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A Rare Case of Non Iatrogenic Colonic Barotrauma with Tension Pneumoperitoneum:

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Abstract: *Colonic barotrauma is usually caused by elevated intra-luminal pressure. Air insufflation during colonoscopy procedure is the most common cause of iatrogenic colon barotraumas .Only few cases of multiple perforations of colon caused by non-iatrogenic barotrauma are reported in literature. Transverse colon perforation following such barotraumas is very rare phenomenon. We present one such case, a 21 year young male , day wager at a factory who came to hospital with sudden onset of abdominal pain, abdominal distension and breathlessness following placement air compressor nozzle close to the anus by his friend and insufflating it with pressure set at maximum. Emergency laparotomy was done. Large amount of Tension Pneumo-peritoneum was let out . Perforation of transverse colon, multiple linear serosal tears in the recto-sigmoid and transverse colon with faecal peritonitis 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 8 weeks, distal colon patency was confirmed by barium study, ileostomy was closed later, and the patient tolerated the procedure well.*

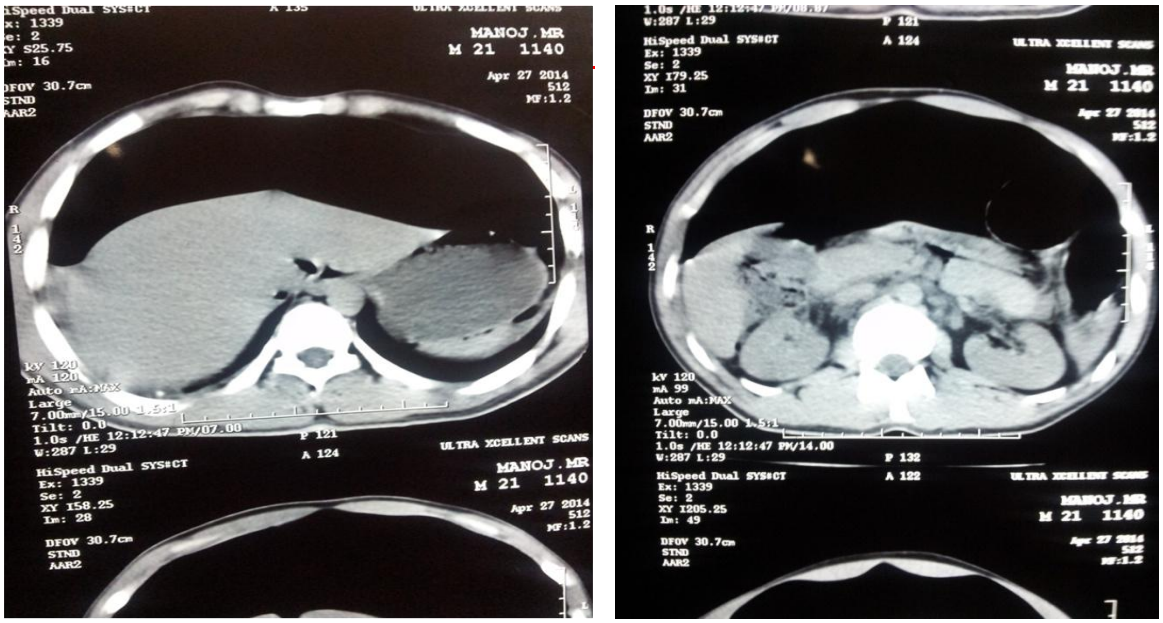
Key Words: *Barotrauma, colonoscopy, compressed air.*

I. Introduction

With advent of high pressure compressed air in industrial work , the risk of associated pneumatic injuries from its improper use are becoming evident which were practically unheard once upon a time. These pressures usually over-exceed those used by medical applications such as colonoscopy and lead to extensive injuries of the bowel. Apart from perforative peritonitis, the resultant accumulation of free intra-abdominal air under pressure known as tension pneumoperitoneum, rapidly and adversely affects the cardiovascular and respiratory function and hence carries high mortality. We aim to present a case of non-iatrogenic colonic barotrauma due to compressed air with transverse colon perforation and tension pneumoperitoneum.

