

Acute intestinal ischaemia

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Section: Abdominal imaging

Area of Interest: Abdomen Veins / Vena cava

Procedure: Diagnostic procedure

Procedure: Dilation

Imaging Technique: Conventional radiography

Imaging Technique: CT

Special Focus: Acute Case Type: Clinical Cases

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Patient: 77 years, male

Clinical History:

A 77-year-old patient with a known history of hypertension, presented with diffuse abdominal pain and meteorism, occurring during hospitalization for an intracerebral haemorrhage of the left basal ganglia with right hemiparesis and inability to swallow.

Imaging Findings:

The patient was primarily sent for a conventional abdominal X-ray examination showing multiple air-fluid levels in both small and large bowel as well as a distended large bowel, suggesting a paralytic ileus. However, based on the clinical history, a CT examination was suggested. This confirmed the multiple air-fluid levels in the whole gastrointestinal tract and bowel dilatation with paralytic ileus, but also showed atherosclerotic calcification, with absent enhancement of a short segment of the small bowel as well as parietal pneumatosis of the ascending colon suggesting bowel infarction. There was also air in the intrahepatic portal branches, as sure sign of mesenteric infarction, indicating a disease with advanced stage. No pneumoperitoneum or retroperitoneum was seen.

Discussion:

Occlusive and non-occlusive causes are recognized for intestinal ischaemia [1, 2, 3].

Clinical signs and symptoms are often nonspecific [2]. It is associated, especially in elderly patients, with other comorbidities [2, 4, 5] such as cardiac pathology – atrial fibrillation, aneurysms of the aorta and abdominal vessels, [1, 4], hypovolaemic shock, heart failure [1, 6], heart operation [7], hypovolaemia associated with pancreatitis, haemorrhage, sepsis, cirrhosis [6].

In 95% of cases, the mesenteric ischaemia is acute [2], being arterial or venous in origin [1, 2], divided in 4 categories [2]: embolic occlusion of the superior mesenteric artery, acute mesenteric arterial thrombosis, non-occlusive mesenteric ischaemia and mesenteric venous thrombosis.

Occlusive causes include emboli or thrombi with occlusion of the arterial or venous vessels [1, 2, 4, 5]. Non-occlusive causes [1, 2, 3, 4, 6] can be generated by reduction of blood flow and generalized atherosclerotic disease.

Even if the native CT examination can depict submucosal haemorrhage, thrombi and atherosclerotic calcifications [1], the enhanced MD-CT is favoured (arterial phase with detection of arterial stenosis, thrombi, occlusion; venous phase with evaluation of venous thrombosis) [1].

The CT findings include intestinal changes (wall thickening, abnormal mural enhancement, bowel dilatation, pneumatosis), vascular (arterial embolus, arterial thrombus, mesenteric venous thrombus, portomesenteric venous gas, occlusion or severe stenosis in at least two major splanchnic arteries) and mesenteric changes (fat stranding,

free fluid, free air) [2].

There are different phases of the disease, beginning with spasm of the involved loops [1, 2, 3], absence of enhancement or wall thickening in early stages, hypotonic bowel dilatation [1], ischaemia with intramural air (parietal pneumatosis) [1, 8], intraluminal air in the mesenteric and portal branches [1] as a sign of infarction [1] and very advanced phase, and necrosis. The only pathognomonic sign of transmural necrosis is bowel perforation with pneumo-/retropneumoperitoneum [1]. Parietal and porto-mesenteric pneumatosis and pneumoperitoneum are indicative for an unfavourable outcome [1, 9] and associated with high mortality [1].

Differential diagnosis are multiple, beginning with wall thickening of the bowel seen in tumours, and with hyperenhancement in ischaemic but also in inflammatory disease such as colitis, Morbus Crohn, abscess; however the clinical history and localisation are contributing to the diagnosis, too. The absence of enhancement suggests mesenteric vessel occlusion or bowel obstruction [1]. Iatrogenic visceral dilation, blunt trauma, paralytic and mechanical ileus or infectious processes can cause portomesenteric venous gas [1].

