

Amoebic liver abscess: MRI findings

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Section: Abdominal imaging

Area of Interest: Liver

Procedure: Diagnostic procedure

Procedure: Image compression

Imaging Technique: Ultrasound

Imaging Technique: MR

Special Focus: Abscess Case Type: Clinical Cases

Authors: Tonolini Massimo, MD.

Patient: 41 years, male

Clinical History:

Middle-aged male with unremarkable past medical history, recently (1 year earlier) immigrated to Western Europe from his native country (Bangladesh). Suffering since a month from recurrent fever, abdominal discomfort and cough, unresponsive to empiric antibiotics.

Laboratory evidence of infection including leukocytosis (18.000 cells/mmc), C-reactive protein >300 mg/L, plus elevated gamma-glutamyl-transpeptidase.

Imaging Findings:

Initial ultrasound (Fig. 1) revealed a large (8x5.5 cm), well-demarcated hypoechoic and avascular mass located in the dorsal aspect of right liver lobe, which caused compression on the inferior vena cava and mild ventral dislocation of the portal vein.

Blood and stool cultures tested negative. Serology revealed positive *Entamoeba histolytica* IgG antibodies, and fecal parasitic trophozoites were found.

Liver MRI (Fig. 2) confirmed a sizeable ovoid lesion with internal fluid-like appearance, thin regular peripheral rim with low T2- and intermediate T1-weighted signal intensity, and mild oedema of the adjacent parenchyma. On diffusion-weighted images, the lesion showed visually hyperintense inhomogeneous appearance, more pronounced at the periphery. Corresponding apparent diffusion coefficient (ADC) maps showed strong peripheral hypointensity and moderately restricted diffusion centrally. After intravenous gadolinium contrast, the lesion showed abscess-like peripheral enhancement.

With laboratory and imaging features consistent with amoebic liver abscess, the patient started appropriate antibiotic treatment including metronidazole and improved clinically.

Discussion:

Transmitted via the fecal-oral route, the intestinal protozoan *Entamoeba histolytica* is endemic in India, Southeast Asia, parts of Africa, and vast regions of Central and South America including Mexico and Brazil. Favoured by malnutrition, colonic trophozoites may enter the portal system. Although occurring in ~1% of infected people,

amoebic liver abscess (ALA) represents the commonest extraintestinal disease site [1-3].

In Western countries, ALA is increasingly encountered in immigrants and occasionally in short-term travellers, after variable time intervals (weeks to years) after leaving high-prevalence regions. ALA typically affects young adults (mean age 35 years) with a striking (10:1) male predominance. Manifestations include high fever, upper abdominal pain following gastroenteritis; sometimes presentation is insidious (diarrhoea, malaise, weight loss). Liver enzymes, function and bilirubin are generally normal. Colonic ulcerations are found endoscopically in half of the patients [1-4]. Diagnosis relies on symptoms and relevant epidemiology, coupled with consistent imaging features, serology and detection of trophozoites, antigens or DNA in stools. The typical solitary ALA (75-80% of cases) is unilocular with variable size (mean 8 cm), located in the right lobe near the capsule. Sonographically, ALAs appear as round or oval masses with regular contour, homogeneous low-level internal echoes and distal through-transmission. CT shows well-defined cavities containing complex fluid (10-20 Hounsfield Units attenuation), with moderately thick (3-15 mm) peripheral enhancement [1, 5-7].

As in this patient, MRI optimally depicts the ALA content with more or less homogeneous, low T1- and high T2-weighted fluid-like signal intensity. Reflecting the fibrin lining and scant perilesional inflammatory reaction, MRI also shows the thin, regular ALA margin with variable signal features, mild oedema of the adjacent liver parenchyma (in 50% of cases), and peripheral "rim" enhancement [5-8].

The key differential diagnosis is pyogenic liver abscess, which is more prevalent in industrialised countries, occurs at a higher mean age without sex bias, often in association with diabetes or underlying hepatobiliary disorders. Features suggesting bacterial aetiology include marked leukocytosis, multifocality, bilobar involvement and complex septated appearance. However, solitary lesions are unreliably differentiated between the two entities on the basis of size and sonographic appearance [1, 4, 6-7].

