

## Early Imaging in Colon Baro-Trauma: A Lead or Mislead?

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### Abstract

Colonic baro trauma resulting from an increase in intra-luminal pressure and may lead to perforation. In most cases such an injury is iatrogenic following air insufflation during colonoscopy and rarely due to industrial accidents. Most reported cases and existing literature advocates early radio imaging to diagnosed barotrauma to colon. We present a case report of a 36 years old male worker of a biscuit factory presented in our emergency department following exposure to high pressure air. However, in our case the perforation presented lately and repeated radio-imaging was unable to detect any signs of an impending perforation.

**Keywords:** Colonic Barotrauma; Barotrauma; Perforation; Compressed Air; Industrial Baro Trauma.

### Case Presentation

A 36 year old male worker from a biscuit factory, Mr. A came to our ER with sudden onset lower abdominal pain for 2 hours following exposure to high pressure air through a compressor blown onto his anus by a co-worker for "fun". The pain started immediately after the incident and was followed by two episodes of fresh bleeding per rectum.

On admission in the ER, Mr. A had a pulse of 104, regular, blood pressure 90/60 mm Hg, respiratory rate 28/min. The patient was afebrile. On examination, there was diffuse severe tenderness over the whole abdomen and it was rigid- "woody hard". Per rectal examination revealed scanty blood. The lab report showed Hb 12.8 gm%, WBC  $18.1 \times 10^9$  /L (neutrophils 95.5%). Serum Amylase, lipase, liver function tests and renal function tests were within normal limits. Erect abdomen X ray in the ER showed dilated loops of colon and no free air under the diaphragm. The contrast enhanced computed tomography (CECT) scan done on the same day revealed mild thickening of the rectal wall with normal sigmoid and descending colon, there was no evidence of perforation. Gaseous distension of transverse and ascending colon was observed with mild peritoneal collection. However, there was no evidence of pneumo-peritoneum found.

The patient was kept NPO and treated conservatively with hydration and antibiotics.

On the fifth day of admission the patient complained of progressive pain in the abdomen with tachypnea and tachycardia. Ryle's tube and flatus tube were placed. A follow up CECT scan of the abdomen at this time showed extensive pneumo-peritoneum with gross peritoneal collections. Though no definite evidence of bowel perforation could be identified on imaging, the patient was shifted to the operating room for an exploratory laparotomy. Total eight sites of perforation were identified- four proximal to cecum and four in the transverse colon one feet distal to hepatic flexure. The perforations were 2 mm in diameter and were surrounded by gangrenous serosa. A peritoneal wash was done and an ileostomy was performed. The patient was observed for the next 5 days and discharged with an ileostomy bag.

### Discussion

#### Incidence

Colon baro-trauma refers to colon injury resulting from an elevated intra-luminal pressure. In most cases such an injury is iatrogenic following air insufflation during colonoscopy and rarely due to industrial

accidents. The usual pressure of air coming out of an air compressor is 50 to 150 psi which is 10-20 times greater than the intestinal threshold [1].

Depending upon the pressure of air that the colon is exposed to, the injury can result in a frank perforation or can merely be seen in the form of mucosal tears. Such mucosal breaks were described as a cat-scratch colon. The authors did a retrospective study and found the incidence of cat-scratch colon to be 0.25% [2].

The susceptibility of different parts of the colon to barotrauma has been explained using different hypotheses. The most popular of these is the Laplace law which explains that the wall tension is directly proportional to the intraluminal pressure and the diameter of the colon. Therefore, the right colon and cecum should be more susceptible to the injury [33]. However a few other theories argue that the recto-sigmoid is more susceptible to injury due to its non-compliance to elevated intra-luminal pressure because of the presence of a thick collagenous sub-mucosa [4]. There are a few other hypotheses like chronic anti-inflammatory drug ingestion and metastatic colon disease which increase the susceptibility of the colon to barotrauma [5].

### Current Case Discussion

The review of existing literature shows that barotrauma to colon is diagnosed at presentation by early radio imaging, or by colonoscopy depending upon the severity of the trauma. However, in our case the perforation presented lately and repeated radio-imaging was unable to detect any signs of an

impending perforation. In order to explain the mechanism of delayed perforation we propose the following hypotheses. The persistent air distension of the bowel in spite of the introduction of the nasogastric tube and flatus tube could possibly lead to pressure necrosis of the bowel.

In the current case it is noteworthy that clothes do not alter the effect of compressed air. In several cases reported in the literature the air hose was used from a distance in the presence of clothes.

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