

## Neuroendocrine liver metastases mimicking haemangiomas

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**Section:** Abdominal imaging

**Area of Interest:** Abdomen

**Procedure:** Diagnostic procedure

**Procedure:** Contrast agent-intravenous

**Imaging Technique:** Ultrasound

**Imaging Technique:** CT

**Special Focus:** Neoplasia Case Type: Clinical Cases

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**Patient:** 72 years, male

### Clinical History:

An asymptomatic 72-year-old male patient performed a follow-up abdominal ultrasound for liver nodules, detected 10 months before during an ultrasound exam for abdominal discomfort. There were no previous abdominal imaging exams, a history of malignancy or of chronic liver disease.

### Imaging Findings:

Two liver nodules with 25mm and 20mm were previously known, diagnosed as haemangiomas, with slight increase of the second lesion. An additional 14mm nodule was detected (Fig. 1 and Fig. 2). All had regular borders and a homogeneous hyperechoic echostructure, except for a small hypoechoic area in the largest lesion. There were no other liver abnormalities.

Contrast-enhanced ultrasound was performed to confirm the diagnosis of haemangiomas. All lesions showed early hyperenhancement with rapid washout 30 seconds after injection (Fig. 3). No other lesions were detected.

Ultrasound-guided biopsy of the largest lesion revealed a neuro-endocrine metastasis. Serum serotonin, 5-hydroxyindoleacetic acid (5-HIAA) and chromogranin A were increased.

Abdominal CT revealed an additional spiculated mesenteric mass with calcifications in the right lower quadrant. There was a slight focal increase in enhancement of the adjacent terminal ileum, suggesting a primary ileal neuroendocrine tumour (Fig. 4). These findings were corroborated by 68Ga-DOTANOC PET/CT and confirmed in the surgical specimen.

### Discussion:

About 11-14% of metastases of an unknown primary are due to neuroendocrine tumours, typically low grade gastrointestinal tumours. Also referred to previously as carcinoids, the small intestine is a frequent location, particularly the terminal ileum. There is a slight male predominance and the median age at diagnosis is 63 years. They are multiple in 30% of cases, usually metachronous [1, 2, 3].

These tumours may produce vasoactive substances, leading to serum increase of serotonin, 5-HIAA and chromogranin A. However, patients are usually either asymptomatic or displaying non-specific symptoms. The classic carcinoid syndrome is only present in 10% of cases [1, 2].

Only one third of small bowel tumours present as a localised disease and dissemination to lymph nodes, mesenteric fat and the liver usually overshadow the primary lesion. Nevertheless, it is always important to locate the primary

tumour, since its resection has prognostic importance. The tumour is generally subtle, less than 2cm, presenting as a hypervascular intramural or polypoid lesion, best detected on CT enteroclysis or CT enterography [1, 2, 3]. Functional imaging with somatostatin analogues is useful for tumour location and to measure receptor expression, which has treatment implications. Newer techniques like 68Ga-DOTANOC PET/CT have overcome the limitations of scintigraphy [3].

Mesenteric metastases are soft-tissue masses in the mesenteric fat that owe their spiculated appearance to an intense desmoplastic reaction to the vasoactive peptides. They have calcifications in 70% of cases and often cause angulation and tethering of the adjacent bowel [1, 2].

Liver metastases are generally hypervascular with washout, although up to 20% can be hypovascular. They can completely mimic haemangiomas on ultrasound, but may show areas of necrosis [1, 2, 4, 5].

Only small (less than 3cm), homogeneous, hyperechoic nodules with regular borders and no hypoechoic halo in asymptomatic patients should suggest the diagnosis of hepatic haemangiomas. Although in remote instances, neuroendocrine metastases were found to be the one malignant exception [4, 5].

Any other finding is atypical and should prompt a contrast-enhanced study to search for washout, with subsequent biopsy if present. On contrast-enhanced ultrasound, benign liver lesions, including haemangiomas, can show washout and timing of the washout is therefore crucial. A rapid washout before 75 seconds after injection, as displayed in this case, is much more suspicious for malignancy, namely metastases [4, 6].