Prompt, early diagnosis is crucial for therapy and patient outcome [1, 2].

Differential Diagnosis List: Acute intestinal ischaemia with mesenteric infarction, Chronic intestinal ischemia, Ogilvie syndrome, Colitis, Morbus Crohn, Non-traumatic abdominal compartment syndrome

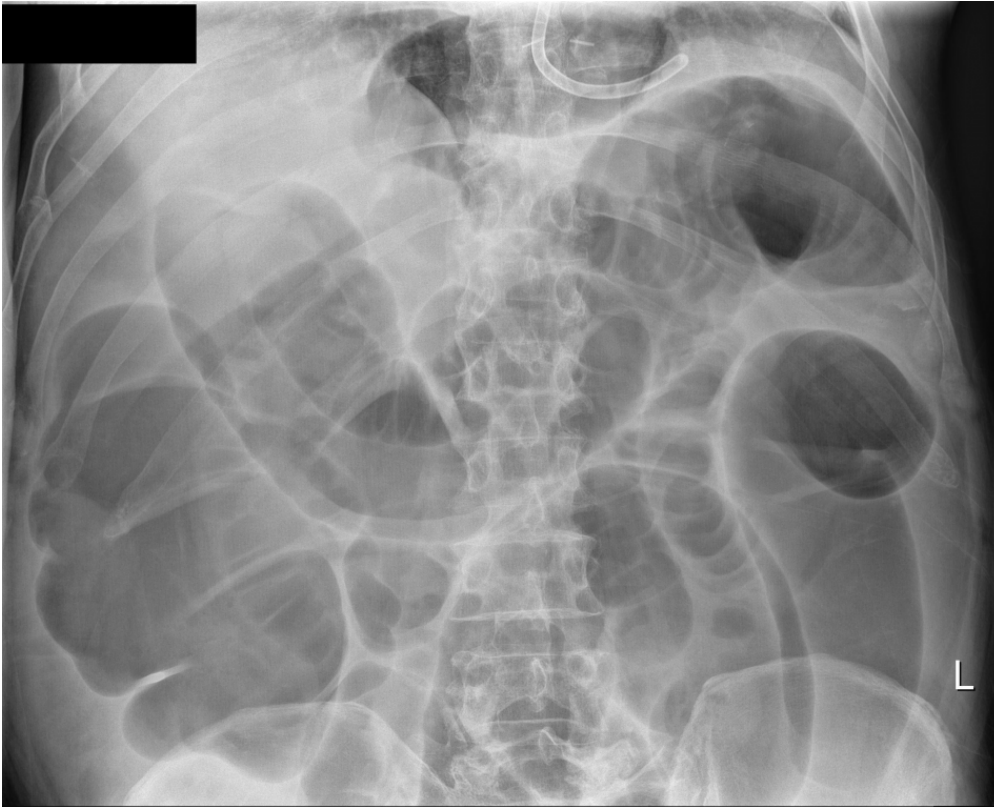
Final Diagnosis: Acute intestinal ischaemia with mesenteric infarction

References:

