

Interesting case of intestinal perforation due to severe barotrauma

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Abstract

Colon barotrauma most common cause is elevated intra-luminal pressure. Air insufflation during colonoscopy procedure is the most common cause of iatrogenic colon barotrauma. Few cases of colon with multiple perforations caused by non-iatrogenic barotrauma can be noted. We present a case report of a 28 years young male, who had recently joined the garage to work as labourer. Every day after finishing work, his co-workers would clean the dust on their clothes by the hose of the air compressor. one day Patient took and inserted the gas hose into his anal canal and insufflated it with the pressure set at the maximum. Patient was immediately brought to our hospital, after investigation (plain x ray erect and USG ABDOMEN). Emergency laparotomy was done. Perforation of the caecum was noted. Primary closure of the perforation was done. A loop ileostomy was then fashioned. Post operative period was uneventful and patient was discharged after 2 weeks. Follow up was done after 6 weeks, distal colon patency was confirmed by barium study, ileostomy was closed, and the patient tolerated the procedure well.


Keywords: Barotrauma, colonoscopy, compressed air.

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Received Date: 19/10/2016 Revised Date: 24/11/2016 Accepted Date: 17/12/2016

Access this article online	
Quick Response Code:	Website: www.medpulse.in
	DOI: 19 December 2016

INTRODUCTION

Colon barotrauma most common cause is elevated intra-luminal pressure. Air insufflation during colonoscopy procedure is the most common cause of iatrogenic colon barotrauma. Few cases of multiple perforations of colon caused by noniatrogenic barotrauma are noted in the literature¹⁻⁵. Colon barotrauma includes colon mucosal traumas and colon perforation with elevated intraluminal pressure, which is mainly caused by air^{1,2,3}. It has been observed that mild type of iatrogenic colon baratrauma is "cat scratch" colon and colon perforation is the severe one. In some cases, it has been reported that colon perforation was caused by compressed air⁴. Colon

barotrauma which is presented as colonic perforation and serosal injuries caused by compressed air.

CASE REPORT

An young male patient 28 years old, who had recently joined the garage to work as labourer. Every day after finishing the work, his co-workers would clean the dust on their clothes by the hose of the air compressor. Patient took the gas hose and inserted into his anal canal and insufflated it with pressure set at the maximum. Following this, he developed abdominal distension and difficulty in breathing. He was brought to our hospital casualty. Patient gave history of bleeding per rectum following the incident. On examination, abdomen was distended, no abdominal movements were seen with respiration, card board like rigidity seen, because of rigidity underlying structures could not be appreciated, resonant note was heard over all the quadrants and bowel sounds were not heard.



Figure 1:

Investigations

X –ray erect abdomen showed pneumo-peritoneum. Patient's relatives were not affordable for CT scan and hence emergency laparotomy was done.



Figure 2:

Intra operative findings

Perforation of size 1 cm is present in the caecum. Remaining bowel and other solid organs normal.

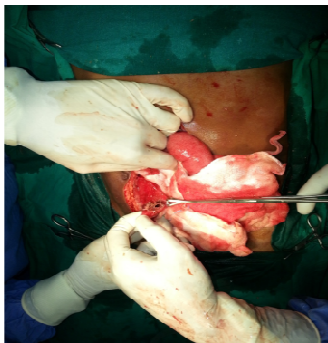


Figure 3: Caecal perforation

Operative procedure

Primary closure of caecum was done using 2 layers closure of 2.0 vicryl. A diverting loop ileostomy was then fashioned and brought out through the abdominal wall in the right iliac fossa. Post operative period was

uneventful and patient Got discharged after 3 weeks. Follow up was done after 6 weeks, distal colon patency was then confirmed by barium study, ileostomy was closed later, and the patient tolerated the procedure well.



Figure 4: Caecal perforation closure



Figure 5: Diverting loop ileostomy

DISCUSSION

Most cases of iatrogenic colonic barotrauma occurs during a colonoscopy procedure. Their incidence is reported as 0.1 to 0.5%. Law of Laplace states that the wall tension is directly proportional to the intramural pressure and diameter of the colon¹⁰. The caecum has the largest one among all the diameters of colonic segments and is the most easily affected area to barotrauma during colonoscopy procedure⁵⁻¹¹. “Cat scratch” colon is commonly seen in a mild type of iatrogenic colon barotrauma and colon perforation is the severe one. Cat scratch colon is usually seen as bright erythematous linear marks resembling scratches⁵. Caecum and ascending colon are mostly injured. Cruz-Correa¹³ reported that the collagenous colitis commonly predisposed to cat scratch colon. Woltjen¹⁰ reported four cases of caecal perforations during 3000 colonoscopy procedures. Misuse of compressed air is reported as one of the causes occurred in a non-iatrogenic colon barotraumas^{5,10,12-15}. Among various industrial fields, compressed air is broadly used for most of the industrial machines including cleaning and fabric machines. However, ignorant and improper use of compressed air equipment may cause disastrous events in which colon wall can rupture. Fortunately, colorectal injury which is caused by compressed air is not frequent in spite of widespread and increased use of compressed air in modern life. Cases of Colon baro-trauma caused by compressed air were reported in the literature. Coffey⁴ in 2007 described a case of young man who was victim to perineal blasting caused by compressed air hose. In Korea, colon barotrauma caused by compressed air was first reported in 1996, where Suh^[11] described in two colorectal trauma patients in which their rectosigmoid region was ruptured due to a jet of compressed air directed towards their anus, while they were playing practical jokes with their colleagues in work place¹¹. One. Patient was treated with