Possible complications include abscess rupture in the pleuropulmonary system (40%), peritoneum (7%) or pericardium, obstructive jaundice and inferior vena cava obstruction. Antiprotozoans (particularly metronidazole) are curative in 90% of patients. Therapeutic aspiration is reserved for huge lesion at risk of impending rupture, those in which bacterial infection is considered or not responding to antibiotics [1, 2].

Differential Diagnosis List: Solitary liver amoebic abscess., Pyogenic liver abscess, Cystic echinococcosis, Biliary cystadenoma / cystadenocarcinoma, Necrotic tumour or metastasis, Complicated / haemorrhagic cyst

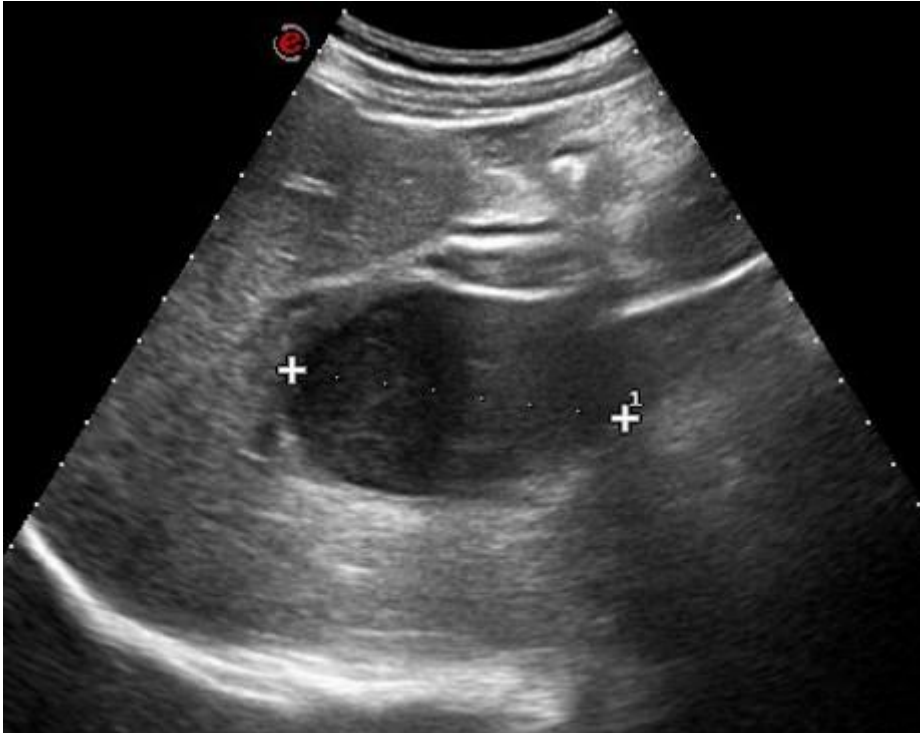
Final Diagnosis: Solitary liver amoebic abscess.

