Case Report

Noniatrogenic Colorectal Barotrauma with Extraperitoneal Rectal Injury

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Abstract

We present the case of a 22-year-old male who presented to us with abdomen discomfort with subcutaneous emphysema in the abdomen and lower chest, following a prank played by his friend who had inserted a nozzle through his anal orifice and pumped high-pressure condensed air through it. Computed tomography showed evidence of air pockets in the ischiorectal fossa and pelvis. Intraoperatively, we found large-bowel and small-bowel distension with large-bowel serosal tears and rectal tears. The tears were primarily sutured and a transverse loop colostomy was fashioned to facilitate healing of rectal wounds and to relieve the distension. The colostomy was closed after 8 weeks. The postoperative period turned out to be uneventful. We intend to present this case to sensitize the readers about the unusual mode of presentation and our management which we hope would help the medical fraternity who might encounter similar scenarios.

Keywords: Barotrauma, extraperitoneal rectal injury, serosal tear large bowel

Introduction

Barotrauma was once very rare, but recent reports of such incidents across the globe suggest that advances in the usage of high-pressure compressed air for various purposes in the industrial environment has led to an increase in pneumatic injuries. Colorectal barotraumas are injuries that happen due to an elevated intraluminal pressure mainly by air, and these injuries can vary from simple mucosal traumas to perforation of the colon.[1] Not many of such colorectal barotraumas have been reported and many of these colorectal injuries presented with bowel perforations and with tension pneumoperitoneum. Most of these patients underwent surgery and very few patients were managed conservatively.[2] This highlights the diversity in clinical presentations and the interventions done in such scenarios. This implies the need for further reporting of such injuries and its interventions for formulating better management protocols.

Case Report

A 22-year-old male, who was a car mechanic by occupation, presented to us with complaints of abdomen discomfort for several hours. After a detailed history, he revealed that as a prank played by his friends, there was the placement of a nozzle into his external anal orifice and release of highly compressed air through it, the previous day in his workshop. Following this event, the patient immediately developed giddiness and breathlessness. The patient presented to us after nearly 1 day and a clinical examination revealed a pulse rate of 76/min, blood pressure of 110/72 mm of Hg, and respiratory rate of 20/min. Abdomen examination showed mild abdomen distension with tenderness in the umbilical and hypogastric region, with subcutaneous emphysema in the abdomen wall extending up to the lower chest. Digital rectal examination revealed a defect of 1–2 cm in the lower rectum at about 4–5 cm from the anal verge with no blood staining of gloved fingers with a normal sphincter tone.

X-ray abdomen erect revealed dilated bowel loops [Figure 1]. Computed tomography scan of the abdomen revealed evidence of air pockets in both ischiorectal fossae and pelvis with...
subcutaneous emphysema tracking to intramuscular plane noted at the lower chest wall, the lower anterior abdominal wall around the perineal region, pelvic region, and scrotum with large bowel loops appearing grossly dilated [Figure 2].

An extraperitoneal rectal injury was suspected from the above scenario and the patient was examined under general anaesthesia. A long tear of about 8 cm posteriorly in the rectum at around 5 cm from the anal verge was identified. We initially proceeded to construct a transverse loop colostomy for fecal diversion to facilitate healing of rectal wounds and to relieve the distension, but on encountering further injuries as mentioned below, we proceeded with an exploratory laparotomy to repair the other injuries. On opening the peritoneum, the following were found: (1) distension of large bowel and small bowel; (2) long-segment serosal tear anteriorly along the upper rectum, sigmoid for a length of 20 cm; (3) another segment of serosal tear along the anterior wall of transverse colon; (4) long-segment serosal tears in the caecum, anteriorly and posteriorly for a length of 7 cm [Figure 3]. A transverse loop colostomy was constructed and the rectal tears were sutured with 3-0 Vicryl by interrupted sutures. Serosal tears in the colon were sutured with 3-0 Vicryl. The postoperative period was uneventful and the patient was discharged with a functioning loop colostomy.

The loop colostomy reversal was done after 8 weeks and the postoperative period was uneventful. Follow-up at 6 months revealed that the patient did not have symptoms or disturbances with bowel habits.

Discussion

Barotraumas in the gut are due to the pressure effect of either air or liquid which exceeds the caliber of the gut. Colorectal barotrauma may be due to either iatrogenic or noniatrogenic causes. Most of these iatrogenic injuries are due to colonoscopic procedures. A mild type of iatrogenic barotrauma to the colon can lead to “Cat scratch” colon, which was defined as bright erythematous linear marks resembling scratches,[3] whereas severe iatrogenic barotrauma can even result in a bowel perforation.[1] Woltjen reported four cecal perforations during 3000 colonoscopy procedures.[4]

Noniatrogenic injuries are mostly due to misuse of compressed air which may be accidentally done or intentionally done as a part of a prank as seen in our patient. The first such case was reported by Stone in 1904.[5] Although there is an increased and widespread use of compressed air in modern life and there have reports of such noniatrogenic colorectal injuries from time to time, fortunately, colorectal injuries by compressed air are still not common. Such colorectal injuries can either present with a tension pneumoperitoneum or can present without a tension pneumoperitoneum.[6] The difference between simple

Figure 1: X-ray abdomen erect showing dilated bowel loops

Figure 2: Computed tomography of the abdomen and pelvis revealing evidence of air pockets in the ischiorectal fossa and pelvis
pneumoperitoneum and tension pneumoperitoneum is the presence of enormous tension in the peritoneal space, which can have fatal hemodynamic and respiratory consequences and the presence of such a condition carries high mortality unless an emergency intervention is done. Due to the ease of increase of the intramural pressures in the rectosigmoid junction in the colon, this area is considered the most vulnerable site for rupture in situations of noniatrogenic colorectal barotrauma. The order of resistant strength to intraluminal pressure was rectum, sigmoid colon, ileum, esophagus, jejunum, transverse colon, caecum, and stomach. The velocity of airflow is as significant as the actual intraluminal pressure in the occurrence of bowel injury. The sudden high-velocity insufflation of air induces extreme shear force at the point of maximal fixation. The rectosigmoid junction has limited mobility due to its bilateral fixation; thus, compressed air insufflation with high velocity can cause rectosigmoid colonic barotrauma. The need for surgical intervention is when there are signs of peritonitis or the presence of free air in the peritoneum in radiological imaging. If not, the injury might be a seromuscular tear and hence these patients can be managed conservatively. Patients should be observed for features suggestive of a delayed colonic perforation in the absence of acute signs of peritonitis and the absence of pneumoperitoneum in radiological imaging, and these patients might need a colonoscopy to confirm the presence of barotrauma.

Declarations
The authors of this manuscript declare that this scientific work complies with reporting quality, formatting, and reproducibility guidelines set forth by the EQUATOR Network. The authors also attest that this clinical investigation was not determined to require the Institutional Review Board/Ethics Committee review (and the corresponding protocol/approval number is not applicable).

Declaration of patient consent
The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

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