# Pneumatosis coli in a case of caecal volvulus

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Pneumatosis coli is an uncommon medical condition which, if not recognized, may result in unnecessary surgical intervention. This case highlights the link between pneumatosis coli and other conditions affecting the large bowel, as well as demonstrating its association with chronic obstructive airways disease.

## INTRODUCTION

Pneumatosis coli is an uncommon disease entity of unknown aetiology. It is characterized by multiple gas-filled cysts within the large bowel wall. Pneumatosis coli is a sub-group of pneumatosis cystoides intestinalis – cysts within the wall of any part of the gastrointestinal tract. It is more common in men with a ratio of 3.5:1 and has been recorded in all age groups, the most common being 25–55 years (Masterson et al, 1978).

Pneumatosis coli may be asymptomatic and the symptoms are generally minor, consisting of abdominal discomfort and passage of mucus. In some cases, however, it may be more dramatic with disabling severe diarrhoea and faecal incontinence (Britten-Jones, 1975).

Since reported by Koss (1952), a pathologist, many theories as to the causation of pneumatosis coli have arisen. Most centre on either the dissection of gas through the bowel wall secondary to increases in intraluminal pressure, or by coliform production of gas that diffuses across the mucosa. Pneumatosis coli is associated with bowel obstruction, bowel infarction, diverticular disease, necrotizing enterocolitis, peptic ulcers, chronic obstructive airways disease, trauma and endoscopy (Gillon et al, 1979; Diwakaran et al, 2000).

## CASE REPORT

A 60-year-old gentleman presented with a 48-hour history of abdominal pain and distension. Bowel habit was normal and there was no history of vomiting. He was housebound with severe chronic obstructive airways disease (COAD), was on long-term oral corticosteroids and had a limited life expectancy.

Examination revealed an emaciated man with thin skin who was dyspnoeic with prolonged expiration. His abdomen was distended in the epigastrium with a tender, soft tympanic mass. Bowel sounds were high-pitched and rectal examination was unremarkable. His chest had widespread wheeze and a chest X-ray was consistent with COAD, with no free gas under the diaphragm. The abdominal X-rays (*Figure 1*) demonstrated a grossly dilated large bowel segment with two air–fluid levels, consistent with caecal volvulus. Furthermore, there was a layer of lucency in the bowel wall suggesting the presence of gas (*Figure 2*). His white cell count was raised (16.5 x $10^9$/litre; normal 4.0–11.0 x $10^9$/litre) and all other blood tests were normal. His oxygen saturation was maintained around 92% with low flow oxygen. A diagnosis of caecal volvulus with possible necrosis was made. Although a poor operative candidate, his wish was for surgery after consultation with his family and the medical team.

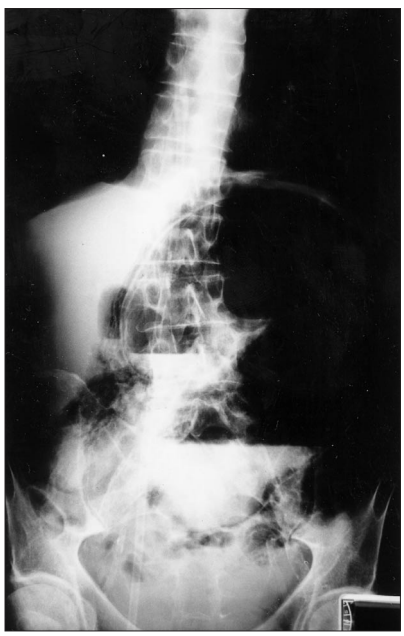
At operation a grossly dilated caecum, which had volved on a relatively long mesentery, was untorted and viable. However, the most remarkable finding was multiple serosal cysts extending from the caecum to the sigmoid, involving attached mesenteries. Cysts were 2–12 mm in diameter and covered the whole affected area. Given the premorbid condition of the patient, a caecostomy rather than resection was performed with a Foley catheter, which was double purse-stringed and fixed in the right iliac fossa. He recovered in intensive care overnight and was extubated the next day. He returned to the general ward for a further 5 days before refusing further treatment, and dying from progressive respiratory failure. His caecostomy drained in the interim and he suffered no further abdominal pain.