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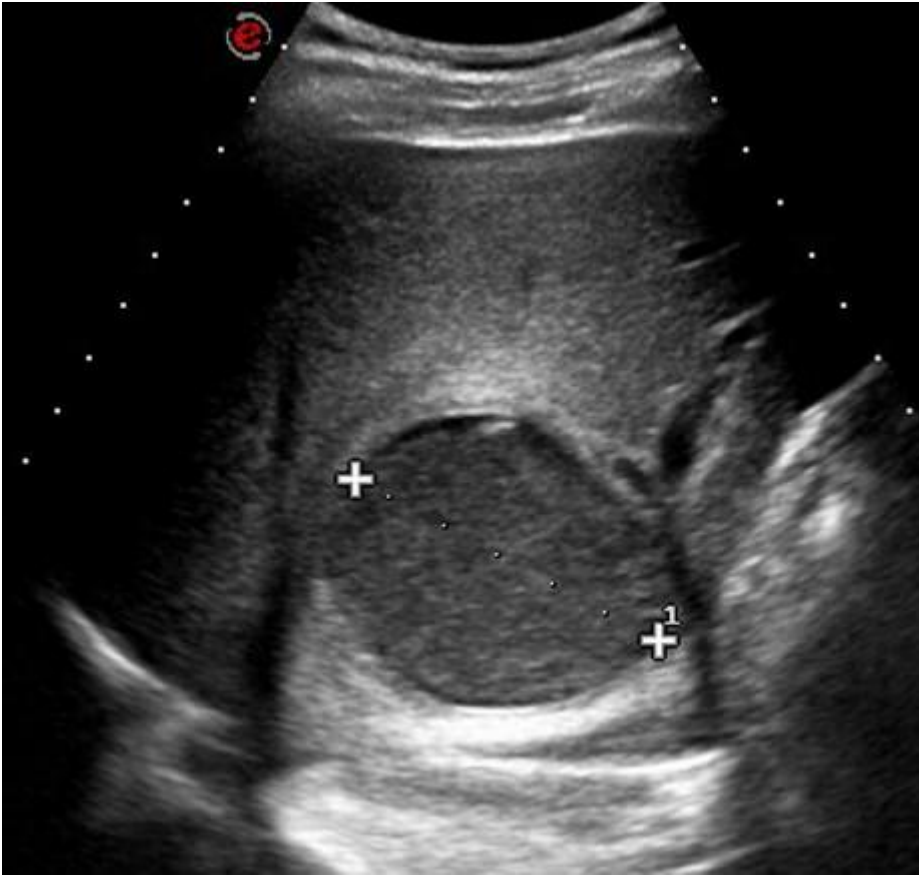
Figure 1

a



Description: Sonography revealed a large well-demarcated ovoid hypoechoic mass (calipers) located in the dorsal aspect of the right liver lobe, measuring approximately 8x5.5 cm, which caused mild ventral dislocation of the portal vein. **Origin:** Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)

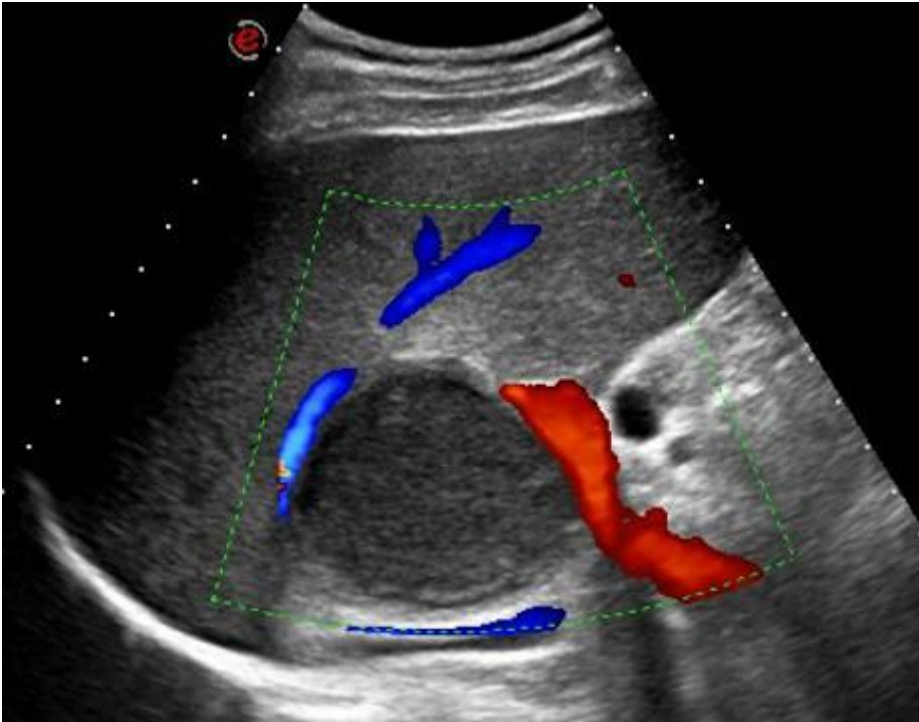
b



Description: The well-demarcated ovoid hypoechoic mass (calipers) measured approximately 8x5.5 cm and had no perceptible wall. Moderately enlarged liver with otherwise unremarkable echotexture.

