

A Benign Case of Medical Pneumatosis Intestinalis in Elderly

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Abstract

Pneumatosis Intestinalis is commonly seen in the infants and the cause being necrotizing enterocolitis. Being an uncommon entity among the adults sometimes the physician may be unaware of the benign causes of the Pneumatosis Intestinalis and pneumoperitoneum for which the patient may be exposed to the unnecessary surgical intervention. Computed Tomography scan is the investigation of choice to diagnose Pneumatosis Intestinalis.

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INTRODUCTION

Pneumatosis Intestinalis (PI) is defined as the presence of gas in the bowel wall, seen on radiographs and CT. This is a finding in a number of conditions and not a diagnosis, ranging from benign to life-threatening. An autopsy series based overall incidence of PI has been reported to be 0.03%. Although PI can be seen on abdominal radiographs, CT is the most sensitive imaging.^{1, 2, 3} In 1998, Pear classified PI pathogenically into four types: bowel necrosis, mucosal disruption, increased mucosal permeability and pulmonary disease.⁴ Currently, there is no consensus on the appropriate management of PI. Though some have attempted to create algorithms, however, they may be difficult to apply clinically.² Moreover PI has a variety of presentations so the clinicians should interpret radiographic findings in concert with the clinical scenario. Here we are presenting a case of PI with pneumoperitoneum in an elderly managed by oxygen therapy.

Case report

75 years of old female presented with the

complaint of gradual distention of abdomen for six months. There was no history of pain abdomen, loose stools, vomiting, fever, trauma, surgery, constipation, obstipation, abdominal surgery, malignancy or endoscopy.

General physical examination was normal, and SpO₂ was 85% on ambient air. The chest was emphysematous, and the cardiovascular system was within normal limit. On examination of the abdomen, there was distention. It was soft, non-tender on palpation and there was no rigidity, guarding or rebound tenderness. The tympanic note was present all over.

On investigation: CBC, LFT & RFT were normal. Ultrasonography revealed pneumoperitoneum and air-filled bowel loops. Chest X-ray showed emphysematous lung fields and air under the diaphragm. CT scan (figure 1 & 2) revealed air filled walls of the small and large intestine, multiple air-filled cysts on the intestinal walls and pneumoperitoneum, no evidence of any perforation, bowel ischemia, abscess or mass and diagnosis of pneumatosis intestinalis was given. The patient was managed with oxygen therapy and bronchodilators; she improved in 5 days and was fine on follow-up.

DISCUSSION

It's hard to delineate the aetiology of PI but is important to establish because the overall mortality is estimated to be 20% to 25%.² There are two

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mechanisms of the development of PI. The first is the mechanical aspect according to which gas traverse the mural portion of the bowel precipitated by inflammation or necrosis. It can also be the result of direct gas diffusion across an intact mucosal membrane as occurs in instances of increased transabdominal pressure. The second mechanism is the origin of the gas from bacterial overgrowth and invasion of the bowel wall leading to PI.^{2, 5, 6} The mechanical theory explains the association of PI with trauma, surgery, endoscopy, and bowel obstruction. The infectious theory postulates that PI results from cysts formed by gas-producing organisms. The infectious theory is supported by the evidence of elevated hydrogen content in the intraluminal cysts which is a byproduct of bacterial metabolism.^{2, 5, 6, 7} Normal intestinal gas contains only 14% hydrogen.

