
CASE REPORT

Luminal Gas Mimicking Pneumatosis Intestinalis: A Cautionary Tale

WC Torreggiani, ID Lyburn, AC Harris, PL Munk

*Department of Radiology, Vancouver General Hospital,
University of British Columbia, Vancouver, Canada*

ABSTRACT

We report the case of a patient with partial small bowel obstruction who underwent laparotomy for possible bowel ischaemia, after imaging studies suggested pneumatosis intestinalis. At surgery, the patient was shown to have small bowel obstruction due to inspissated feeds. This paper outlines the diagnostic difficulties in this case and illustrates differentiating features of pneumatosis intestinalis on computed tomography imaging as a guide for radiologists.

Key Words: Computed tomography, Intestinal obstruction, Pneumatosis cystoides intestinalis

INTRODUCTION

On plain abdominal radiographs and CT, air within the bowel lumen is almost universally present and easily recognised. Air within the bowel wall (pneumatosis intestinalis) is abnormal, however, and requires prompt recognition. Although gas lucencies within the bowel wall may be observed on plain radiographs, CT is currently the most sensitive imaging modality for detecting its presence.¹ Occasionally, luminal air can appear as pneumatosis, leading to an incorrect diagnosis and inappropriate surgical intervention.

CASE REPORT

A 56-year-old woman presented with progressive generalised abdominal pain and distension for 2 days, with prior intermittent fever for 1 week. Her past history included cryptococcal meningitis, and recurrent episodes of aspiration pneumonia necessitating radiological placement of a feeding gastro-jejunostomy tube. On physical examination, temperature was 38.5° C, heart rate 110 beats/minute and the abdomen distended and tender. Plain chest and abdominal radiographs showed

bilateral alveolar pneumonia and generalised small bowel dilatation, without extraluminal gas.

An abdominal CT scan was performed to exclude an intra-abdominal collection and to determine the cause of the small bowel dilatation. The CT examination was performed with a helical unit (HiSpeed Cti, GE Medical Systems, Milwaukee, USA). Images through the abdomen and pelvis were obtained with oral and intravenous contrast medium, using the following scan parameters: 120 KvP, 240 mAs, 1 second scan time, 7 mm slice collimation, 3.5mm reconstruction interval, and 1.5 pitch. The study demonstrated dilated fluid-filled loops of jejunum in the upper abdomen (Figure 1). At

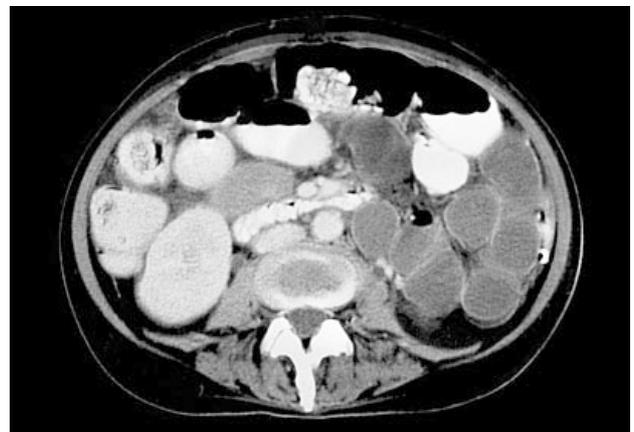


Figure 1. CT scan with oral and intravenous contrast demonstrates dilated fluid-filled loops of jejunum within the upper abdomen. No mesenteric venous or free air is identified.

Correspondence: Dr. PL Munk, Department of Radiology, Vancouver General Hospital, 899 W. 12th Ave., Vancouver, BC, Canada V5Z 1M9.

Tel: (604) 875 4533; Fax: (604) 875 4723;

Email: plmunk@interchange.ubc.ca

Submitted: 27 July 2001; Accepted: 18 March 2002.