Origin: Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)

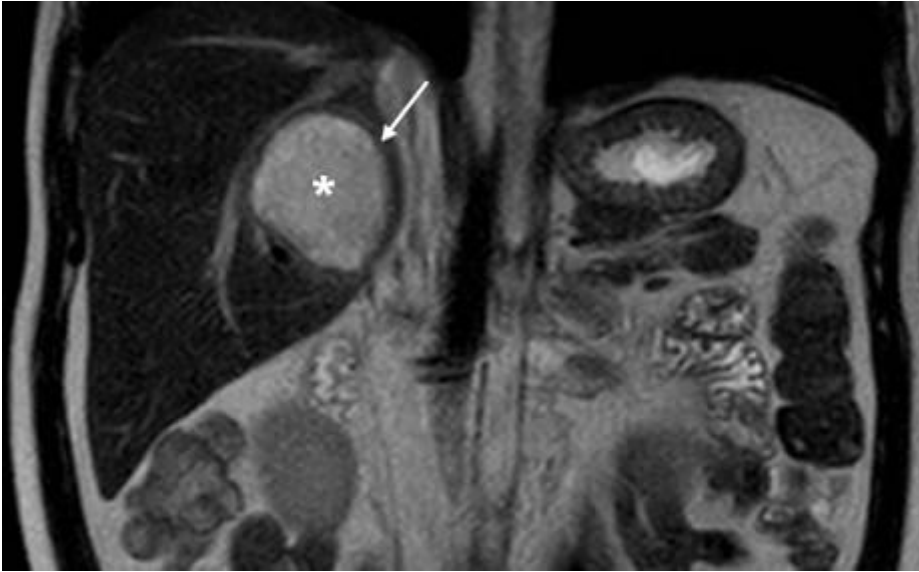
c



Description: The well-demarcated ovoid hypoechoic mass (calipers) had no perceptible wall nor intralesional signal at color-Doppler ultrasound (c), and caused compression on the inferior vena cava and mild ventral dislocation of the portal vein. **Origin:** Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)

