

Bowel perforation with peritonitis and pneumoperitoneum – an emergency presentation of acute intestinal ischaemia

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Section: Abdominal imaging

Area of Interest: Emergency Gastrointestinal tract

Procedure: Complications

Procedure: Education

Imaging Technique: CT

Imaging Technique: CT-Angiography

Special Focus: Acute Ischaemia / Infarction Case Type: Clinical Cases

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Patient: 38 years, female

Clinical History:

A 38-year-old female was brought to the emergency department with the chief complaint of acute onset severe abdominal pain. The abdominal pain was not associated with vomiting or fever. Her blood pressure at the time of presentation was 90/50 mm Hg and her pulse rate was 112/minute. Her past medical history revealed that she was a known case of rheumatic heart disease. She was admitted and was treated for bacterial endocarditis ten days back. No history of hypertension or diabetes was noted. No history of previous abdominal surgeries was noted.

Imaging Findings:

She underwent abdominal ultrasonography followed by CT scan of the abdomen and pelvis. Abdominal ultrasonography showed gaseous abdomen which was suspicious of free air in abdomen. Moderate amount of hypoechoic collection with mobile internal echoes was also noted in the abdomen and pelvis. Contrast-enhanced CT abdomen was performed for further evaluation. Contrast CT abdomen arterial phase study showed hypodense filling defect in the proximal superior mesenteric artery (suggestive of superior mesenteric artery thrombosis) with markedly attenuated distal ileocolic artery (indicative of ileocolic artery thrombosis). Rest of the abdominal visceral arteries showed normal course, calibre and opacification. There was poor enhancement of distal ileum noted that was associated with marked thinning of the bowel wall. The poorly enhancing segment of the ileum spanned a length of approximately 8.2 cm. It was associated with bowel wall dehiscence in the region. Adjacent peri-ileal collection with air fluid level was noted. Proximal bowel loops were mildly distended. Patient underwent emergency laparotomy and it showed approximately 12 cm of necrotic ileal loop with perforation. Resection anastomosis was done.

Discussion:

Intestinal ischaemia and infarction can be caused by a number of etiologies that can be either acute or chronic in origin. Common causes of bowel ischaemia are mesenteric arterial occlusion (due to thrombosis, thromboembolism, dissection, vasculitis), mesenteric venous occlusion (due to venous thrombosis, thrombophlebitis), mechanical obstruction (due to strangulation) and inflammatory causes (as pancreatitis, diverticulitis and peritonitis) [1]. Intestinal ischaemia can also occur as a result of non-occlusive systemic conditions commonly referred to as NOMI (Non-Occlusive Mesenteric Ischaemia). Hypotension resulting from congestive heart failure, sepsis, myocardial infarction, advanced hepatic and renal causes can lead to NOMI. Arterial thrombosis or embolism is the most common cause of acute intestinal ischaemia. It is a potentially life-threatening disorder and its prognosis depends on early diagnosis and timely intervention [2]. In young patients with intestinal ischaemia/ infarction, cardiac causes should also be ruled out (like the superior mesenteric artery occlusion associated with emboli from the bacterial endocarditis in our case). Among the various imaging modalities, contrast-enhanced CT is widely accepted as the first-line imaging technique for evaluation of patients with suspected intestinal ischaemia due to its speed, widespread availability and ability to diagnose alternative causes of acute abdominal pain [3]. It can not only demonstrate the cause of the intestinal ischaemia but can also demonstrate the complications associated with it. Contrast-enhanced CT with angiography can show hypodense filling defect in the concerned artery (for example superior mesenteric artery in our case) suggestive of thromboembolism. Features of ischaemia as absence of bowel wall enhancement with wall thickening or thinning can be easily demonstrated by CT [4]. Mural gas due to necrosis or features of bowel perforation as pneumoperitoneum can be demonstrated. Associated supplementary findings as mesenteric oedema, bowel dilatation, free fluid and presence of intrahepatic portal venous gas can also be demonstrated [4]. Hence, high index of suspicion in patients with pertaining history with proper and timely imaging can help in significantly decreasing the morbidity and mortality associated with intestinal ischaemia/ infarction [5].