Figure 2. CT scan through the caecum and ileum demonstrates material within the lumen of the ileum, the so-called 'small bowel faeces sign' consistent with small bowel obstruction. The material within the small bowel is the same consistency as that in the caecum and is representative of inspissated feeds. Peripheral collections of gas in the periphery of the ileum were misinterpreted as pneumatosis intestinalis. These simply represent air surrounding the inspissated feeds.

the level of the caecum and distal ileum, collections of gas were noted in the periphery of the bowel, which were interpreted as evidence of pneumatosis intestinalis. Semi-solid content was present in the lumen of the ileum and caecum (Figure 2). Based on the radiological findings and the clinical possibility of ischaemic bowel, an exploratory laparotomy was performed. At surgery, no bowel gangrene was found and the bowel wall was normal. The ileal lumen was packed to the level of the ileocaecal valve with semisolid inspissated feeds, resulting in small bowel obstruction. The inspissated feeds were manually 'milked' into the colon and the obstruction was relieved.

DISCUSSION

Gas within the bowel wall (pneumatosis intestinalis) can exist as an isolated entity or in conjunction with a broad spectrum of diseases of the gastrointestinal tract or respiratory system. The most common cause is gastrointestinal disease with bowel necrosis,¹ with urgent laparotomy and bowel resection usually required. Consequently, the accurate diagnosis of pneumatosis intestinalis is imperative.

CT offers the greatest sensitivity and specificity in the detection and differential diagnosis of pneumatosis intestinalis, as it allows imaging of the bowel in cross-section.² CT can depict the extent and distribution of pneumatosis, and assist in the differentiation of primary and secondary forms.³ Pneumoperitoneum, portal and mesenteric venous air are other important associated findings which may be detectable only on CT.⁴

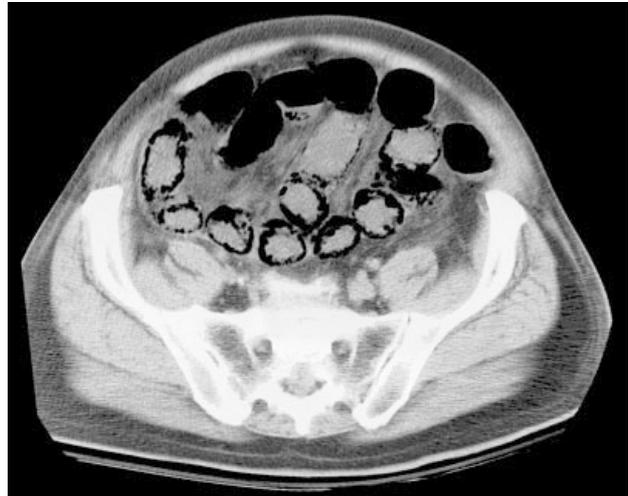


Figure 3. CT scan image at a lower level shows extensive curvilinear and bubbly collections of gas present within the small bowel wall, typical of pneumatosis intestinalis. The discrete bubbles individually measure between 1 and 3 mm in size. Bowel infarction was confirmed in this patient.

In the case presented, the CT images were reviewed retrospectively by the authors to identify helpful features to differentiate luminal air from air in the bowel wall. On initial examination of CT images, peripheral air within the bowel can appear as mural air. There are some subtle signs, however, that indicate when abnormal air is not intraluminal.

For example, a rim of tissue representing the bowel wall surrounding the abnormal air can be seen. Comparing the thickness of this tissue rim to that of a CT image of a patient with proven bowel infarction and pneumatosis intestinalis can prove helpful (Figure 3). More important to note in this case, was the presence of semi-solid material within the bowel lumen of the same consistency as the material in the caecum (Figure 2). In our experience, ischaemic or infarcted bowel is always fluid filled and does not contain such solid material. Other findings against a diagnosis of bowel infarction in this case were the lack of portal or mesenteric venous air. Figure 4 demonstrates mesenteric and portal venous air in a patient with surgically proven bowel infarction.

