

Pneumatosis Intestinalis Successfully Treated with Oxygen Inhalation

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ABSTRACT

Pneumatosis intestinalis is a rare disease with variable presentation. It is characterized by presence of gas in the gut wall. It may be primary (idiopathic) or secondary to other diseases. In the absence of signs and symptoms of perforation and peritonitis, pneumatosis intestinalis can be managed conservatively with inhaled oxygen and close monitoring of the patient. We present a case of 62 years old lady with this condition who was successfully treated with oxygen therapy.

Key words: *Pneumatosis Intestinalis. Oxygen therapy. Acute abdomen. CT scan.*

INTRODUCTION

Pneumatosis intestinalis is a rare disease characterized by presence of air within the gut wall as submucosal or subserosal cysts in small or large intestine.¹ The first description of pneumatosis intestinalis was made by Deveroni during a cadaver dissection in 1730.²

The overall incidence of pneumatosis intestinalis is 0.03% in general population based on autopsy studies.² It still poses a challenge to surgeons as controversy exists regarding its exact pathogenesis and management.³ It can be divided into two types. The primary or idiopathic type and the secondary type which occurs as a result of other diseases.⁴ The secondary form of the disease may occur in mesenteric ischemia, intestinal obstruction, gastroenteritis, colitis, steroid use, connective tissue disorders and chronic obstructive pulmonary disease.

Treating pneumatosis intestinalis can be challenging as it is often difficult to determine who will require surgery. An initial conservative approach should be adopted while searching for a secondary cause. Surgery is indicated if the patient has signs and symptoms of perforation and / or peritonitis and not responding to non-operative treatment.⁷

We present a case of an elderly lady with primary pneumatosis intestinalis who was successfully treated with oxygen inhalation therapy.

CASE REPORT

A 62 years old lady presented to the Surgical Out Patient Department with 3 days' history of abdominal

pain, vomiting and constipation. Pain was generalized but more in the epigastrium. It was moderate in nature and dull in character with no radiation. There were no relieving or aggravating factors. The patient also had vomiting and relative constipation. Systemic review was unremarkable. She had no comorbid conditions. Her past history was significant for a similar attack about 2 months back for which she received no treatment and it resolved in 2 days without any medical consultation or hospitalization.

Her general physical examination showed signs of dehydration and tachycardia. Her pulse was 110/minute, blood pressure of 100/70 mmHg and she was afebrile. On abdominal examination there was mild distention, mild tenderness in the epigastrium and her bowel sounds were sluggish. Rest of the abdominal and systemic examination was unremarkable.

The patient was admitted to the hospital. Intravenous line, urinary catheter and a nasogastric tube was passed immediately. Fluid resuscitation and antibiotics were started. Investigations showed haemoglobin level of 15.1 g/dl with TLC count of 10,600/cm³; the differential count was normal. She had normal serum amylase level of 36 U/L. Her serum electrolytes level and renal function tests were normal. Chest X-ray was normal while abdominal erect X-ray showed dilated gut loops.

CT abdomen with contrast showed air in both small and large gut wall with dilated gut loops with diagnosis of pneumatosis intestinalis (Figure 1).

Since the patient had mild symptoms and no pneumoperitonium, portal venous gas or secondary cause for pneumatosis intestinalis could be found, a conservative approach was adopted with monitoring of the patient. The patient was started on oxygen treatment, 70% inhaled oxygen using high flow oxygen mask at flow rate of 5 L/minute, fluid resuscitation and monitoring for the abdominal distension was started. On the third day of treatment the patient was asymptomatic

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Received August 11, 2010; accepted April 01, 2011.

and passed stools. The abdominal distention and pain had subsided. She was vitally stable. The oxygen treatment was continued for 5 days and the patient was discharged on the 7th day of admission after a repeat CT scan which showed no radiological features of pneumatosis intestinalis.



Figure 1: CT abdomen showing distended gut loops with pneumatosis intestinalis.

DISCUSSION

Pneumatosis intestinalis is a rare disease; it may be asymptomatic or present as a life threatening condition. The primary or idiopathic variety is usually asymptomatic or presents with mild symptoms while the secondary type may pose a life threatening situation. The exact pathogenesis is not known. There are three possible sources of gas in the gut wall, intraluminal gastrointestinal gases, as a result of bacterial proliferation in gut and lastly because of entry of air from the lungs. The entry of air from lungs is best explained with the alveolar rupture theory, according to which, air from ruptured alveoli travels along vascular channels in mediastinum then to retroperitoneum and finally to mesentery or bowel wall.⁶ The gas collected in bowel wall contains upto 50% hydrogen.² This may explain the role of oxygen therapy in pneumatosis intestinalis. It is important to rule out life threatening causes like mesenteric ischemia as early as possible.

Diagnosis is mainly based on imaging investigations like plain abdominal X-ray, ultrasonography and CT abdomen. CT abdomen is considered the investigation of choice for the diagnosis as it can easily differentiate pneumatosis intestinalis from intraluminal air and submucosal fat, it can also help diagnose other pathologies associated with this condition. CT abdomen may also detect portal venous gas which is associated with gut ischemia.⁷

Morris *et al.* reviewed 97 cases of pneumatosis intestinalis. The location of the disease was colon in 46%, small bowel in 27%, stomach in 5% and both small

and large bowel in 7%. Fourteen patients had portal venous gas and 43% of them died. Non-operative approach was adopted in 52% of cases while surgery was performed in 33%. The over all mortality was 22%.⁸

The difficulty in treating pneumatosis intestinalis arises from the fact that it is often difficult to decide for the conservative treatment or early surgical intervention. Treatment with inhaled oxygen is an excellent option. The exact mechanism of oxygen therapy is not known but oxygen may expose the cyst to blood diffusion gradient resulting in re-absorption of gas cysts.⁶ Oxygen inhaled at high partial pressure of 300 mmHg using 70-75% oxygen at flow rate of 8 L/minute has been successful. Holt *et al.* described different methods of oxygen therapy for pneumatosis intestinalis with concentration ranging from 55 to 75% and flow rate from 4 L/minute to 12 L/minute.⁵ In this case, 70% inspired oxygen was delivered by face mask at a flow-rate of 5 L/minute for 5 days.

In a study performed at Duke University Medical Center, Durham, 16 out of 27 cases underwent exploratory laparotomy. They underwent bowel resection for ischemic bowel and 3 required obstructing tumour bypass. One had necrosis of bowel from ligament of Treitz to anus and only one had no pathology at laparotomy.³ The presence of pneumoperitoneum and portal venous gas is associated with bowel perforation and gut ischemia, requiring early surgical intervention.⁷ However, there are reports where patients with pneumatosis intestinalis and portal venous gas were successfully been managed by conservative approach.¹⁰

In this case, the patient had no features suggesting gut perforation or peritonitis and there was no portal venous gas, so she was managed conservatively with oxygen inhalation while closely been monitored the patient for any signs of deterioration.

Pneumatosis intestinalis can pose a serious challenge to the surgeons because it is often difficult to decide whether to treat the patient conservatively or go for surgery. In the absence of clinical features suggestive of perforation or peritonitis, an initial conservative approach with oxygen therapy seems to be an effective treatment option.

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