Rare disease

Trans-anal barotrauma by compressed air leading to sigmoid perforation due to a dangerous practical joke

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Summary

To present a case report of trans-anal barotrauma by high-pressure compressed air jet as a dangerous practical joke, that is, playful insufflation of high-pressure air jet through the anal orifice resulting in sigmoid perforation. The patient presented to emergency a day later with complaints of severe pain in the abdomen and abdominal distension following insufflation of high-pressure air jet through the anus. On examination, he had signs suggestive of perforation peritonitis and x-ray of the abdomen showed gas under the diaphragm. An emergency exploratory laparotomy was performed which revealed a 4-cm perforation in the sigmoid colon. Resection of the segment containing perforation along with the surrounding devitalised part was done with double-barrel colostomy. Reversal of colostomy was done after 8 weeks. Follow-up was uneventful.

BACKGROUND

Rectal injuries due to penetrating trauma are more common than blunt trauma.¹ The diagnosis of trans-anal rectal injuries is usually delayed because of the patient's unwillingness to give correct history. These injuries may be caused by introduction of a foreign body per rectally, sexual assault, iatrogenically during colonoscopy or during cleansing enema and rarely by barotrauma by compressed air jet through the anus. Early diagnosis and aggressive treatment result in good prognosis, regardless of the patient's age and previous medical condition.^{1 2} Many industries and households make use of high-pressure air and gas systems that can cause injury in various ways. Forceful or playful insufflation of high-pressure air jet through the anal orifice had been seen to cause potentially fatal injuries to the intestines leading to colonic perforation. These injuries usually happen as a practical joke, that is, playful insufflation of high-pressure air jet through the anal orifice. We encountered a similar case which needed emergent surgical intervention.

CASE PRESENTATION

A 30-year-old man was admitted to our emergency with severe pain and distension of the abdomen for the last 1 day following playful insufflation of high-pressure air jet (used for cleaning motor vehicles) through the anal orifice with the clothes on as a practical joke among fellow workers. After the incidence, the patient developed pain and gradual distension of the abdomen. There was no history of bleeding per anum. On general examination, the patient was dyspnoeic and had tachycardia (114/min) with tachypnoea (24/min) and his blood pressure was recorded as 102/76 mm Hg. The findings of the abdominal examination were consistent with perforation peritonitis (distended abdomen, abdominal tenderness along with rigidity). Liver dullness was masked with absent bowel sounds.

On rectal examination, there were no signs of any external injury to the anal opening and digital rectal examination also did not reveal any significant finding.

INVESTIGATIONS

x-Ray of the abdomen AP erect showed gas under the diaphragm (figure 1). Ultrasonography was suggestive of free fluid in the peritoneal cavity with distended bowel loops. In an haemogram, haemoglobin measured 8 g/dl. His total leucocyte counts were 10 500 cell/mm³, were on the higher side but within normal limit.

TREATMENT

The patient was posted for emergency exploratory laparotomy. On exploration, peritoneal cavity was full of feculent fluid. A single sigmoid perforation of about 4 cm diameter with surrounding devitalised area of about 2.5 cm was present near the attachment of the mesocolon (figure 2) which was located about 2 cm distal to the junction between the descending colon and the sigmoid colon. The involved segment was resected and double-barrel colostomy was carried out. Reversal of colostomy was done after 8 weeks.

OUTCOME AND FOLLOW-UP

The postoperative course was satisfactory and follow-up was uneventful.

DISCUSSION

Trans-anal barotrauma by compressed air causing injuries of the intestine are not common. In our search of the contemporary literature we could find only a few such cases. Mansab *et al*³ reported ten cases of colorectal injuries due to compressed air directed to the anus while playing practical jokes at work place from 2006 to 2008. Perforations occurred at the anterior wall of the rectum in two cases, sigmoid colon in two cases, recto sigmoid junction in three

Figure 1 Abdominal x-ray showing gas under the diaphragm.

and three in the descending colon. In a study conducted by El-Ashaal *et al*⁴ from 1993 to 2006, they reported experience of 12 cases of trans-anal rectal injury. Injury was caused by a fall on a sharp object in five patients, by a rectal foreign body in two patients, by a compressed air hose in two patients, by sexual assault in two patients and by rectal cleansing enema in one patient. Raina *et al*⁵ reported a case of multiple perforations of the bowel after compressed air injury. Onyedunma⁶ reported a case from Nigeria in which compressed air injury resulted in a large perforation

necessitating resection. Kampmann and Kijewski,⁷ while reporting a case of colonic perforation following compressed air insufflation highlighted that closer the nozzle of the air insufflation tubing to the anal region, greater are the chances of colonic perforation.

Andrews,⁸ using compressed air to distend the intestine of dogs and oxen, found that normal intestine required a pressure of 0.49–0.88 kg/cm² to get ruptured. Burt⁹ showed that the average pressure needed to cause full thickness tear in human gastrointestinal tract is 0.29 kg/cm². Most of the injuries occur in the region of junction of rectum and sigmoid colon and proximally. The anal canal and rectum usually escape injury whereas sigmoid colon and the descending colon suffer maximum damage. Proximal sigmoid colon suffers the maximum damage due to the relative fixity and acute curve of its junction with the descending colon. High-pressure air jet through the anal orifice passes unhindered through the rectum and the first hindrance to the air is the junction between sigmoid and descending colon.

For traumatic large colon perforation primary repair or resection and anastomosis with or without diversion is now the preferred method of treatment except in conditions such as patient in shock, extensive faecal contamination, multiple associated injuries, significant blood loss and blood transfusions, prolonged delays from injury to operation, distracting colon injury and left colon injury.^{10 11} Our patient was not suitable for primary repair as he presented late, that is, after 24 h, faecal contamination was present, bowel was oedematous and there was left-sided colonic injury (sigmoid colon). He was anaemic (haemoglobin 8 g/dl) and his nutritional status was not good. So we decided to do double-barrel colostomy with resection. As per recommendations, colostomy is preferred over ileostomy, if possible. In colostomy, loop or double-barrel colostomy is preferred over end colostomy with Hartman's procedure as reversal is complex in the latter.

In our patient, the perforation was present at the junction of the descending colon and the sigmoid colon so double-barrel colostomy was feasible hence was preferred over Hartman's procedure, because reversal is easy and possible from the local site in both double-barrel and loop colostomies.¹²

Figure 2 Intraoperative image showing site of perforation and a schematic diagram depicting the site of perforation.

Learning points

- ▶ Intestinal perforation following insufflation of high-pressure air jet through the anus can be potentially fatal even if applied above the clothes.
- ▶ The sigmoid and the descending colon are the most prone for injury because of its angulation and its relative fixity whereas rectum and anus are spared because of their almost vertical course.
- ▶ The workers handling compressed air should be made aware of the hazards before allowing them to use it. The potential dangers should be prominently displayed in writing in places where it is being used to minimise such accidents in the future.
- ▶ For traumatic large colon perforation primary repair or primary resection and anastomosis with or without diversion is now the preferred method of treatment except in conditions such as patient in shock, extensive faecal contamination, multiple associated injuries, significant blood loss and blood transfusions, prolonged delays from injury to operation, distracting colon injury and left colon injury.

Competing interests None.

Patient consent Obtained.

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