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Figure 1

a



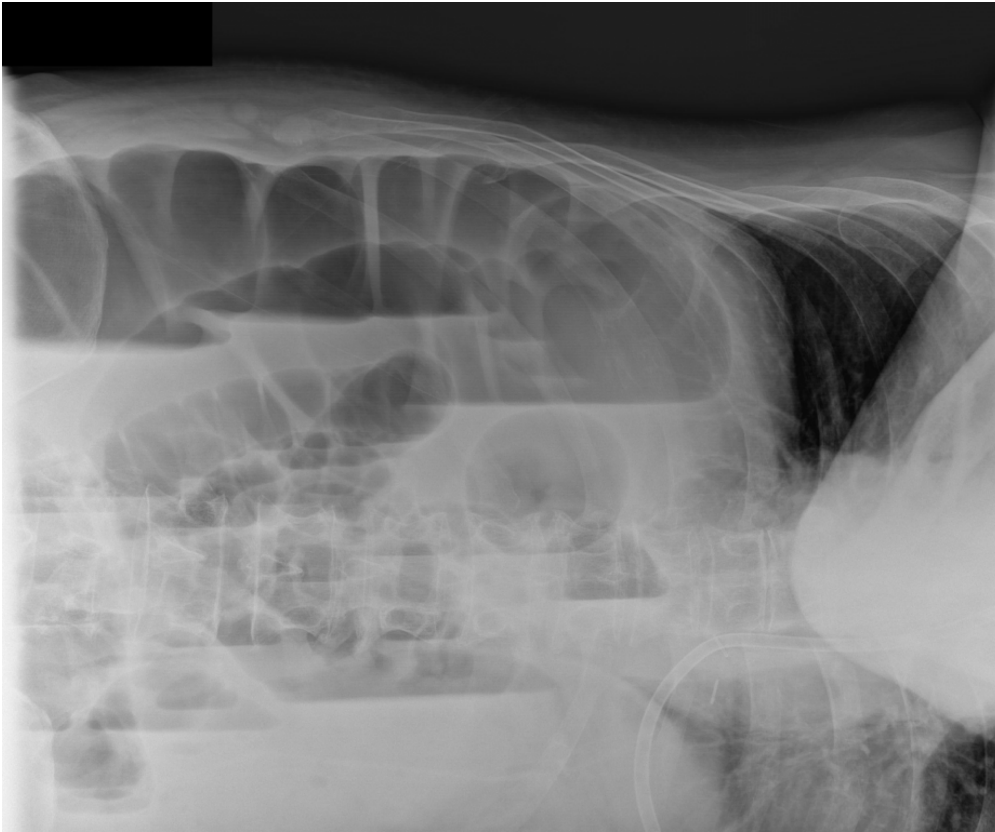
Description: Conventional abdominal X-ray examination: Distended intestinal loops with air-fluid levels in both small and large bowel. **Origin:** Division of General Radiology, Dept. of Radiology, Medical University of Graz

b



Description: Conventional abdominal X-ray examination: Distended intestinal loops with air-fluid levels in both small and large bowel. **Origin:** Division of General Radiology, Dept. of Radiology, Medical University of Graz

c



Description: Conventional abdominal X-ray examination, lateral view: Distended intestinal loops with multiple air-fluid levels in both small and large bowel. No free intraperitoneal air was seen. **Origin:** Division of General Radiology, Dept. of Radiology, Medical University of Graz