Disseminated neuroendocrine tumours are treated with surgical resection, embolisation techniques, chemotherapy and somatostatin analogues [1].

In conclusion, neuroendocrine tumour metastases can completely mimic hepatic haemangiomas at ultrasound. Any atypical finding should prompt further investigation.

**Differential Diagnosis List:** Ileal neuroendocrine tumour with mesenteric and liver metastases, Hepatic haemangiomas, Hepatic adenomas, Nodular steatosis

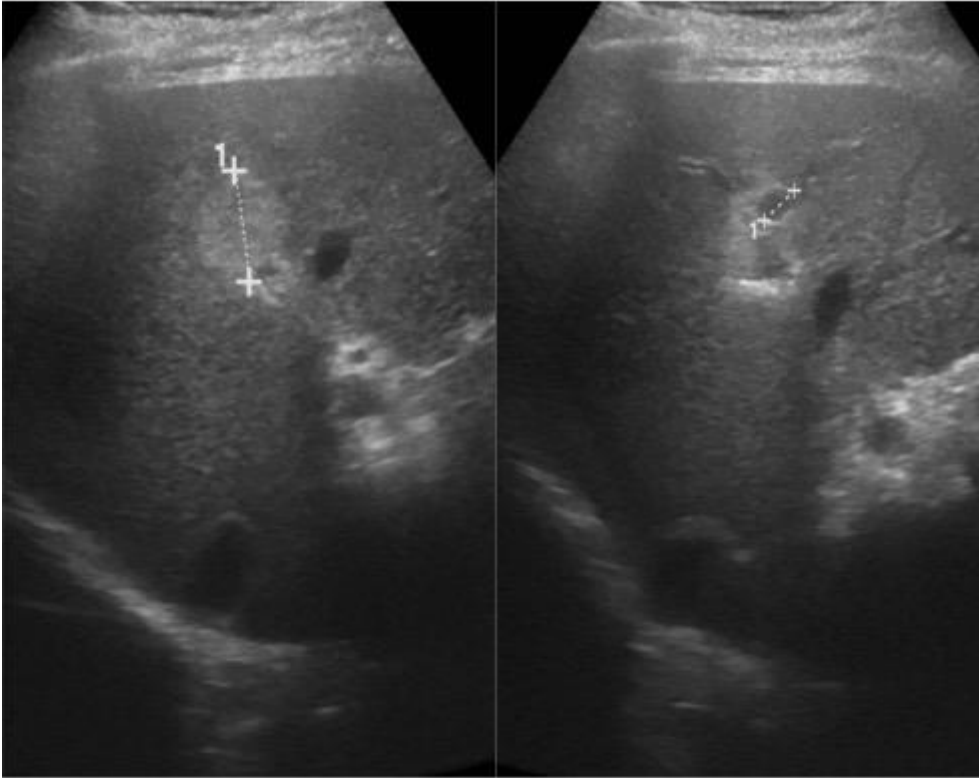
**Final Diagnosis:** Ileal neuroendocrine tumour with mesenteric and liver metastases