Figure 2

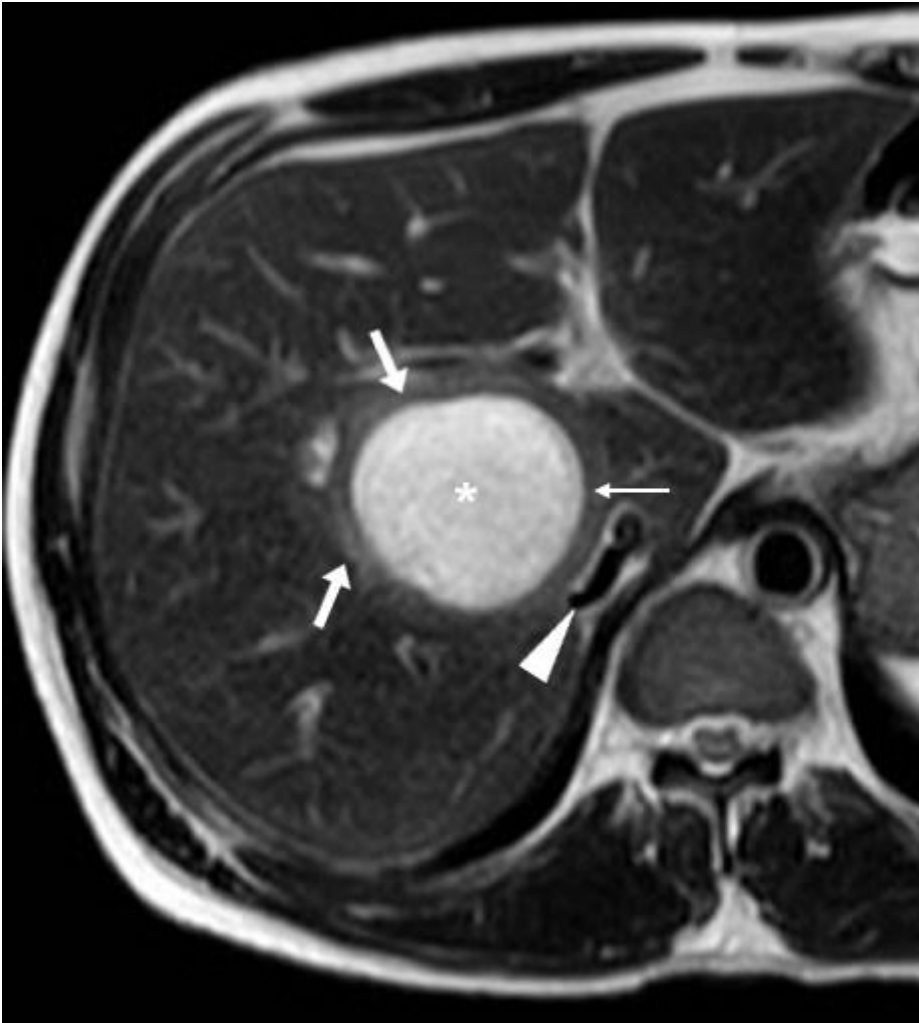
a



Description: T2-weighted images (a-b, fat-suppressed c) confirmed sizeable mass (*) in the dorsal aspect of right liver lobe, with internal fluid-like hyperintense signal, thin low-signal contour (arrows).

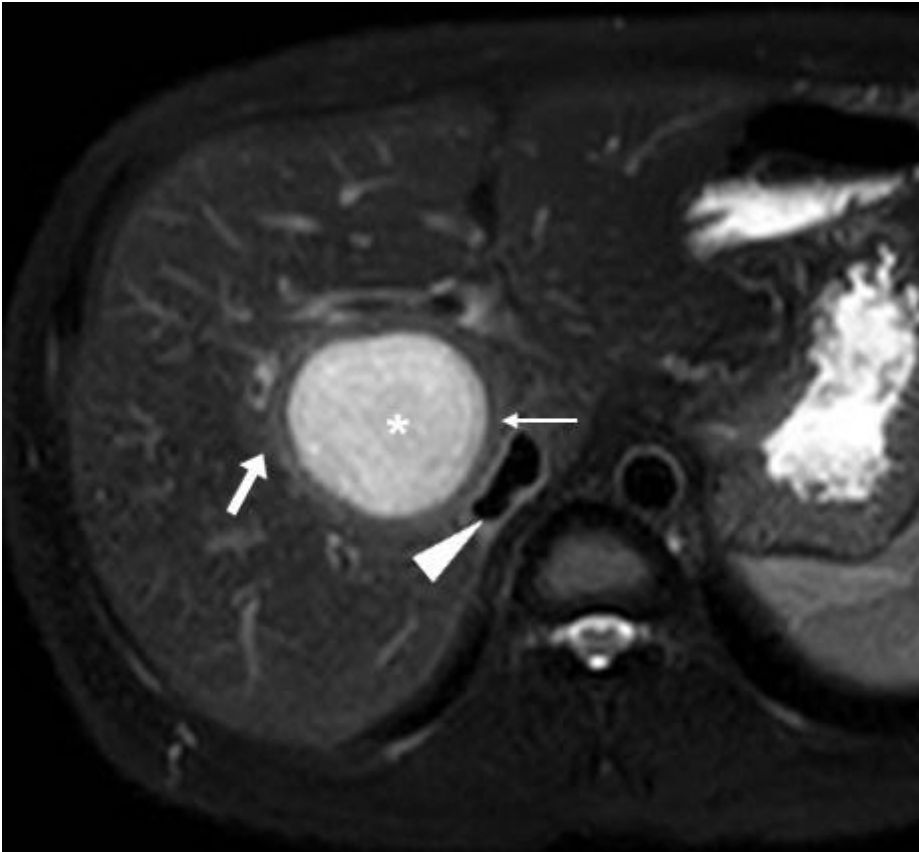
Origin: Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)