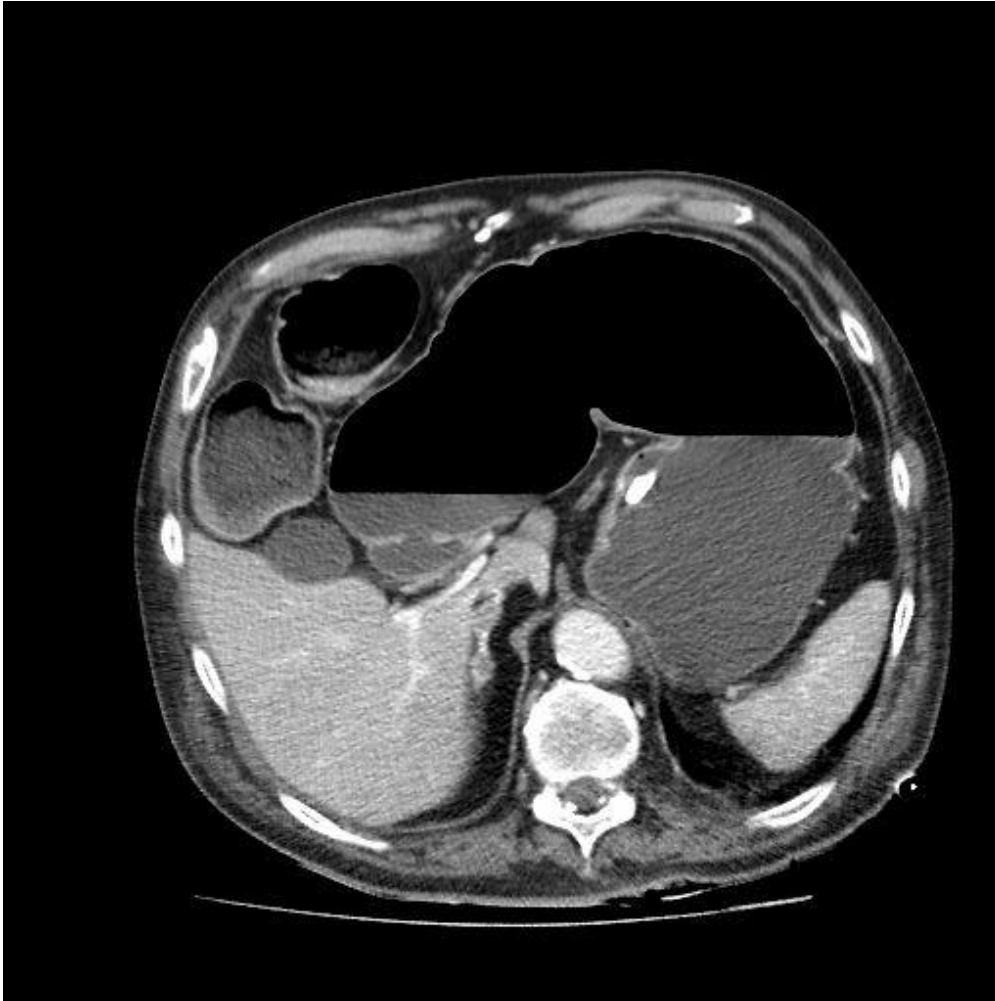
d



Description: Conventional abdominal X-ray examination, lateral view: Distended intestinal loops with multiple air-fluid levels in both small and large bowel. Intraluminal air in the rectal ampulla. No free intraperitoneal air was seen. **Origin:** Division of General Radiology, Dept. of Radiology, Medical University of Graz