## References:

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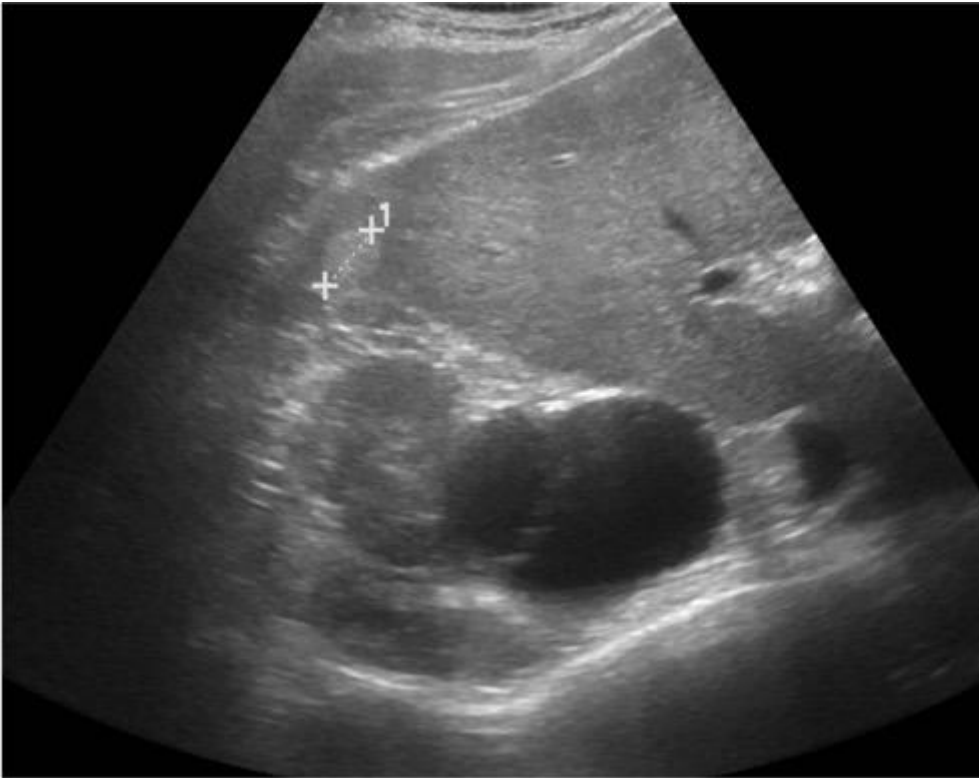
**Figure 1**

a



**Description:** On the first abdominal ultrasound, a 25mm hyperechoic nodule was detected in segment 8 of the liver, with regular borders but a small hypoechoic area. **Origin:** Medical Imaging Department and Faculty of Medicine, University Hospital of Coimbra, Portugal

