



A RARE CASE OF COLONIC PERFORATION FROM AN INDUSTRIAL PRESSURE AIR PUMP INSERTED THROUGH THE ANUS: CASE REPORT

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ABSTRACT

Industrial accidents can have a varied presentation. Industrial equipment that use a high pressure air jets are employed in a myriad of roles. However an unfortunate accident or a malicious prank resulting in a jet of air being pushed inside the rectum can cause tear of the colon and tension pneumoperitoneum warranting an emergency surgical intervention. Here we present the clinical vignette of one such case.

KEYWORDS : Barotrauma, colon perforation, industrial injury

INTRODUCTION

Barotrauma to the intestines has been reported with blast injuries and industrial high pressure jets¹. Full thickness tear in human gastrointestinal tract results when the pressure exceeds 0.29 kg/cm² which is frequently the case with an industrial jet that shoots air at pressure far greater than the described value.² This type of barotrauma to the intestines is encountered in today's world usually as an accident or prank wherein air is pushed through the rectum and causes rupture of the colon.³

Here we describe a similar case that presented to the surgical emergency with history of insertion of a high pressure jet into the anus as a prank and resulted in tension pneumoperitoneum and peritonitis.

Case Report

A 36 years old gentleman working in the armamentarium maintenance department of a factory reported to the surgical emergency of Pt. B.D.S. PGIMS, Rohtak with the history of insertion of a high pressure air pump through the anus as a prank on him by his co-workers, patient developed massive distension of abdomen with pain which was sudden in onset occurring immediately after insertion of the pressure pump, pain was moderate to severe non radiating non migrating, not getting relieved on medications or any association with postural variation.

Distension had developed immediately after the pump insertion following which the patient developed labored breathing, respiratory rate increased to 32 after the said injury, patient did not have a previous history of any respiratory disease. Patient had no history of any addictions. General examination revealed tachypnea and tachycardia, feeble pulses with regular rate and rhythm. Abdomen, on examination revealed resonance, absence of liver dullness, mild tenderness and blood on per rectal examination with no discontinuity of rectum.

On further evaluation of the abdomen via a X-ray revealed tension pneumoperitoneum. Patient was then taken for emergency laparotomy which revealed a tension pneumoperitoneum along with linear perforation in the sigmoid colon and which was then managed with a primary repair of the perforation, along with placement of drains. Patient had an otherwise uneventful recovery and was discharged on post operative day 5. Follow up was uneventful.



X ray of the abdomen in the standing position showing tension pneumoperitoneum with upward shifting of the diaphragm

DISCUSSION

Factories employ air pressure jets and pumps for a variety of reasons. Insertion of an air pump into the rectum or spraying of the perineum with a high pressure jet has been reported in literature multiple times, either accidentally or as a prank.

Experiments have been conducted to determine the maximum tolerable pressure by the colon. Duthie and Watters showed that the mean anal pressure was 0.87 ± 0.005 kg/cm² (12.4 ± 0.711 psi/640 $\pm$ 50 mmHg) with a range 0.06–0.109 kg/cm²

(0.85–1.55 psi/44–80 mmHg) and following pudendal block, anal pressure decreased with mean of 0.07 ± 0.006 kg/cm² (1.04 ± 0.08 psi/ 54 ± 4.4 mmHg) and range of 0.05–0.11 kg/cm² (0.73–1.55 psi/38–80 mmHg).⁵

Mansab et al studied 10 patients with colonic injury due to high pressure air they described that a pressure of 3.99 psi tears the muscle and serosal layer of intestine and 4.07 can rupture the whole intestinal wall leading to perforation. The usual pressure of compressed air is 50-150 psi which is 10-30 times greater than the pressure needed for intestinal perforation. Their study comprised males with age ranging between 20-45 years with median age of 32.5 years.⁵

X-rays usually reveal a tension pneumoperitoneum. Clinical presentation of the case may vary depending upon the amount of air that has found its way inside the peritoneum, patients may present with a dramatic picture of a massively distended abdomen, respiratory distress along with signs of peritonitis. A tension pneumoperitoneum may cause cardio-respiratory embarrassment as has been seen with our case and a case reported by Yin et al⁴, cases reported by Brown et al⁷ however did not have any cardiovascular abnormality in many cases.

Surgical interventions in the form of an emergency laparotomy would find perforations of the colon. Case series done on barotrauma to the colon have demonstrated the sigmoid to be the usual site of perforations in colonic barotrauma via a high-pressure air pump or jet. Mansab et al reported 10 cases and found perforations were noted at the anterior wall of the rectum in 2 cases, sigmoid colon in 2 cases, recto sigmoid junction in 3 and 3 in the descending colon. In 8 cases there was a single perforation, 1 case had 2 perforations and 1 had 3 perforations. All patients presented within 6-24 hours of the injury.⁶

Patients can then be managed with resection of the diseased colon and a colostomy can be fashioned which may then be closed at a later date after stabilization and control of the abdominal contamination without the risks that usually accompany an ileostomy.⁴

CONCLUSION

High pressure jets are an unpartable section of industrial equipment, however they bring along with them the inadvertent risk of barotrauma to the intestines. Such hazards can be prevented by sound handling of equipment and proper protection gear. In the unwarranted event of an injury an early identification and transport to the hospital should be the norm whereby early surgical interventions can be life saving.

Conflict of Interest : None declared

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