Take-Home Message:

Acute intestinal ischaemia is a potential life-threatening condition and high index of suspicion is required for its timely diagnosis. Arterial thromboembolism is the most common cause of acute intestinal ischaemia/ infarction. MDCT is the diagnostic modality of choice for the diagnosis of intestinal ischaemia and infarction. Timely diagnosis and intervention can reduce the mortality and morbidity associated with this condition.

Written informed patient consent for publication has been obtained.

Differential Diagnosis List: Acute intestinal ischaemia with bowel perforation and pneumoperitoneum, Strangulation of small bowel with bowel obstruction, Mesenteric venous thrombosis, Paralytic ileus

Final Diagnosis: Acute intestinal ischaemia with bowel perforation and pneumoperitoneum

References:

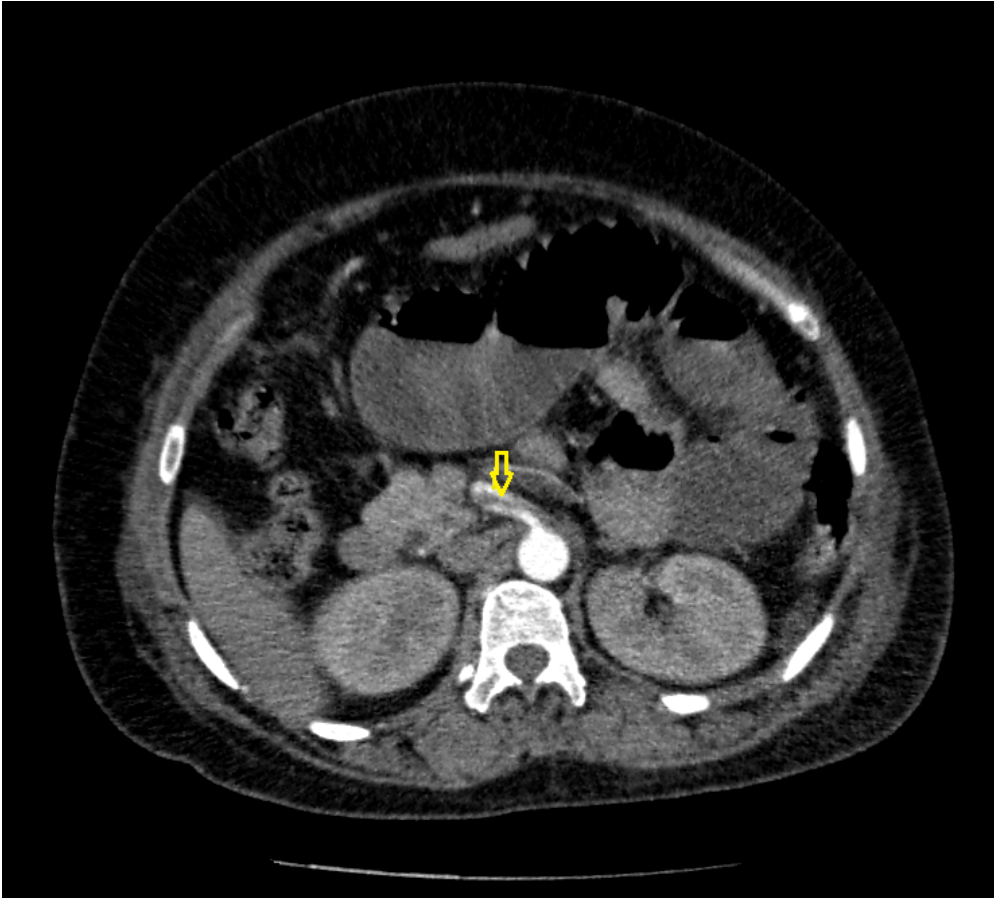
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Figure 1