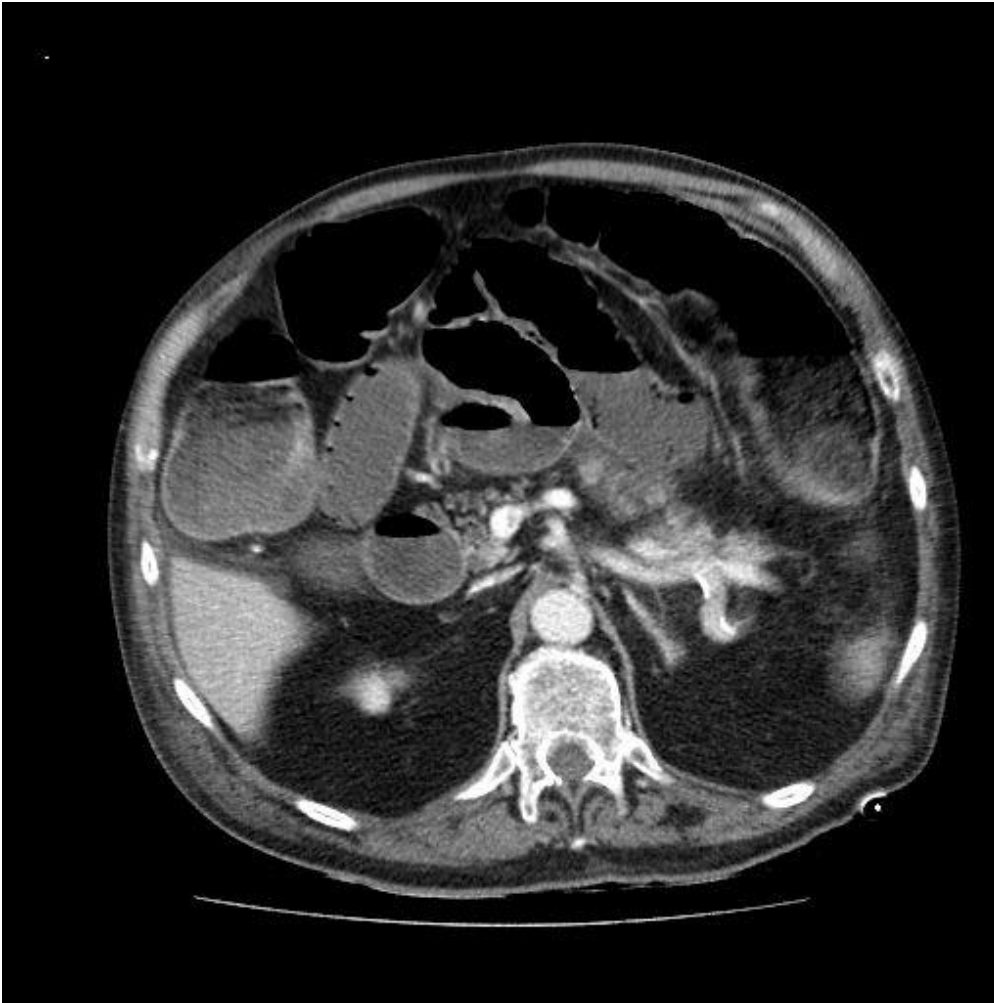
Figure 2

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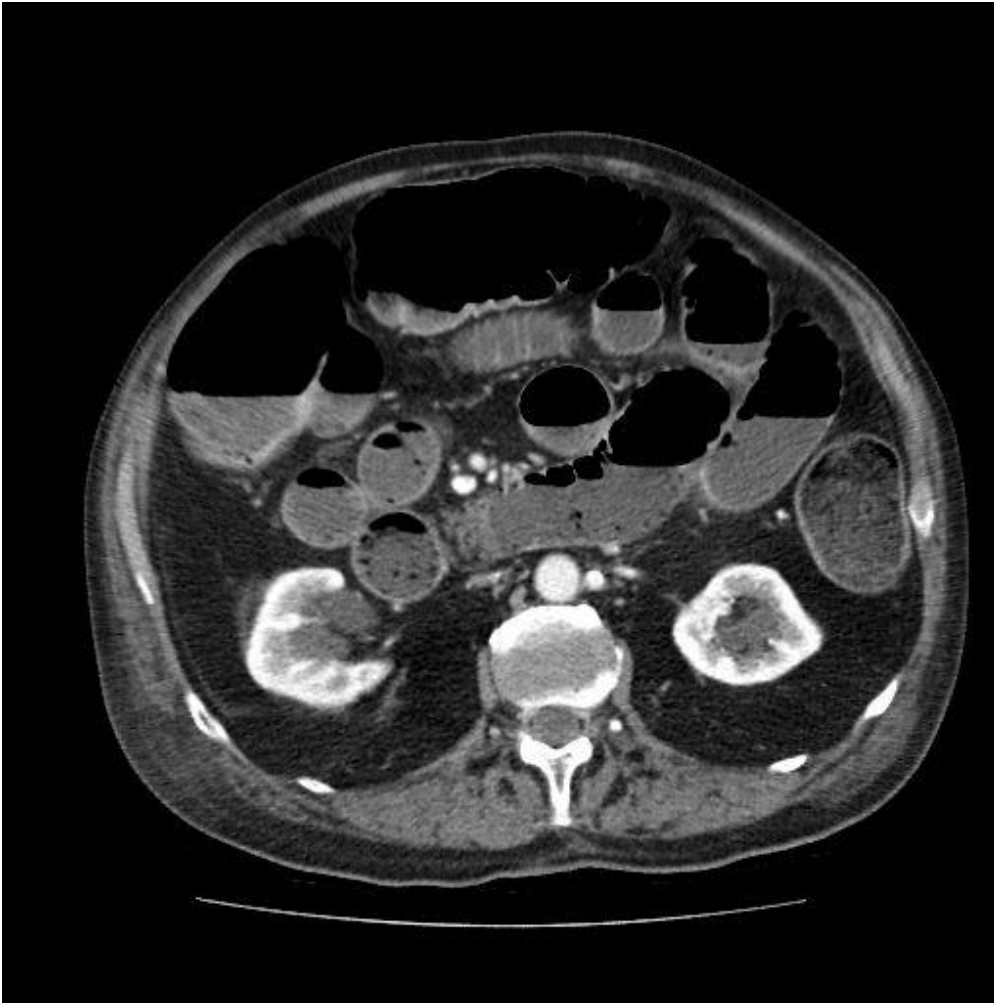
Description: Enhanced axial CT image: Dilateted stomach and intestinal loops. **Origin:** Division of General Radiology, Dept. of Radiology, Medical University of Graz