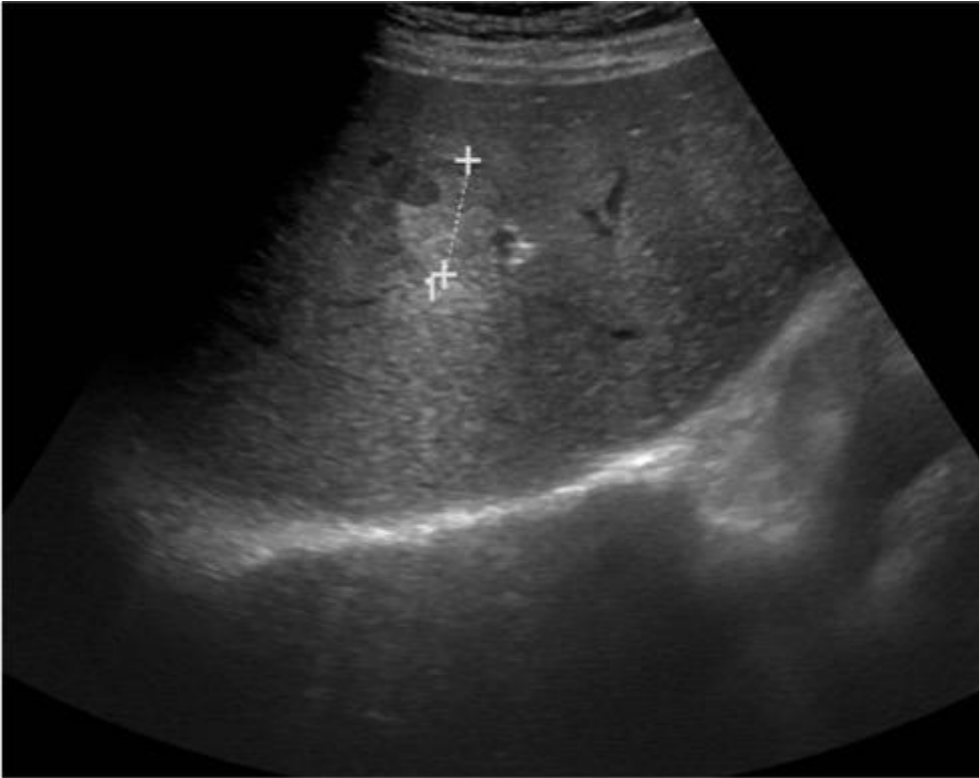
**b**



**Description:** A second hyperechoic nodule was detected in segment 6 with 16mm, regular borders and homogeneous echostructure. A right renal cyst with internal septum is also shown. **Origin:** Medical Imaging Department and Faculty of Medicine, University Hospital of Coimbra, Portugal