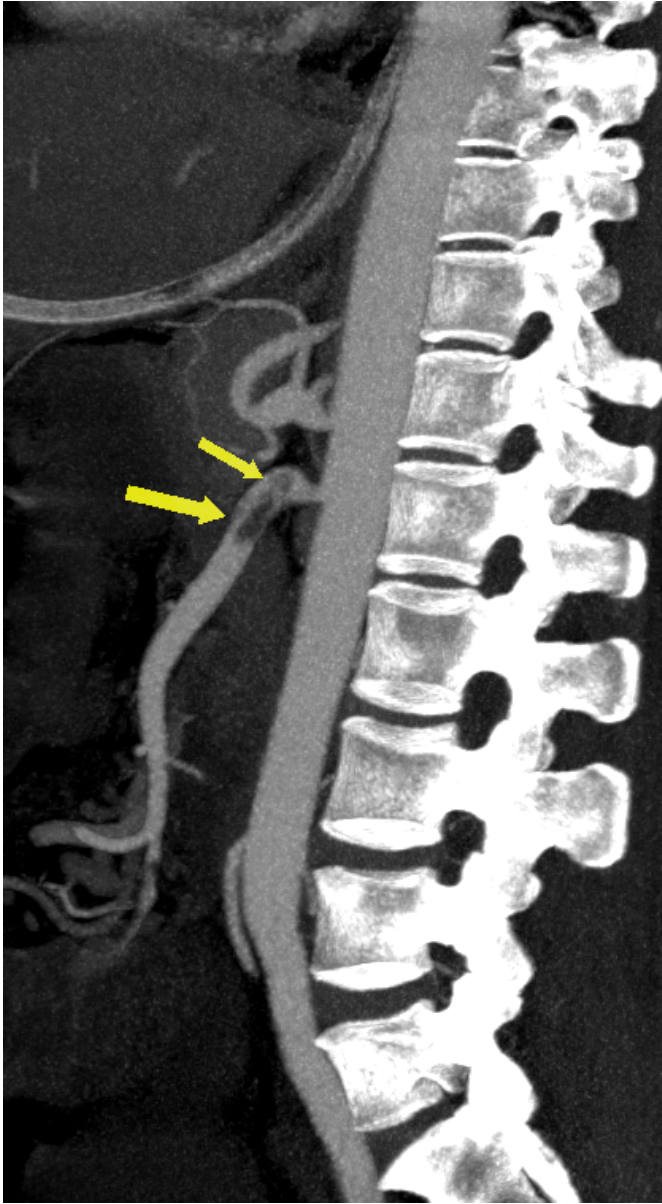
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Description: Contrast enhanced CT abdomen showing hypodense filling defect in the proximal superior mesenteric artery suggestive of thromboembolism (yellow arrow). **Origin:** © Department of Radiodiagnosis and Imaging, Grande International Hospital, Kathmandu, Nepal.

