

## SIGMOID COLON PERFORATION CAUSED BY COMPRESSED AIR: CASE REPORT

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### *Abstract*

With the increasing of industrialization, usage area of high pressure air compressor became widespread. It has varied range of uses as a source of power for various tools and cleaning machines and fabrics. As a natural consequence of this, various organs and tissue injury including colorectal by using it except for the purpose has taken place in the literature. Colon injury as a result of bantering with high pressure air compressors especially among the workers around industrial fields is extremely rare but has serious morbidity and mortality rates. The case we described in this report is a case of sigmoid colon perforation in 37-year-old man who was harmed by compressed air that entered through the anus. In our opinion it is a unique cause of colonic perforation for about 150 cases of colon rupture by compressed air have been described so far. Sigmoid resection and colorectal anastomosis was performed and the patient discharged uneventfully.

### *Keywords:*

*Compressed air, Sigmoid colon injury, Pneumoperitoneum.*

### **Introduction**

The high pressure air compressor found widespread use, as a result of industrialization, except for the purpose of abuse has been lead to devastating consequences.(1,2) Whether it is used as a purpose of sexual assault or practical jokes, exposing to high air pressure through the anus may cause perforation especially in rectum and sigmoid colon or any part of the colon. (2) We aimed to present a case of sigmoid colon perforation as result of high air compressor barotrauma.

### **Case Report**

Thirty-seven years old male patient was admitted to our hospital with diffuse abdominal pain and distension. He is an industry worker. It was learned that 2 hours ago he was exposed to high air compressor through his anus as a practical joke of his colleagues. The vital signs of patient were stable. On physical examination, the abdomen was distended, and bowel sounds were decreased. He was examined moderate direct tenderness and rebound tenderness. He did not have symptoms of nausea, vomiting or no complaining desire to defecate. On a digital rectal examination, it was seen no rectal bleeding. On laboratory blood tests, white blood cell count was 12.400 /L, hemoglobin 14.6 g/dL and the others were not clinically significant. Abdomen X-ray showed free air in the peritoneal cavity (Fig. 1). The patient underwent emergency surgery. By the exploration of the peritoneal cavity sigmoid colon perforation was found and following segmentary resection of sigmoid colon a colorectal anastomosis was performed. The patient was discharged without postoperative complication on postoperative 8th day.

### **Discussion**

The injury caused by pressure effects is called barotrauma. Most of colonic barotrauma are iatrogenic and occurred during a colonoscopy procedure (1). The incidence was reported as 0.058% to 0.5%. (3,4,5) However colonic injuries with high pressure air compressor which was mostly used in industry sectors are extremely rare(6,7)

and was reported especially among the workers around industrial fields as a result of practical joke of colleagues of workers. The first case has been reported by Stone in 1904. (6, 8)

Barotrauma cause superficial abrasions like cat scratch in the colon mucosa or perforation that results with serious morbidity and mortality.(9, 10, 11) According to Laplace's law, wall tension is directly proportional to the intramural pressure and colon diameter. Therefore colonoscopic barotrauma injuries occurring most commonly in the cecum as a result of its largest diameter.(12) Kozarek and Sanowski showed that the cecum perforated occur at lower pressures (mean, 120 mm Hg) compared to the sigmoid colon (mean, 202 mm Hg) on the cadaver by colonoscopy. (13) Reported colon injuries caused by the air compressor in the literature are in different regions but mostly in the rectosigmoid junction.(1,2) This situation is contrary to the law of Laplace. This is because the rectosigmoid junction sensitized with the high air pressure and so perforation in this area will reduce the air passing through proximal of the colon or decrease in the pressure. The rectosigmoid junction is the first part of colon that cannot stand higher pressure while anus, distal rectum are supported with pelvic structures. Intraluminal pressure is not the only reason of intestinal injury, but a sudden and high flow velocity of air at the same time is important.(1,2) In our case full-thickness sectional perforation of sigmoid colon was detected in the operation.

In the case of delay in diagnose or a sectional colon perforation caused by barotrauma colostomy is recommended. However, in young patients without any signs of peritonitis, resection anastomosis or primary repair may be preferred if no delay in diagnose.(2,3,9) In our case colostomy was not open because patient immediately transported to emergency service and we did not find any signs of peritonitis so resection and anastomosis was performed.

## Conclusion

Consequently, colonic injuries occur with a high pressure air compressor are reported especially in the industrial zones. If a patient who worked in this business segment is presented with abdominal distension and pain, perforation of colon by barotrauma should be considered in the differential diagnosis of peritonitis. Though it has high morbidity and mortality rates, surgery reduce the mortality, so operation decision must be made as quickly as possible. Resection-anastomosis will be appropriate treatment in the early period of perforation in young patients.



*Figure 1: free air in the peritoneal cavity*

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