b



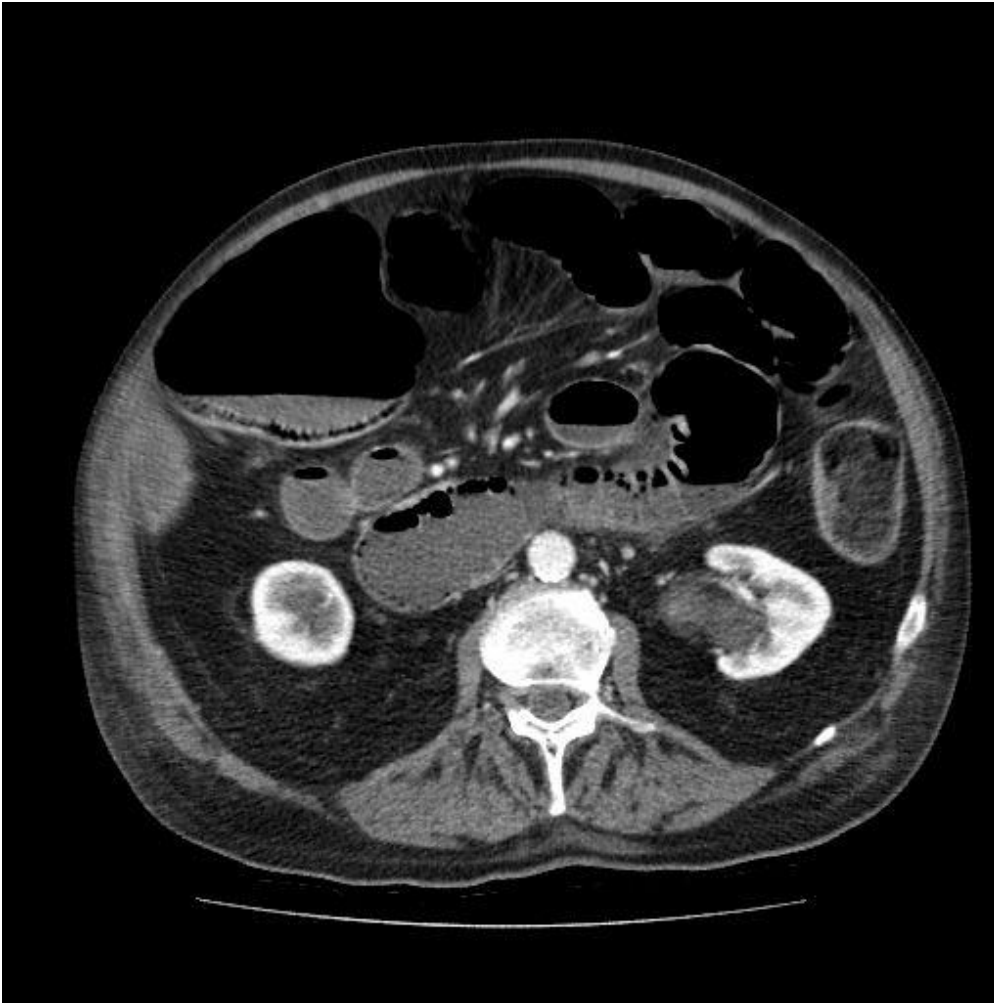
Description: Enhanced axial CT image: Air-fluid levels in small and large bowel. Atherosclerosis of the aorta and abdominal vessels. **Origin:** Division of General Radiology, Dept. of Radiology, Medical University of Graz