b



Description: The sizeable, well-demarcated mass (*) in the dorsal aspect of right liver lobe showed internal fluid-like hyperintense signal, thin low-signal contour (arrows) and mild oedema (arrows) of the adjacent parenchyma. Note compressed inferior vena cava (arrowheads). **Origin:** Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)

c



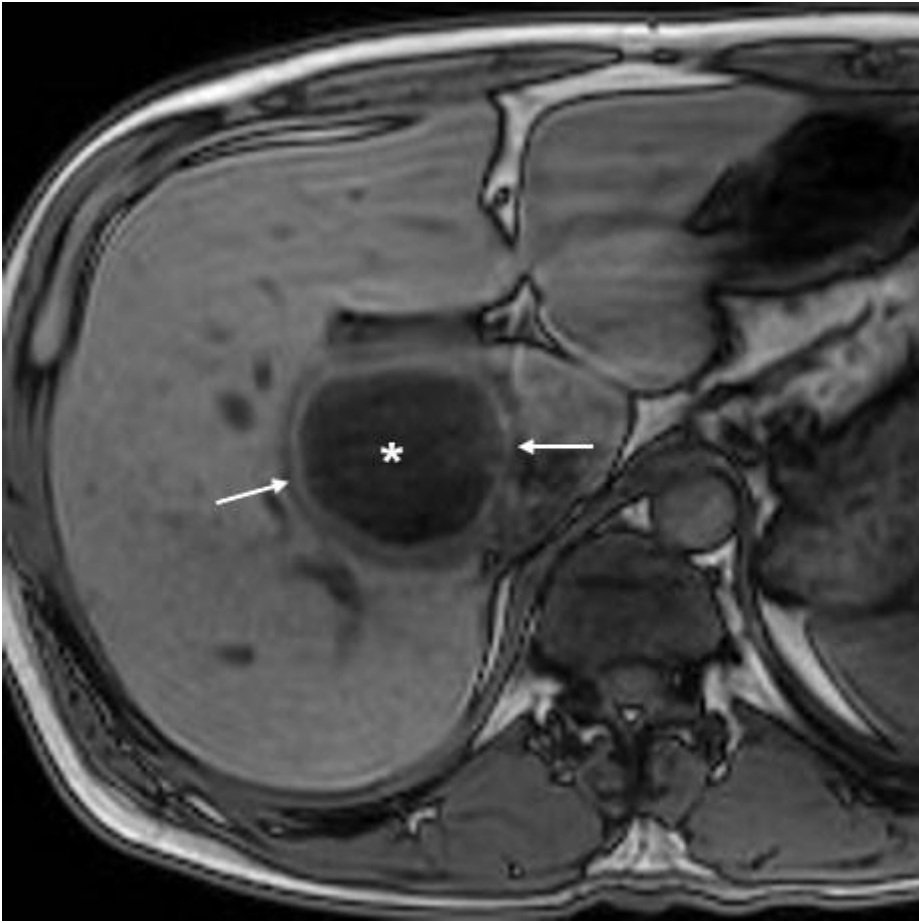
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d