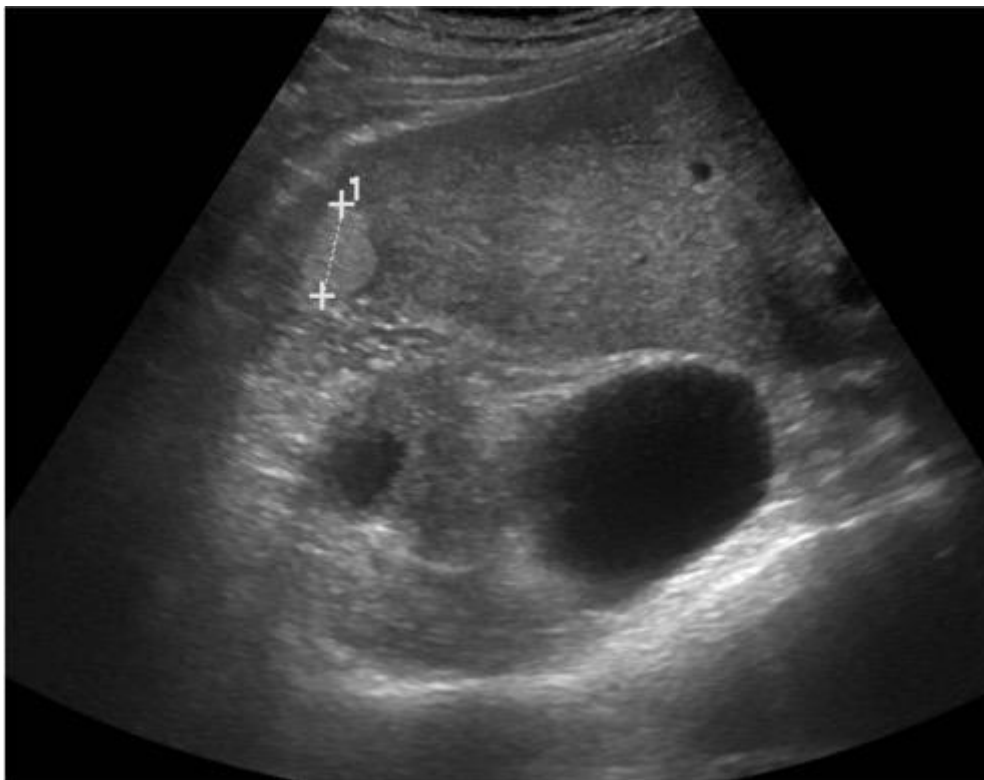
**Figure 2**

a



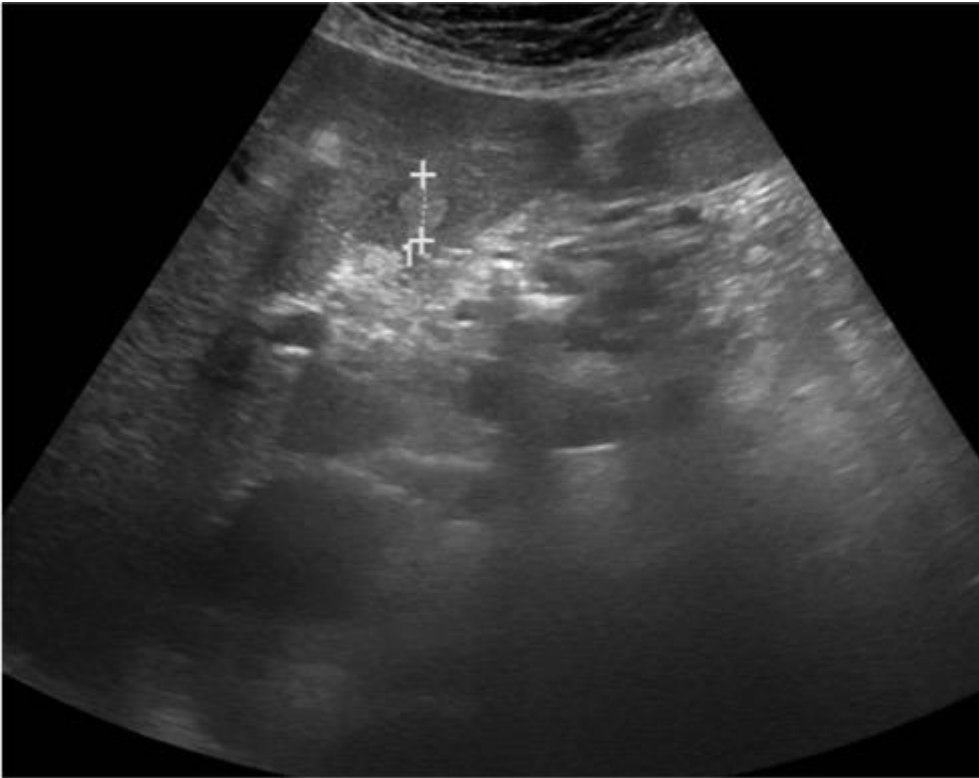
**Description:** On the abdominal ultrasound performed 10 months later, the larger hyperechoic nodule in segment 8 remained stable, with 25mm and the hypoechoic area. **Origin:** Medical Imaging Department and Faculty of Medicine, University Hospital of Coimbra, Portugal

**b**



**Description:** The nodule in segment 6 showed a slight increase, measuring 20mm, remaining homogeneously hyperechoic with regular borders. **Origin:** Medical Imaging Department and Faculty of Medicine, University Hospital of Coimbra, Portugal

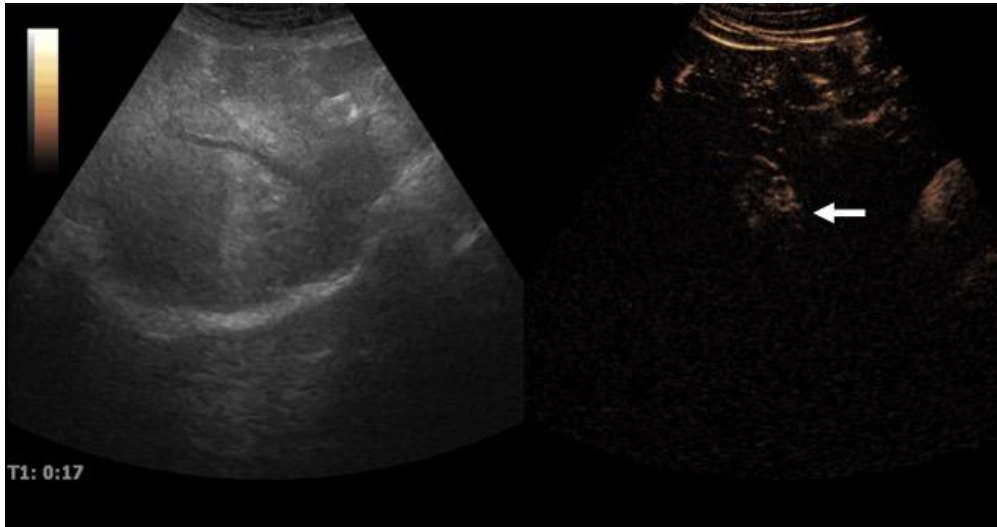
**c**



**Description:** An additional hyperechoic lesion was observed in segment 4b, previously unmentioned, with 14mm. **Origin:** Medical Imaging Department and Faculty of Medicine, University Hospital of Coimbra, Portugal