Figure 2

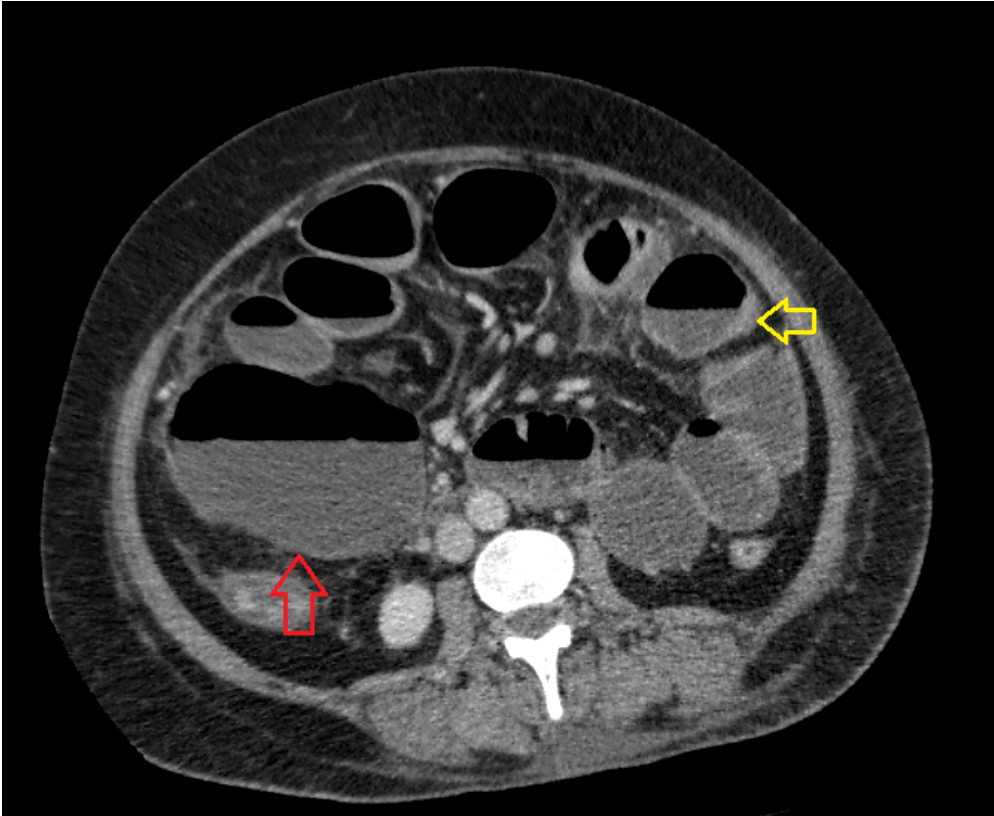
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Description: Reconstructed MIP image sagittal view from contrast CT abdomen showing thromboembolism of superior mesenteric artery (yellow arrows). **Origin:** © Department of Radiodiagnosis and Imaging, Grande International Hospital, Kathmandu, Nepal.

Figure 3

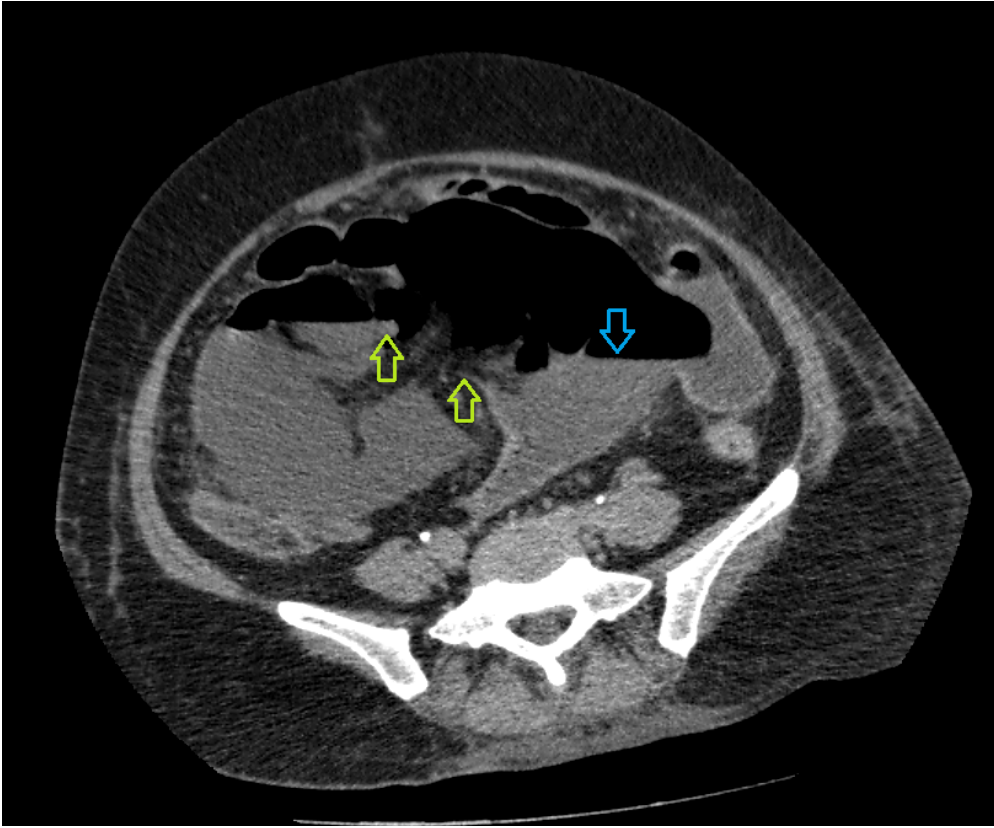
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Description: Contrast enhanced CT abdomen axial view showing dilated bowel loops (yellow arrow) with poor enhancement of ileal loops (red arrow). **Origin:** © Department of Radiodiagnosis and Imaging, Grande International Hospital, Kathmandu, Nepal.