Because of its rare nature, pneumatosis coli presents a challenge in both diagnosis and management. Most may be managed conservatively because of the benign course of the disease and surgery is only indicated when complications such as volvulus, intestinal obstruction, severe rectal bleeding, or recurrence of severe symptomatic disease arise (Gillon et al, 1979). This case is the first reported involving pneumatosis coli with caecal volvulus in a patient who also had the additional risk factor of chronic obstructive airways disease.

## DISCUSSION

This case highlights several aspects of pneumatosis coli, primarily that a lack of awareness of the condition may result

***Figure 1. Plain erect abdominal X-ray demonstrating the grossly dilated caecum.***



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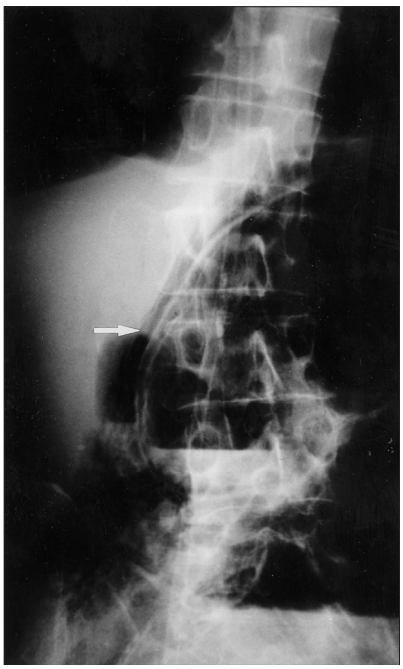

*Figure 2. Enlargement of the abdominal X-ray shown in* **Figure 1** *demonstrating gas in the caecal wall (arrow).*

in misdiagnosis with unnecessary surgical intervention. Pneumatosis coli only became obvious at laparotomy despite the plain X-ray findings which suggested air in the bowel wall. If a volvulus was not present, further imaging with barium enema or computed tomography may have been helpful (Pear, 1998). Colonoscopy with biopsy to confirm the diagnosis is usually necessary although at colonoscopy pneumatosis coli has been confused with polyposis, leading to unnecessary colectomy (Spigelman et al, 1990).

This patient may have been at risk of pneumatosis coli given his severe chronic obstructive airways disease and its strong association with the disease (O'Reilly, 1973). Some suggest that pneumatosis coli results when alveoli rupture allowing gas to dissect interstitially into the mediastinum and then retroperitoneally along the vascular supply to the viscera (Gillon et al, 1979; Pear, 1998).

One explanation is that his chronic obstructive airways disease was a causal factor for pneumatosis coli which itself then led to the volvulus – this would agree with some cases reported in the past (Gillon et al, 1979). A second possibility is that, by causing obstruction, the caecal volvulus raised the intraluminal pressure causing the pneumatosis coli, and that his chronic obstructive airways disease was a concurrent unrelated condition.

Neither surgical resection of involved bowel or conservative treatment prevents recurrence in all cases. Surgery was indicated in this patient for caecal volvulus. However, conservative treatment of pneumatosis coli is favoured with high flow oxygen (20–40 kPa) with regular blood gas measurements performed for 6–10 days (Masterson et al, 1978).

It is hypothesized that the denitrogenation of the blood with high flow oxygen leads to obliteration of the cysts via diffusion, as the gas in the cysts is mainly nitrogen (Britten-Jones, 1975).

The situation of a patient with severe chronic obstructive airways disease is more complex. They cannot simply be treated by hyperoxygenation given the risk of carbon dioxide intoxication. They may have to be mechanically ventilated for some days before regression of the cysts (Klausen et al, 1982).

Radiological diagnosis or suspicion of pneumatosis coli should be tempered against the clinical condition. Although pneumatosis coli is benign itself in most instances, it should not be confused with life-threatening causes of intramural bowel gas resulting from bowel necrosis such as necrotizing enterocolitis (Pear, 1998).

Awareness of pneumatosis coli is the key to appropriate treatment and avoiding unnecessary surgical intervention. **HM**


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