulcer perforation, trauma, and endoscopy.¹ To the best of our knowledge, tension pneumoperitoneum due to self-harm is not yet recorded.

Increased intra-abdominal pressure impairs venous return and arterial inflow. Tissue ischemia occurs and inflammatory mediators are activated. Hepatosplanchnic flow, renal blood flow, and venous return to the heart are decreased. This eventually leads to multiple organ failure and ultimately death. Abdominal decompression is essential in its management, but ischemia-reperfusion injury may occur as a complication of decompression.²

Here we present a rare case report of tension pneumoperitoneum caused by inflation of the abdominal cavity with the intent of self-harm.

CASE REPORT

A 37-year-old man was seen in the emergency department of Al-Sader teaching hospital, Iraq in a state of hypovolemic shock. He had a history of abdominal distension for one day. He had a medical history of clinical depression and drug abuse. The patient was brought to the emergency department by his workmates who found him unresponsive in a car tire store. At arrival, the patient was unarousable with GCS of 13.

On initial evaluation, he was drowsy with dyspnea (respiratory rate 30 breaths/minute), tachycardia (heart rate 120 beats/minute), temperature (36 degrees centigrade), hypotension (blood pressure 80/55mmHg). An arterial blood gas analysis showed metabolic acidosis with hypoxia. Baseline blood parameters revealed leukocytosis with electrolytes imbalance. On examination, his abdomen was grossly distended with tympanic notes on percussion all over his abdomen. There was small puncture injury to the left iliac fossa region of his abdomen surrounded by skin bruise and

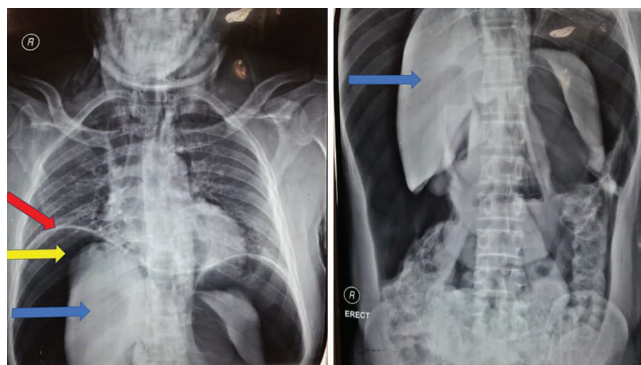


Figure-1: Erect chest and abdominal X ray. (Blue arrows: Saddlebag sign, Yellow arrow: Air under diaphragm enveloping the liver, Red Arrow: right dome of the diaphragm)

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localized emphysema

Immediate resuscitation was carried out with intravenous fluids, high-flow oxygen, and nasogastric tube decompression. After optimizing the patient hemodynamically, a Portable chest x-ray and Abdominal X-ray were performed as part of the primary survey. The erect chest x-ray revealed air under the diaphragm. The erect abdominal x-ray showed that the liver has diminished in size and has shifted downwards and medially, which is called the saddlebag sign (fig1).

To relieve the tension pneumoperitoneum, needle decompression was performed. This led to a slight improvement in his hemodynamic state. However, persisting peritonitis mandated an exploratory laparotomy. The abdomen was accessed through a midline laparotomy incision. A large area of necrosis with perforation was noted to the sigmoid and ascending colon, with fecal contamination of peritoneal cavity. The abdomen was closed primarily after stoma formation

The patient had a prompt recovery in the post-operative period with his vials returning to normal with the first few hours. The electrolytes imbalances were also corrected. He was then referred to the department of psychiatry for further evaluation and treatment. He also underwent a successful stoma reversal after 4 months.

During the follow up, the patient confessed that he had inflated his abdomen with a ball inflation needle connected with car tires air compressor as a suicide attempt under the influence of recreational drugs.

DISCUSSION

Tension pneumoperitoneum is the abnormal presence of air or gas in the abdominal cavity. The increased intraabdominal pressure caused by tension pneumoperitoneum exerts its deleterious effects mainly on the pulmonary and cardiovascular systems. Massive air accumulation causes elevation of the diaphragm, which restricts lung volumes and movement of the diaphragm, decreases venous return, and leads to decreased cardiac output. It may even lead to cardiopulmonary arrest depending on the magnitude of the intraabdominal pressure and reduced tissue perfusion like bowel and kidneys.³

Tension pneumoperitoneum is mostly seen because of perforation of the gastrointestinal tract permitting air to enter the peritoneal cavity in one way by the effect of abdominal omentum that acts as a one-way valve leading to gas accumulation in high pressure. Perforation can be caused by peptic perforation, blunt abdominal trauma or barotrauma from mechanical ventilation or scuba diving. It can also be iatrogenic following endoscopic procedures, owing to intraperitoneal escape of insufflating gas.⁴ After literatures review, we did not find a case of tension pneumoperitoneum which is caused by self-harm.

Tension pneumoperitoneum can be diagnosed by history, examination, and high clinical suspicion and usually confirmed by radiological scans. Pneumoperitoneum is often demonstrated on an erect chest X-ray as free gas under the diaphragm. For patients who are unable to stand or sit

due to shock, lateral decubitus horizontal abdominal X-ray can show the intraabdominal gas between the liver and the lateral portion of the right hemidiaphragm. In severe cases, tension pneumoperitoneum signs can be seen in a supine abdominal x-ray. CT scan is the best method of diagnosis when available.⁵

Tension pneumoperitoneum is a surgical emergency. Urgent needle decompression is required to improve hemodynamic stability and ventilatory compliance, which is usually followed by close monitoring. An exploratory laparotomy is planned only if peritonitis is present, for identification and definitive management of the intraabdominal cause of tension pneumoperitoneum.⁶

CONCLUSION

A high level of clinical suspicion and good radiological knowledge are required for the early recognition of tension pneumoperitoneum, which is a life-threatening condition but potentially reversible. In our case report, we were able to demonstrate the management of tension pneumoperitoneum which led to ultimate recovery of the patient. This also highlights an additional mechanism of injury by self-harm which can lead to this diagnosis.

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