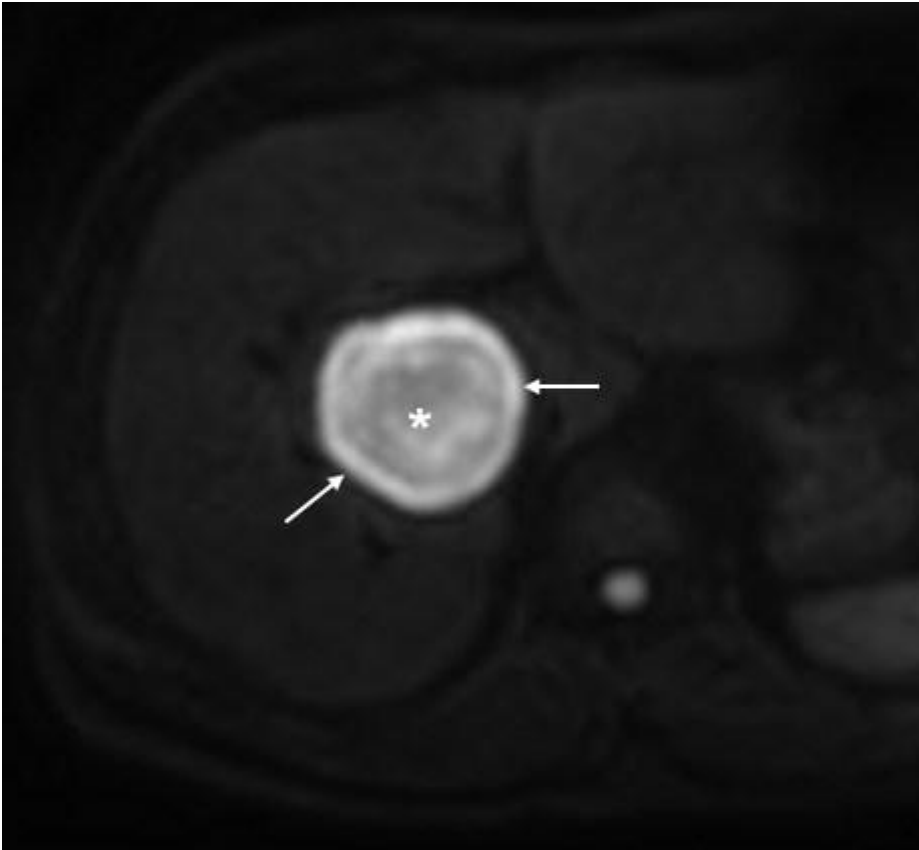
Description: On precontrast T1-weighted images (d,e) the right liver lobe mass (*) showed homogeneous, fluid-like low signal intensity; a thin regular peripheral rim (thin arrows) with intermediate signal intensity was clearly perceptible. **Origin:** Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)

e



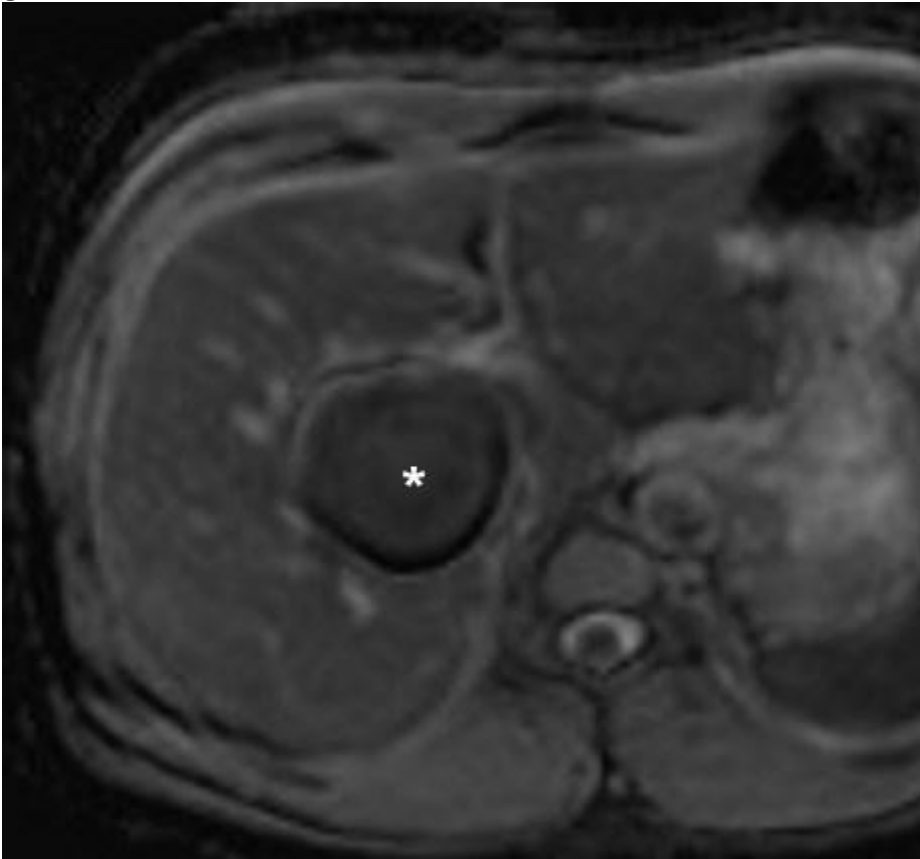
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f