Figure 4

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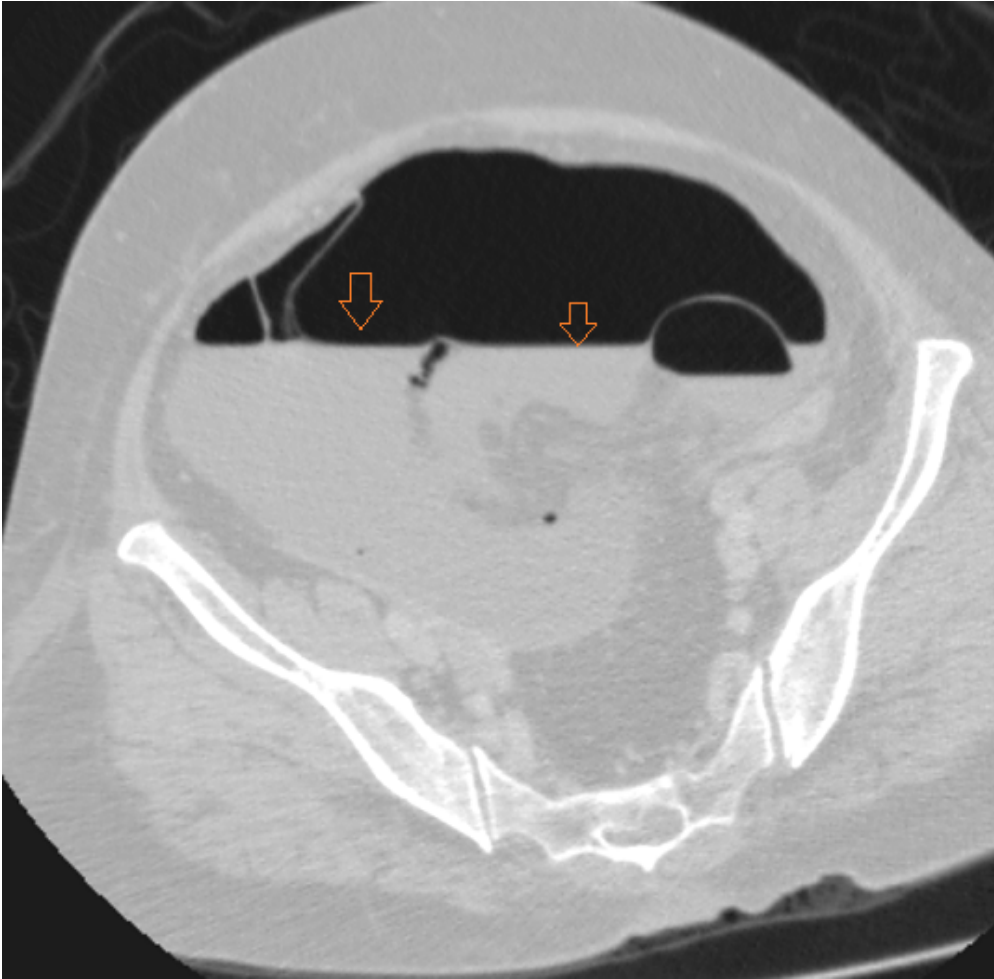


Description: Contrast enhanced CT abdomen axial view showing poor enhancement of ileal loops with wall dehiscence (green arrows) giving rise to localized free air and collection in abdomen (blue arrow).

Origin: © Department of Radiodiagnosis and Imaging, Grande International Hospital, Kathmandu, Nepal.

