

# Emergency Imaging

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**Figure 1**

**A**n 85-year-old woman presents to the emergency department with abdominal distension. The patient has a medical history of polymyalgia rheumatica for which she is on chronic steroid therapy. A radiograph is obtained (Figure 1).

**What is the radiographic abnormality?**

**What is the differential diagnosis?**

**What further imaging should be performed?**

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## ANSWER

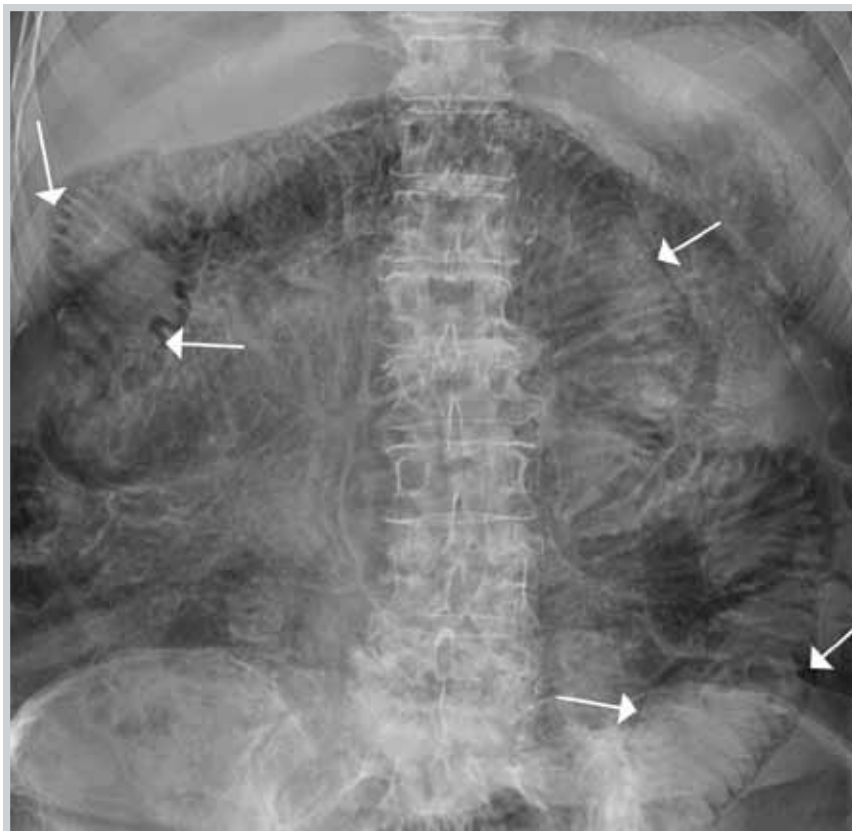


Figure 2

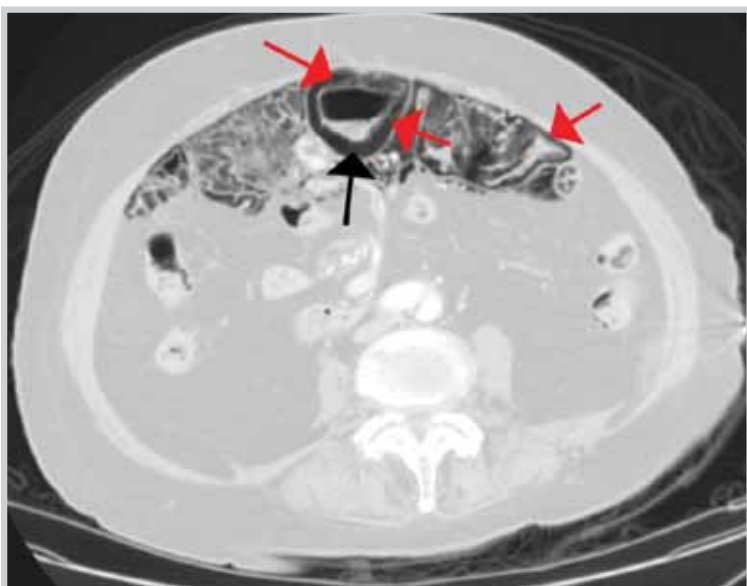


Figure 3

The upright anteroposterior radiograph of the abdomen demonstrates multiple distended loops of small bowel. In addition, there appears to be air within the walls of the bowel loops, creating a lucent outline of the bowel and its folds (white arrows, Figure 2). Gas within the wall of the gastrointestinal tract is known as *pneumatosis intestinalis*. Pneumatosis can appear as linear or bubbly areas of gas conforming to the shape of the bowel wall on x-ray or CT imaging.

Pneumatosis intestinalis may result from both benign and potentially life-threatening conditions. Benign causes include connective tissue disorders, pulmonary disease, and certain medications such as corticosteroids and chemotherapeutic agents. Potentially life-threatening causes include mesenteric ischemia, bowel obstruction, and trauma. Because treatment is dependent on the underlying cause, it is important to be able to distinguish the

life-threatening etiologies of pneumatosis intestinalis from the benign.<sup>1,2</sup> CT with contrast is the imaging modality of choice to evaluate for the potentially life-threatening causes.

A CT examination was performed on this patient. An axial image displayed in narrow lung windows (to better evaluate the air) confirms the presence of air in the bowel wall (red arrows, Figure 3). The fact that this air is found in the dependent portion of bowel (black arrow, Figure 3) confirms that the air is trapped within the bowel wall and is not within the lumen of the bowel. A coronal image of the abdomen demonstrates twisting and crowding of the root of the small bowel mesentery (asterisk, Figure 4) with abrupt cutoff of mesenteric vessels (white arrow, Figure 4). These findings were confirmed by examin-

ing multiple contiguous slices. This CT “whirl sign” is suggestive of small bowel volvulus.

Although small bowel volvulus is more commonly seen in children, expanded use of CT in emergency departments has resulted in increased detection of this condition in adult patients.<sup>3</sup> Small bowel volvulus typically occurs in patients with congenitally abnormal mesenteric anatomy. In adults, symptoms may be intermittent in cases where the volvulus is able to spontaneously reduce, or constant in cases where it cannot. Volvulus may cause mesenteric ischemia, bowel obstruction, or both.

In the case patient, the presence of the CT whirl sign and pneumatosis intestinalis allowed recognition of small bowel ischemia. The patient was taken to the operating room, where the volvulus was confirmed and reduced. This case underscores the importance of excluding the life-threatening etiologies of pneumatosis even in patients with potential reasons for benign pneumatosis (in this patient, chronic steroid therapy). The patient recovered and was discharged without complication. **EM**



**Figure 4**

## References

1. Wang JH, Furlan A, Kaya D, et al. Pneumatosis intestinalis versus pseudo-pneumatosis: review of CT findings and differentiation. *Insights Imaging*. 2011;2(1):85-92.
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3. Peterson CM, Anderson JS, Hara AK, et al. Volvulus of the gastrointestinal tract: appearances at multimodality imaging. *Radiographics*. 2009;29(5):1281-1293.