c



Description: Enhanced axial CT image: Absent enhancement of a small bowel loop. Air-fluid levels in small and large bowel. Atherosclerosis of the aorta and abdominal vessels. **Origin:** Division of General Radiology, Dept. of Radiology, Medical University of Graz

d



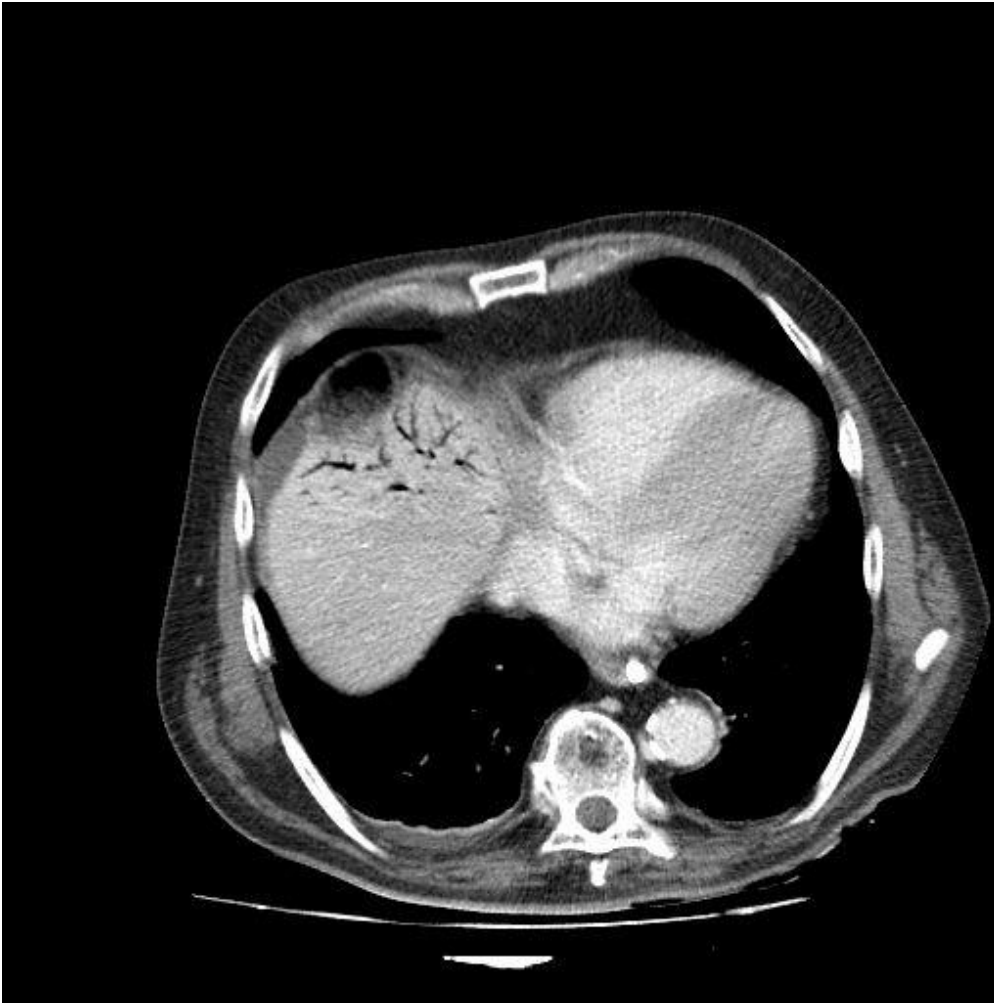
Description: Enhanced axial CT image: Parietal pneumatosis of the ascending colon. Absent enhancement of a small bowel loop. Air-fluid levels in small and large bowel. Atherosclerosis of the aorta and abdominal vessels. **Origin:** Division of General Radiology, Dept. of Radiology, Medical University of Graz

e



Description: Enhanced axial CT image: Distended rectal ampulla (no mechanical ileus). **Origin:** Division of General Radiology, Dept. of Radiology, Medical University of Graz

f



Description: Enhanced axial CT image: Air in the intrahepatic portal branches indicating mesenteric infarction. **Origin:** Division of General Radiology, Dept. of Radiology, Medical University of Graz

