

Pneumatosis Cystoides Intestinalis and Associated Volvulus of the Transverse colon

Yücel Artaç^x, Kadir Kazez^{xx}, İhsan Pekri^{xx}

Summary: Pneumatosis cystoides intestinalis is a condition in which submucosal or subserosal gas cysts are found in the wall of the small or large bowel. Many different causes of pneumatosis cystoides intestinalis have been proposed, including mechanical and bacterial causes. In this paper we report a case of pneumatosis cystoides intestinalis occurring in patient with perforated duodenal ulcer and associated volvulus of the transverse colon.

Key words: Pneumatosis cystoides intestinalis, volvulus of the transverse colon.

Pneumatosis cystoides intestinalis is a relatively rare condition in which hydrogen-containing gas cysts occur subserosally, submucosally or both. It may affect the small or large bowel and usually is noted as an incidental finding at laparotomy. Pneumatosis cystoides intestinalis has been reported in association with a variety of gastrointestinal and pulmonary disorders (1,2,7,10). This is a case report of pneumatosis cystoides intestinalis in combination with volvulus of the transverse colon.

Case Report

A 25 year old man was admitted to Erciyes University; Medical Faculty Hospital in June 1988 for an emergency surgical problem. Duodenal ulcer had been detected after a gastrointestinal work up in 1985. His symptoms progressed to severe stabbing pain and vomiting in last three days. Abdominal examination revealed diffuse muscular rigidity and tenderness.

Bowel sounds were hypokynetic. Emergency chest radiograph and plain abdominal radiographs disclosed free subdiaphragmatic air and dilated hepatic flexura of the colon (Figure 1). Laboratory values were: Hb:13 % gr, WBC:9800/mm³, BUN:11 %, Na:136 mEq/l, K:4.3 mEq/l. Preoperative diagnosis was peptic ulcer perforation and diffuse peritonitis.

From The Department of General Surgery, Erciyes University, Medical Faculty Hospital, Kayseri, Turkey.

x: Professor of General Surgery

xx: Resident of General Surgery



Figure 1: Chest radiograph shows two characteristic radiologic features: 1)Free air in subdiaphragmatic regions.
2)Distended hepatic flexura of the colon.

Emergency laparotomy was performed after a short period of nasogastric decompression and intravenous hydration. In general abdominal exploration a 0.5 cm perforated duodenal ulcer was detected and ulcer was sutured. Free peritoneal exudate and fluid was evacuated and copious peritoneal irrigation with isotonic saline was performed.

Volvulus of the transverse colon and widespread pneumatosis cystoides intestinalis were noted on the terminal ileum in abdominal exploration. Only detorsion was applied for volvulus. The transverse colon was redundant and dilated with a long, mobile mesocolon. Bilateral truncal vagotomy + antecolic gastrojejunostomy and entero-enterostomy (Braun) was performed for obstructing duodenal ulcer.

His postoperative course was uncomplicated and he was discharged on the seventh day.

Discussion

Pneumatosis cystoides intestinalis (PCI) is fairly uncommon finding, only 410 cases had been described as of 1974 (6). It was described by Du Vernoi in 1930 in a cadaver dissection (2).

The two most widely accepted theories about the formation of PCI relate the disorder to either mechanical or bacterial causes. According to the former, gas is forced into the bowel wall by several mechanisms: 1) Increased pulmonary pressure with rupture of alveoli and dissection of gas through the retroperitoneum, mesentery and bowel wall; 2) Direct trauma to the bowel (5,7); 3) Mucosal breaks in the bowel, including ulceration and anastomoses (8,9); and 4) Increased pressure in the bowel associated with increased peristalsis and/or obstruction (2,3).

The bacterial theory is based on studies which show that gas within the cysts contains a significant amount of hydrogen, which is a product of bacterial metabolism and not produced by mammalian cells(2,5). Both fulminant and benign forms exist. Fulminant pci is associated with an acute bacterial process, sepsis and necrosis of the bowel (2). Benign pci is usually asymptomatic and frequently an incidental finding at laparotomy. Idiopathic and secondary forms have been described. Pci of the small bowel and ascending colon is usually secondary and associated with a variety of gastrointestinal lesions and pulmonary diseases (1,2,7,10).

Benign pci may occasionally produce symptoms such as constipation, rectal bleeding from congested mucosa over the cysts, passage of mucus per rectum, abdominal discomfort or pain, malabsorption with weight loss (1,4,8,10). In these cases pci may be treated by hyperbaric oxygen or breathing high concentrations of oxygen for several days or by a two week elemental diet (4,9). There are a number of reports which document the resolution of secondary pci with adequate treatment of the associated gastrointestinal lesion (2,8).

In our patient pci was an incidental finding at laparotomy. It was located in last 100 centimeters of the ileum. The duodenal ulcer perforation and the transverse colon volvulus were associated findings. Increased pressure in the ileum associated with increased peristalsis due to transverse colon obstruction could be a causal factor. This observation supports a mechanical cause in our case. Breaks in mucosal integrity such as duodenal ulcer perforation, as in our patient, could be thought to permit entry of intraluminal gas into the bowel wall.

It is believed that the gas in the bowel wall provoked an inflammatory reaction with walling off cyst formation. These cysts are surrounded by foreign body giant cells and macrophages. The fibrosis progresses until cysts decrease in size and disappear eventually (2). Serosal cysts are usually near the mesenteric border, with few cysts occurring at antimesenteric margin. Cysts often are located on loops of dilated bowel and may range in size from a few millimeters to several centimeters. Submucosal cysts are not visible but give the bowel a spongy consistency.

Surgery in patients with pci is indicated only in fulminant cases where delay may lead to extensive necrosis of the bowel, sepsis and death. Complications of pci such as volvulus or intestinal obstruction may require surgery (3) as documented in our patient.

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