primary two layer closure, and the other patient with both primary two layer closure and sigmoid loop colostomy¹¹. In our case, severe compressed air caused complete tear of the anterior wall of the caecum. Unlike air insufflations during colonoscopy procedure, misuse of compressed air may lead mainly to transverse colon perforation^{4,11,12}. In case of non-iatrogenic colon barotrauma, the rectosigmoid junction in the colon is the vulnerable site due to easy increase of the intramural pressure. Burt showed that average pressure required to rupture the full thickness of bowel including different layers of human gastrointestinal tract was 0.29 kg/cm². Order of resistance to intra luminal pressure were seen in rectum, sigmoid colon, ileum, esophagus, jejunum, transverse colon, cecum and stomach in that order¹⁵. Not only the actual intra luminal pressure, but the velocity of airflow is also important in occurrence of bowel injury¹¹. Insufflation of air with sudden high velocity induces extreme shear force at the point of maximal fixation. Recto-sigmoid junction has bilateral fixation, with limited mobility; thus, compressed air insufflation with high velocity can cause recto-sigmoid colon barotraumas⁴. The diagnosis may not be difficult if the patient having history of abdominal pain and distension after exposure to the compressed air. However, patients with acute abdominal pain of unknown origin should be checked for history of trauma and occupational history, such as construction, industrial worker and cleaners using compressed air. Free air in Intra peritoneal region of abdomen or abdominopelvic computed tomography confirms the findings of colon perforation. In our case, lots of free air seen on simple x-ray confirmed the case of colonic barotrauma with perforation. Necessary management based on the severity of barotrauma. In case of colon perforation, surgical procedure should be considered and conservative treatment can be given in colonic mucosal ulcers. The prognosis has been generally favourable in recent years¹¹. Our patient was managed with surgical treatment and recovered without having further complications. In summary, occurrence of colon barotrauma can be caused by industrial compressed air and most commonly injured part is recto-sigmoid colon, but can cause perforation of any part of the bowel.

CONCLUSION

Patients with acute abdominal pain of unknown origin should be checked for history of trauma and occupational

history using compressed air. Most cases of colon barotrauma due to compressed air reported as rectosigmoid colon perforation, but in our case perforation of caecum was noted.

REFERENCES

1. Choi JY, Park KS, Park TW, Koh WJ, Kim HM. Colon Barotrauma Caused by Compressed Air. *Intestinal research* 2013;11:213-216.
2. McDonnell WM, Loura F, Pointon MJ, Greenson JK. Cat scratch colon. *Endoscopy* 2007;39:459-461.
3. Baudet J S, Diaz - Bethencourt D, Arguiñarena X, Soler M, Morales S, Avilés J. Cat scratch colon is caused by barotrauma secondary to insufflation during colonoscopy. *Endoscopy* 2008;40:878; au-thor reply 878-879.
4. Coffey JC, Winter DC, Sookhai S, Cusack SP, Kirwan WO. Non-iatrogenic perforation of the colon due to acute barotrauma. *Int J Colorectal Dis* 2007;22:561-562.
5. Anderson ML, Pasha TM, Leighton JA. Endoscopic perforation of the colon: lessons from a 10-year study. *Am J Gastroenterol* 2000;95:3418-3422.
6. Orsoni P, Berdah S, Verrier C. Colonic perforation due to colonoscopy: a retrospective study of 48 cases. *Endoscopy* 1997; 29:160-164.
7. Jentschura D, Raute M, Winter J, Henkel T, Kraus M, Manegold BC. Complications in endoscopy of the lower gastrointestinal tract. Therapy and prognosis. *Surg Endosc* 1994;8:672-676.
8. Lippert H, Falkenberg B. Treatment strategy in iatrogenic perforation of the large intestine. *KongressbdDtschGesChirKongr* 2001;118:301-306.
9. Marwah S, Gupta R, Singh I, Marwah N. Compressed air injury of the colon--delayed presentation. *Indian J Gastroenterol* 2002;21:206-207.
10. Woltjen JA. A retrospective analysis of cecal barotrauma caused by colonoscope air flow and pressure. *Gastrointest Endosc* 2005; 61:37-45.
11. Suh HH, Kim YJ, Kim SK. Colorectal injury by compressed air--a report of 2 cases. *J Korean Med Sci* 1996;11:179-182.
12. Ikapischke M, Tepel J, Pai M, Schulz T. Sigmoid perforation by compressed carbon dioxide. *Scand J Gastroenterol* 2005;40:356-359.
13. Cruz-Correa M, Milligan F, Giardiello FM. Collagenous colitis with mucosal tears on endoscopic insufflation: a unique presentation. *Gut* 2002;51:600.
14. Zunzunegui RG, Werner AM, Gamblin TC, Stephens JL, Ashley DW. Colorectal blowout from compressed air: case report. *J Trauma* 2002;52:793-795.
15. Burt AV. Pneumatic rupture of the intestinal canal with experimental data showing the mechanism of perforation and the pressure required. *Arch Surg* 1931;22:875-902.

Source of Support: None Declared
Conflict of Interest: None Declared