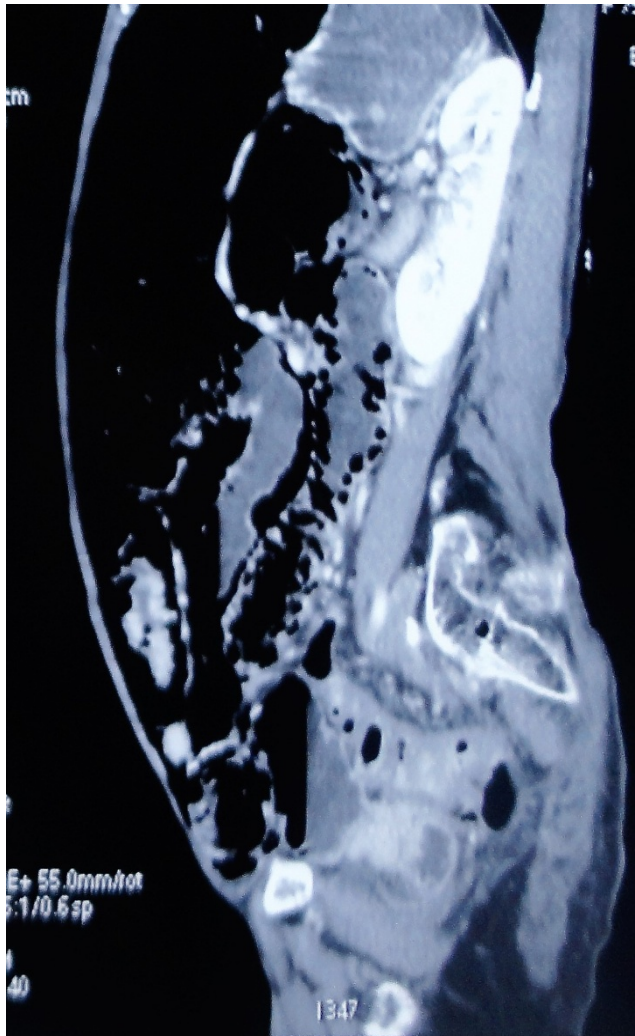


Figure 1. CT Scan

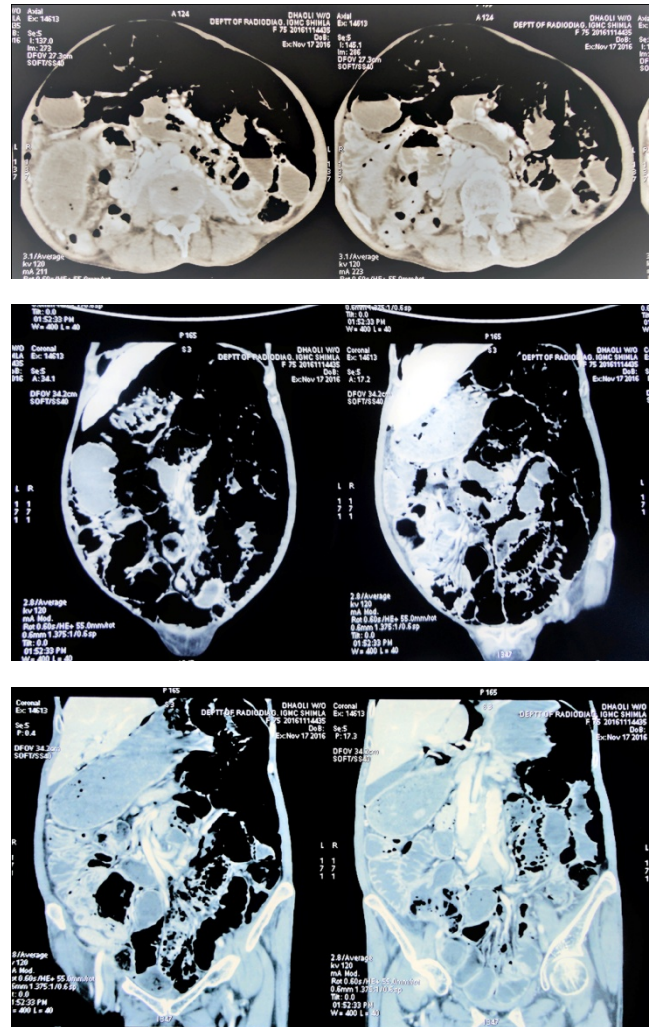


Figure 2. CT Scan

The high hydrogen level in the cysts suggests a bacterial or mechanical cause; hydrogen levels of up to 50% have been reported.^{5, 6}

In the past, PI was regarded as a sign of intestinal ischemia and an indication of surgical intervention, especially when it is associated with pneumoperitoneum. However, new evidence indicates that a conservative approach may be sufficient.^{5, 6, 8, 9} In the case of COPD and Asthma alveolar rupture may lead to PI, through dissection of air along vascular channels in the mediastinum, tracking caudally to the retroperitoneum and then to the vascular supply of the viscera. Some authors say that PI in COPD may simply be due to fluctuations in intra-abdominal pressure caused by pulmonary obstruction. Furthermore, oxygen tension in the blood of these patients is relatively low, which may facilitate inter-compartmental gas transfer.^{5, 6, 8} A review from Boerner and colleagues revealed that 20% of their 123 patients of PI had COPD.¹⁰ Jamart in a study of 919 cases in 1979 found a prevalence of localisation of PI as 42% for ileal, 36% for the colon and in the remaining 22% of

cases both the small and the large intestine were involved.¹¹



Figure 3. Chest X-ray

PI does not have a definite clinical presentation, patients may be asymptomatic or sometimes the patient may be sick depending on the underlying cause, with a mortality rate that may reach 75%. Patients with small intestine PI most frequently present with vomiting (60%), abdominal distension (59%), weight loss (55%), and abdominal discomfort (53%). Patients with colonic PI most commonly present with symptoms of diarrhoea (56%), hematochezia (50%), abdominal discomfort (32%), and abdominal distension (28%).^{8,11} Two third of the patients of PI may have characteristics radiological changes on X-ray. However, one-third of the patients does not have a suggestive X-ray and require a CT scan or magnetic resonance imaging.^{5,6,7,8,9} The patterns of pneumatosis in a CT scan such as linear, bubble, curvilinear gas collections localised or diffuse are useful to differentiate benign and clinically serious case of PI. ^{6, 7, 8, 11} CT scan also helps to delineate the associated findings like bowel wall thickening, altered contrast mucosal enhancement, dilated bowel, soft tissue stranding, ascites, and the presence of portal air. Oral and intravenous contrast media in CT is not required, but it helps in delineating the bowel lumen and wall for the confirmation or exclusion of other diagnoses.^{5, 6, 8} Pneumatosis (intramural gas) and pseudopneumatosis (intraluminal gas) can be differentiated by CT

findings. A gas shadow which is confined to the inner wall of the caecum or proximal right colon and terminates at a gas-fluid level is strongly suggestive of pseudo-pneumatosis.^{7, 8, 11}

Joseph D. et al. in their review defined Predictors of poor outcome as pH of less than 7.3, bicarbonate levels < 22 mEq/L, lactate level of > 2 m mol/L, amylase level > 200 U/L and portal gas on imaging.¹² Treatment options include bowel rest, antibiotics and surgery. Now recently oxygen therapy has emerged as an important aspect of the management. The rationale of oxygen therapy is that oxygen therapy increases the partial pressure of oxygen in the blood which increases the pressure gradient of the gas in the cysts. So the cysts release gases contained within them and refill with oxygen which is then metabolised leading to resolution. Oxygen therapy can be made through humidified oxygen administered by Venturi mask (6 L/min) or nasal cannula (4 L/min). ^{6, 12}

Abbreviations

PI – Pneumatosis Intestinalis, CT – Computed tomography, COPD – Chronic obstructive pulmonary disease. CVS – Cardiovascular system, CHG – Complete hemogram, LFT – Liver function test, RFT – Renal function tests.

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