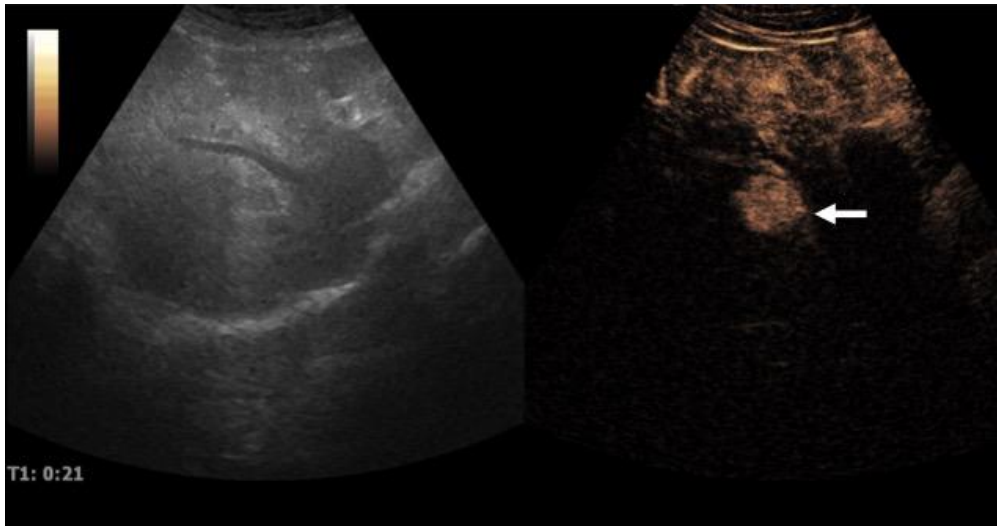
**Figure 3**

**a**



**Description:** Assessment of the lesion located in segment 8 demonstrates rapid centripetal enhancement in the arterial phase (arrow). **Origin:** Medical Imaging Department and Faculty of Medicine, University Hospital of Coimbra, Portugal

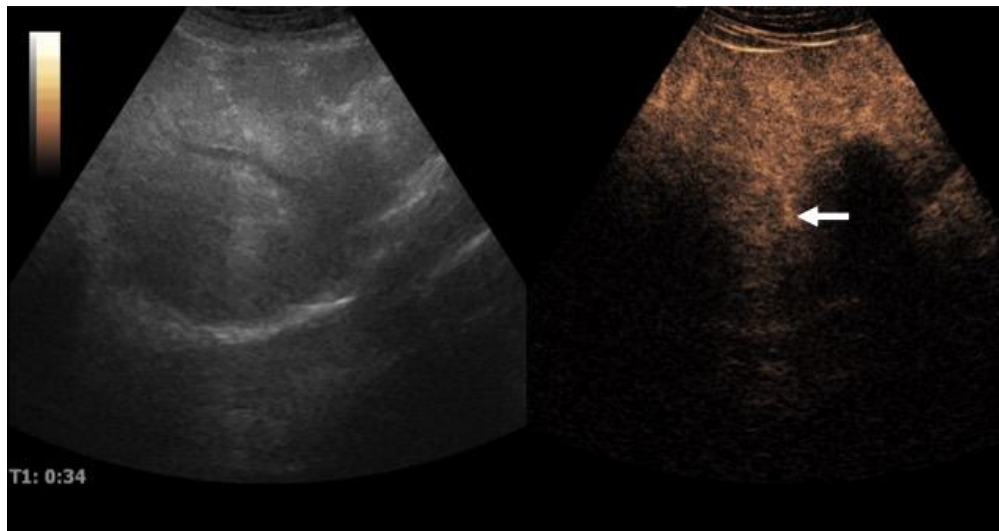
**b**



**Description:** Assessment of the lesion located in segment 8 demonstrates rapid centripetal enhancement in the arterial phase (arrow). **Origin:** Medical Imaging Department and Faculty of Medicine, University Hospital of Coimbra, Portugal