Figure 3

a



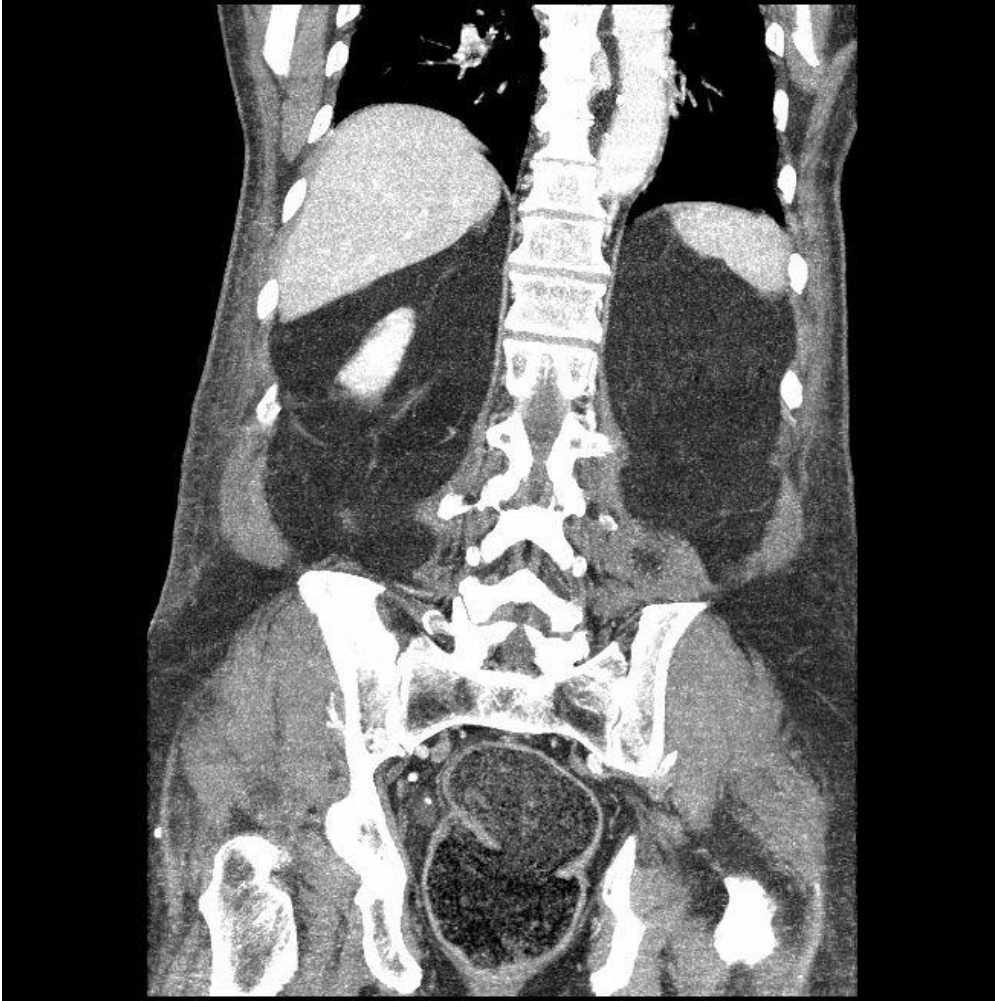
Description: Coronal reconstructed CT: Dilateted small and large bowel loops. **Origin:** Division of General Radiology, Dept. of Radiology, Medical University of Graz

b



Description: Coronal reconstructed CT: Dilateted and fluid-filled small and large bowel loops. Note the parietal pneumatosis. **Origin:** Division of General Radiology, Dept. of Radiology, Medical University of Graz

c



Description: Intraluminal air in the rectal ampulla. **Origin:** Division of General Radiology, Dept. of Radiology, Medical University of Graz