Description: High (800) b-value diffusion-weighted images showed the lesion (*) to have inhomogeneous, visually hyperintense signal which was more pronounced at the periphery (thin arrows). **Origin:** Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)

g



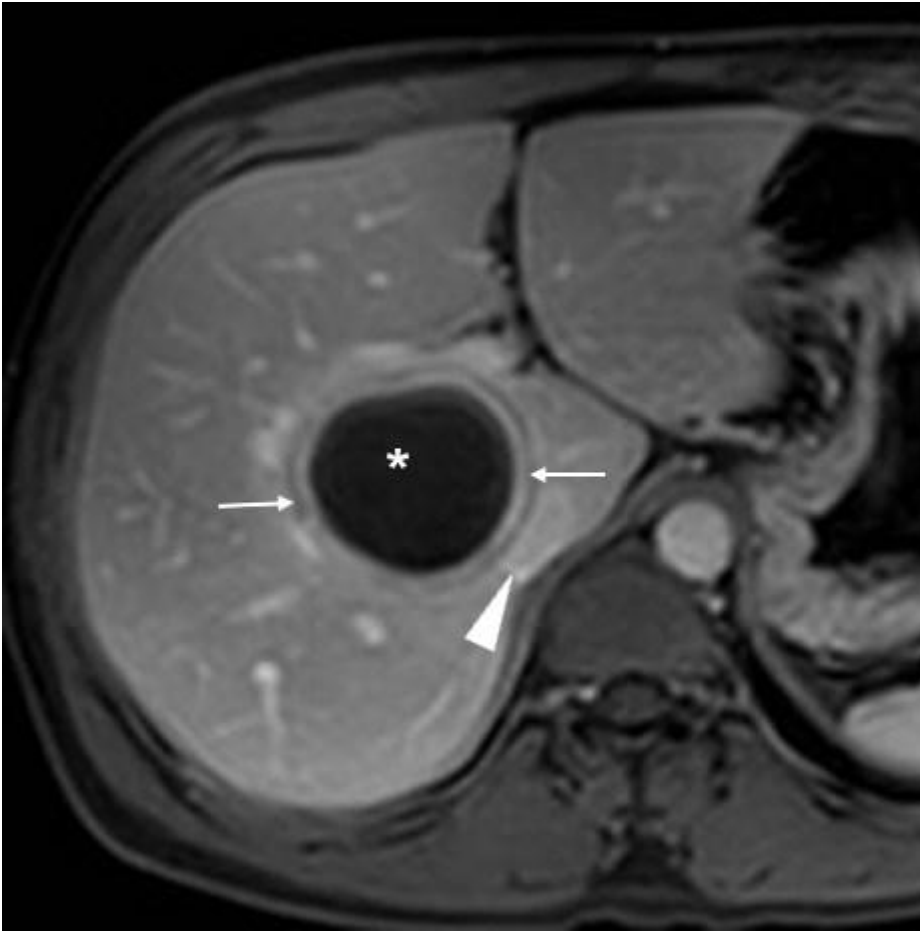
Description: Corresponding apparent diffusion coefficient (ADC) map showed strong peripheral hypointensity (measured values $0.25\text{-}0.35 \times 10^{-3} \text{mm}^2/\text{s}$), moderately restricted diffusion centrally (*, mean $0.9 \times 10^{-3} \text{mm}^2/\text{s}$). **Origin:** Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)

h



Description: After intravenous gadolinium contrast, the lesion (*) did not enhance centrally; a moderately thick uniform peripheral rim of enhancement (thin arrows) was best visible in the arterial-dominant (h) compared to the venous (i) phase. **Origin:** Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)

i



Description: After intravenous gadolinium contrast, the lesion (*) did not enhance centrally; a moderately thick uniform peripheral rim of enhancement (thin arrows) was best visible in the arterial-dominant (h) compared to the venous (i) phase. **Origin:** Tonolini M, Radiology Department, "Luigi Sacco" University Hospital – Milan (Italy)