Figure 5

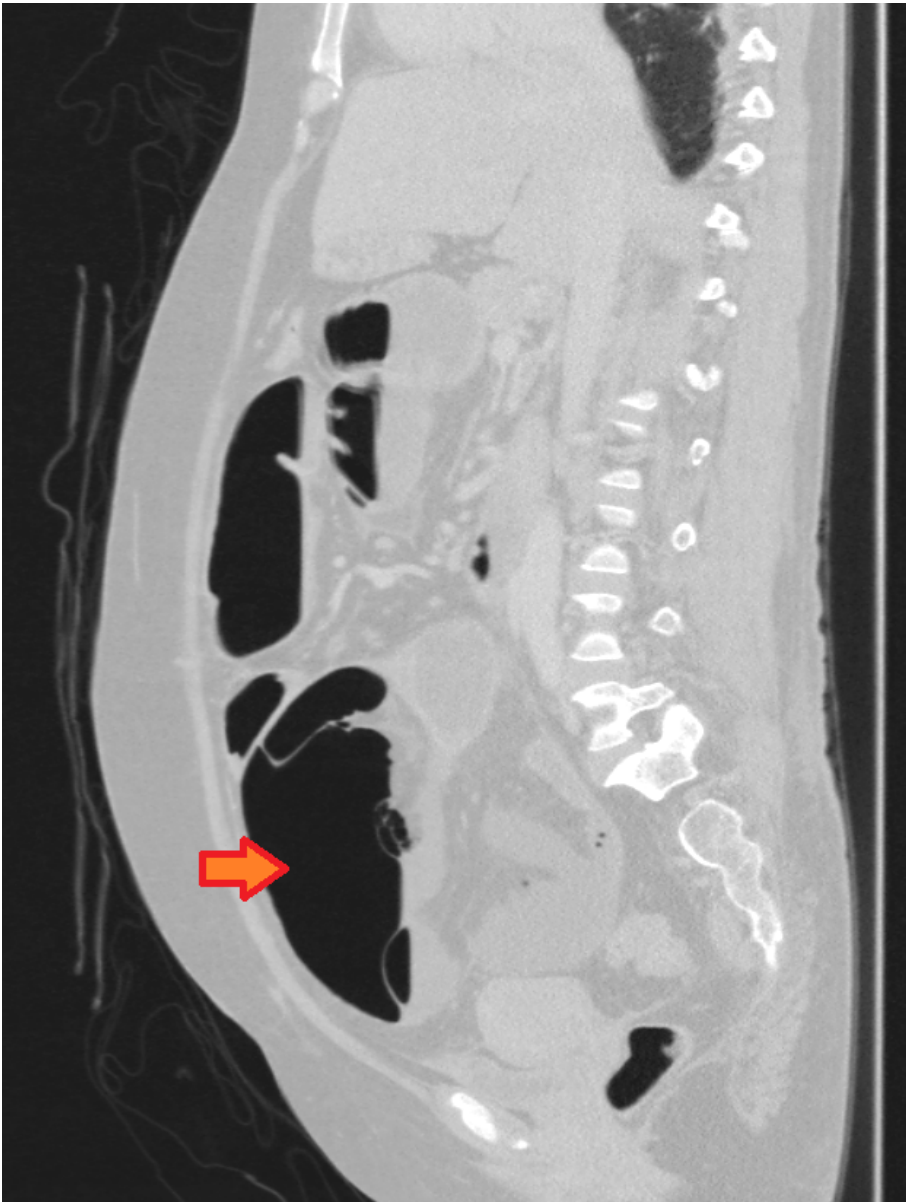
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Description: CT abdomen axial view lung window showing collection with free air giving rise to air-fluid level in the abdomen (orange arrows). **Origin:** © Department of Radiodiagnosis and Imaging, Grande International Hospital, Kathmandu, Nepal.

Figure 6

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Description: CT abdomen sagittal view lung window showing collection with free air in the abdomen (red arrow). **Origin:** © Department of Radiodiagnosis and Imaging, Grande International Hospital, Kathmandu, Nepal.