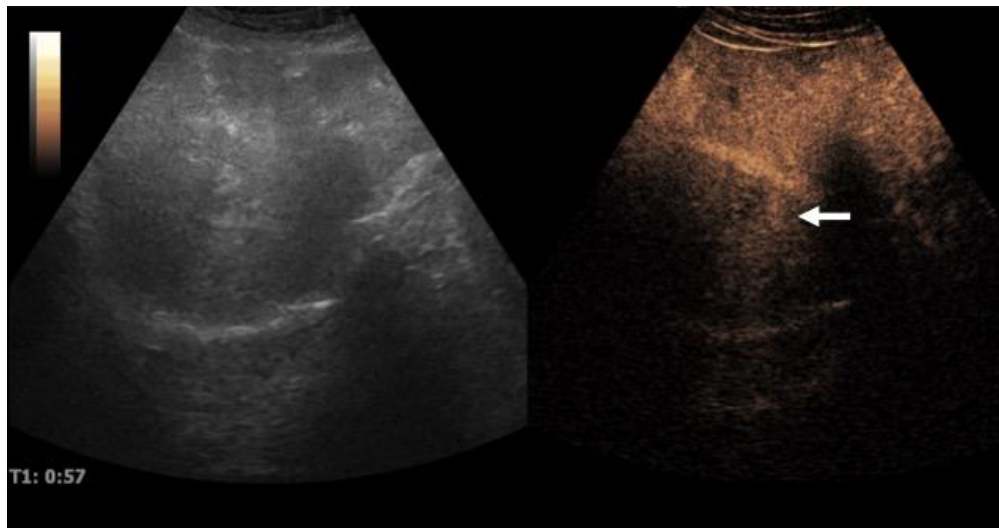


**c**



**Description:** Washout was observed early on (arrow), starting about 30 seconds after injection. **Origin:** Medical Imaging Department and Faculty of Medicine, University Hospital of Coimbra, Portugal