II. Case Report

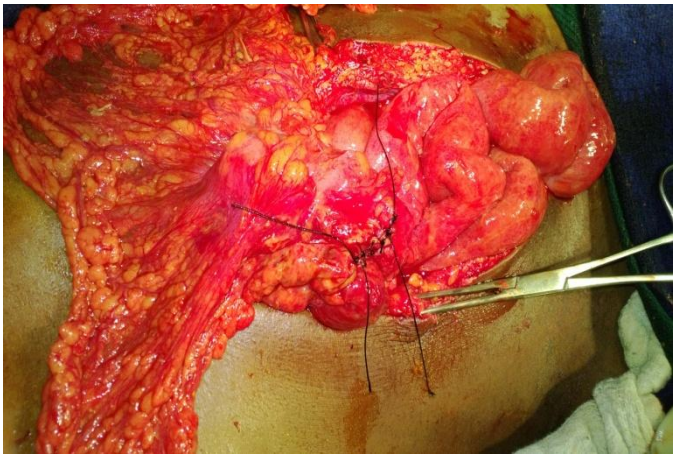
A 21 year old male resident of pune working as a day wager in a factory in Chennai came with complaints abdominal pain and distension for 1 day of sudden onset. Patient also had a history of breathlessness and vomiting for one day. On further probing patient revealed the placement of the compressed air nozzle close to anus as a play prank by his friend at work place. General examination showed that patient was tachypnoeic and dyspnoeic. Tachycardia with thready pulse was present. Abdomen was distended ,with presence guarding and rigidity . Patient had been evaluated outside in a private hospital and had come with CECT abdomen which showed large pneumoperitoneum with evidence of colonic perforation. Baseline investigations and X ray Chest were taken. Patient was proceeded to urgent exploratory laparotomy under GA which reveled a transverse colon perforation 2*2 cm with large pneumoperitoneum. The Large bowel was congested and multiple seromuscular tears noted at rectosigmoid and transverse colon . The pneumoperitoneum was evacuated and primary closure of the perforation with covering loop ileostomy was done. Post operative period was uneventful. Ileostomy reversal was done after 8 weeks . Patient is asymptomatic and in follow up.



Large Pneumoperitoneum In Cect Abdomen

Transverse Colon Perforation

Congested Large Bowel With Seromuscular Tears



Primary Closure Of Perforation

Loop Ileostomy

III. Discussion

Most cases of iatrogenic colonic barotrauma occurred during a colonoscopy procedure. Their incidence is reported as 0.1 to 0.5%. According to the law of Laplace, the wall tension is directly proportional to the intramural pressure and the diameter of the colon. The cecum has the largest one among all the diameters of colonic segments, and is the most easily affected area to barotrauma during colonoscopy procedure. Misuse of compressed air is reported as one of the causes occurring in a non-iatrogenic colon barotraumas. In various industrial fields, compressed air is broadly used for industrial machines. Fortunately, colorectal injury by compressed air is not frequent in spite of the increased and widespread use in modern life. Colon baro-trauma cases caused by compressed air were reported in the literature. Coffey in 2007 described the case of a young man who was victim to perineal blasting by compressed air hose .Most common site of injury is recto-sigmoid because of bilateral fixity.The order of resistance to intra luminal pressure were rectum, sigmoid colon, ileum, esophagus, jejunum, transverse colon, cecum and stomach in that order. Not only actual intra luminal pressure, but the velocity of airflow is also important in the occurrence of bowel injury. The sudden high velocity insufflation of air induces extreme shear force at the point of maximal fixation. Burt showed that the average pressure necessary to rupture the full thickness of bowel considering different layers of human gastrointestinal tract was 0.29 kg/cm^2. Apparently the muscularis mucosa adapts itself more readily to sudden changes in tension than the outer muscular coats of the bowel.

In serious injuries, rents in the muscle are usually along one of the longitudinal bands, with the underlying mucosa intact.. When there are multiple seromuscular lacerations, complete rupture through all the layers is usually found in only a few cases perhaps one of them is our case. A tear along the taenia coli with full thickness solitary perforation with stripping of the serosa and muscularis and bulging of mucosa at multiple places can occur [as noted in our case]. Perforation occurs at the anti-mesentric border leading to tension pneumoperitoneum with imminent signs of abdominal compartment syndrome.