The presence of solid material resembling faeces within a dilated segment of small bowel is abnormal and has been referred to as the small bowel faeces sign.^{5,6} It is associated with small bowel obstruction in 82% of patients. Other less common conditions associated with this sign are bowel ischaemia, Crohn's disease, infectious enteritis, and overly vigorous jejunostomy tube feeding.⁵

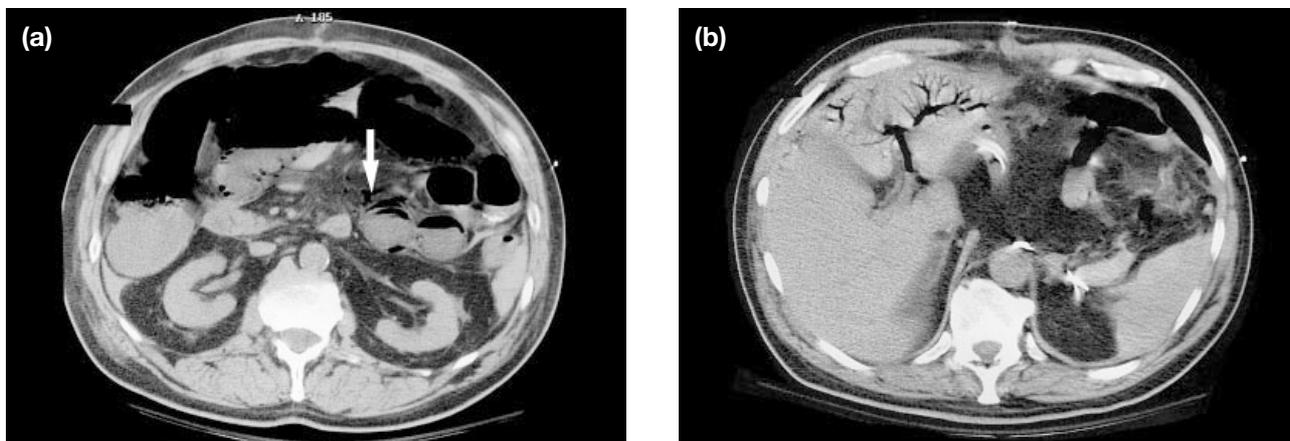


Figure 4. CT findings in a patient with surgically proven bowel infarction. (a) Axial CT without the use of intravenous contrast at the level of the renal hila demonstrates moderate distension of the small bowel and ascending colon. There is some free fluid in the right paracolic gutter. In addition, there is air present in the branches of the superior mesenteric vein (arrow); (b) CT through the liver demonstrates branching collections of gas within the left portal venous system.

CONCLUSION

Luminal air surrounding inspissated bowel content in the presence of small bowel obstruction may mimic the imaging appearance of pneumatosis intestinalis. Potential errors in patient management may be prevented by this knowledge, careful evaluation of CT imaging, and correlation of imaging findings with the clinical history.

REFERENCES

1. Boerner RM, Fried DB, Warshauer DM, Isaacs K. Pneumatosis intestinalis. Two case reports and a retrospective review of the literature from 1985 to 1995. *Dig Dis Sci* 1996;41:2272-2285.
2. Salzano A, De Rosa A, Carbone M, et al. Computerised tomography features of intestinal infarction: 56 surgically treated patients of which 5 with reversible mesenteric ischaemia [in Italian]. *Radiol Med (Torino)* 1999;97:246-250.
3. Scheidler J, Stabler A, Kleber G, Neidhardt D. Computed tomography in pneumatosis intestinalis: differential diagnosis and therapeutic consequences. *Abdom Imaging* 1995;20:523-528.
4. Ryback LD, Shapiro RS, Carano K, Halton KP. Massive pneumatosis intestinalis: CT diagnosis. *Comput Med Imaging Graph* 1999;23:165-168.
5. Mayo-Smith WW, Wittenberg J, Bennett GL, Gervais DA, Gazelle GS, Mueller PR. The CT small bowel faeces sign: description and clinical significance. *Clin Radiol* 1995;50:765-767.
6. Catalano O. The faeces sign. A CT finding in small-bowel obstruction. *Radiologe* 1997;37:417-419.