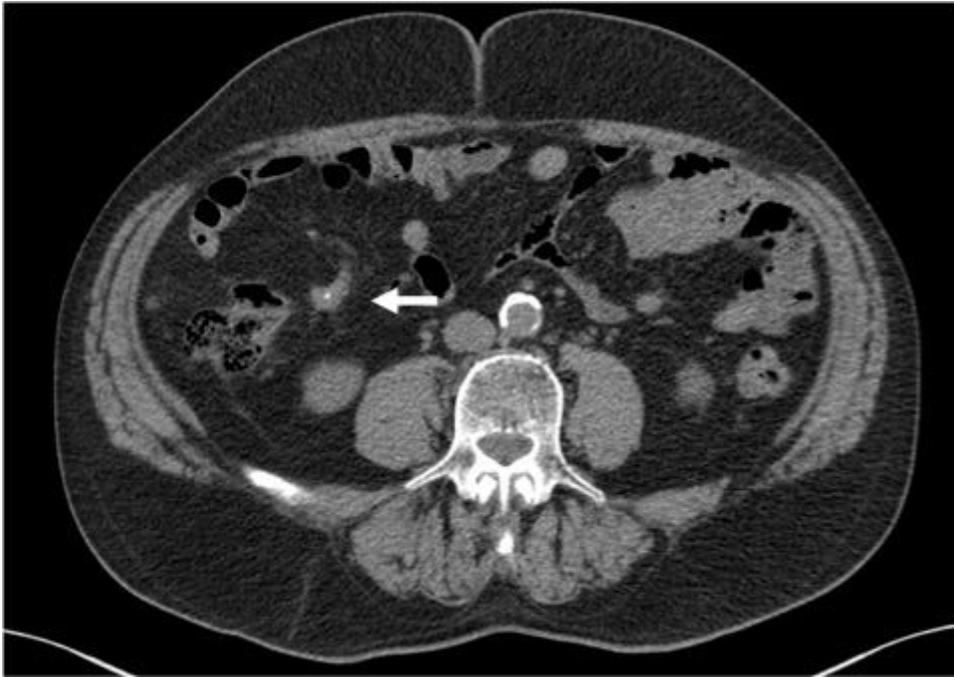
**d**



**Description:** Washout was observed early on (arrow), starting about 30 seconds after injection. **Origin:** Medical Imaging Department and Faculty of Medicine, University Hospital of Coimbra, Portugal

**Figure 4**

**a**



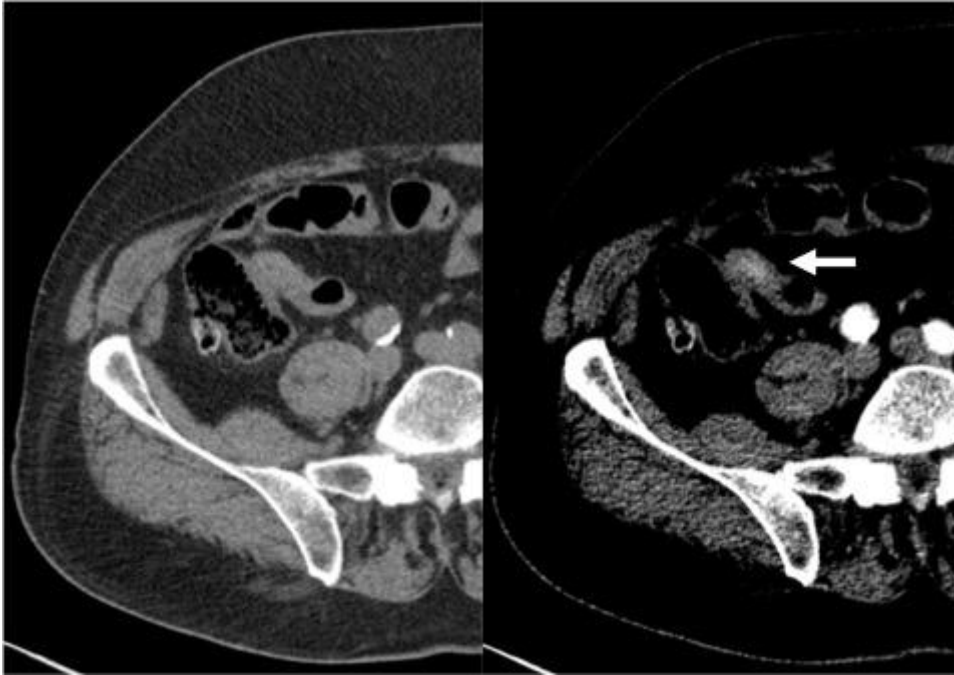
**Description:** On the precontrast CT scan, a spiculated mass in the mesenteric fat of the right lower quadrant was detected, with discrete calcifications (arrow). **Origin:** Medical Imaging Department and Faculty of Medicine, University Hospital of Coimbra, Portugal

**b**



**Description:** Coronal reformat of the portal venous phase scan, showing the spiculated mesenteric mass (arrow) immediately cranial to the terminal ileum. No other mesenteric lesions or retroperitoneal lymphadenopathies were detected. **Origin:** Medical Imaging Department and Faculty of Medicine, University Hospital of Coimbra, Portugal

**c**



**Description:** The adjacent terminal ileum presented slight hyperenhancement in the arterial phase (arrow), compared to the precontrast scan. **Origin:** Medical Imaging Department and Faculty of Medicine, University Hospital of Coimbra, Portugal