Tension pneumoperitoneum is a rare presentation of colonic barotraumas has a high mortality of about 60%. Management depends on the hemodynamic stability of the patient. If patient is hemodynamically stable urgent exploratory laparotomy is done. For unstable patients urgent celiotomy using Verre ‘s needle or cannula to evacuate pneumoperitoneum and alleviate abdominal pressure followed by exploratory laparotomy. The diagnosis is not difficult if the patient has a 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 trauma history and occupational history, such as construction, industrial worker and cleaner’s staff, using compressed air. Intraperitoneal free air on a simple abdomen or abdominopelvic computed tomography confirms the colon perforation which warrants immediate intervention. In the absence of colonic perforation patient should be observed for chances of delayed colonic perforation and need colonoscopy to confirm barotrauma. Colonoscopy may reveal Cat scratch colon in mild cases.

IV. Conclusion

In summary, occurrence of colon barotrauma can be caused by industrial compressed air and the recto-sigmoid colon is most likely injured. Patients with acute abdominal pain of unknown origin should be checked for trauma history and occupational history using compressed air. Most cases of colon barotrauma in compressed air reported rectosigmoid colon perforation, but our case reported transverse colon perforation with tension pneumoperitoneum which is a rare but serious manifestation of the same.

References

[1]. Thomson SR, Fraser M, Stupp C, Baker LW. Iatrogenic and accidental colon injuries-what to do? Dis Colon Rectum 1994; 37:496-502 |

[2]. Zunzunegui RG, Werner AM, Gamblin TC, Stephens JL, Ashley DW. Colorectal blowout from compressed air: case report. J Trauma. 2002;52(4):793-795.

[3]. Roswell K. Brown, M.D.,J. H. Dwinelle, M.D., | Rupture of the colon by compressed air, report of three cases, Annals of surgery | January, 1942, Volume 115 Number 1,13-20 | |

[4]. Stone GW. Rupture of the bowel caused by compressed air. Lancet. 1904;2:216.

[5]. Petren, G.: Ein\ Fall von traumatischer Oesophagusruptur, nebst Bemerkungen uber | die Entstehung der Oesophagusrupturen. Beitr. z. klin. Chir., 6i, 265, 1908

[6]. Andrews, E. W.: Pneumatic Rupture of the Intestine-a New Type of Industrial Accident. | Surg., Gynec., and Obstet., 12, 63, I911. |

[7]. Con Amore V. Burt, M.D. Pneumatic rupture of the intestinal canal with experimental data showing the mechanism of perforation and the pressure required Arch Surg. 1931;22(6):875-902. |

[8]. Suh HH, Kim YJ, Kim SK. Colorectal injury by compressed air--a report of 2 cases. J Korean Med Sci. 1996;11(2):179-182. | pubmed

[9]. Weber M, Kolbus F, Dressler J, Lessig R. Survived ileocecal blowout from compressed air. Int J Legal Med. 2011;125(2):283-287. | doi pubmed |

[10]. Avallone S,La Torre M, Meurette G. Rectal injury by compressed air. J Trauma. 2010;68(1):248. doi pubmed |

[11]. Pascu M, Hanke B, Wiedenmann B, et al. Complication of Waldenström's macroglobulinaemia following ERCP. Gut. 2004; 53(12):1793. |

[12]. Olinde AJ, Carpenter D, Maher JM. Tension pneumoperitoneum. A cause of acute aortic occlusion. Arch Surg. 1983;118(11): 1347-1350. |

[13]. Zechel GL. Pneumatic rupture of colon as an industrial injury. Industrial Med Surg 1967; 36:663-667. |

[14]. Millar DM. Tension pneumoperitoneum:a simple solution. Br J Hosp Med. 1988;40(2):149. | pubmed | Chan SY, Kirsch CM, Jensen WA, Sherck J. Tension pneumoperitoneum. West J Med. 1996;165(1-2):61-64.

[15]. Ortega-Carnicer J, Ruiz-Lorenzo F, Ceres F. Tension pneumoperitoneum due to gastric perforation. Resuscitation. 2002; 54(2):215-216.