Gallbladder perforation complicated by intrahepatic abscess: multimodal imaging diagnosis
Published on 21.09.2011

DOi: 10.1594/EURORAD/CASE.9573
ISSN: 1563-4086
Section: Abdominal imaging
Area of Interest: Biliary Tract / Gallbladder
Procedure: Cholangiography
Imaging Technique: CT
Imaging Technique: MR
Imaging Technique: Ultrasound
Special Focus: Acute Case Type: Clinical Cases
Authors: Tonolini Massimo, MD; Ippolito Sonia, MD; Norsa Alba H., MD.
Patient: 76 years, female

Clinical History:

Elderly woman with longstanding cholelithiasis, complaining of persistent fever, right hypocondrium pain, malaise and progressive weight loss for 3 months. Moderate pain evoked during liver palpation without frank Murphy’s sign. Mild anaemia (12.1 g/dL), raised inflammatory markers (8800/mmc neutrophils, C-reactive protein 138 mg/L), ALP, GGT and LDH enzymes.

Imaging Findings:

Ultrasound performed at another institution (not shown) detected cholelithiasis, gallbladder mural thickening and a vast hypoanchoic inhomogeneous pericholecystic lesion, initially interpreted as gallbladder cancer with parenchymal invasion.

Transferred to our hospital, the patient underwent contrast-enhanced MDCT with multiplanar reformations: a large multilobular, centrally hypodense lesion with peripheral enhancement occupied most of 4th and 5th liver segments, abutting the thickened enhancing gallbladder fundus.

Further investigation with contrast-enhanced MRI confirmed internally fluid-like liver abscess surrounded by oedematous parenchyma and allowed identification of fistulisation to the discontinuous gallbladder fundus. MRCP excluded abnormalities of both intrahepatic and common bile ducts.

Following MRI, focused ultrasonographic re-evaluation confirmed gallbladder with sludge content and dominant obstructing infundibular stone, plus fistulous communication identifiable between its fundus and adjacent hypoanchoic liver lesion.

Laparotomic surgery (including cholecystectomy with liver abscess drainage) and pathologic findings confirmed acute and chronic cholecystitis complicated by fistulous communication with intrahepatic abscess.

Discussion:

Gallbladder perforation (GBP) is a rare but life-threatening complication of cholecystitis. Risk factors include advanced age, arteriosclerosis, diabetes, immunosuppression and steroidal treatment. GBP may occur acutely during cholecystitis or weeks after onset. Pathogenesis involves overdistension and increased intraluminal pressure
from neck cystic duct obstruction causing mural oedema, ischemia and gangrene [1, 2].

Often GBP manifests acutely with right upper or diffuse abdominal pain, fever and vomiting along with variable peritoneal irritation, local tenderness or positive Murphy’s sign. Conversely, some patients present insidiously with malaise, weight loss and a palpable mass, mimicking a malignant process [1-4].

According to the 1934 Niemeier classification, spontaneous GBP is classically categorised as acute (type 1) with biliary peritonitis, subacute (type 2) with pericholecystic abscess and chronic (type 3) forms with fistulisation between the gallbladder and adjacent organs. Intrahepatic perforation with cholecystohepatic communication and liver abscess formation is even rarer, with less than 15 cases reported in literature, mostly diagnosed weeks to months after onset of acute cholecystitis symptoms [1, 5, 6].

Ultrasound may detect signs of cholecystitis along with most hepatic abscesses with varying degrees of internal echoes, but the gallbladder wall defect is rarely identified and misinterpretation as malignancy is not uncommon [3, 5, 6].

Currently, cross-sectional imaging allows correct diagnosis of complicated cholecystitis, differentiation from malignancy, planning and timing of laparoscopic or laparotomic surgery. Most usually, GBP is preoperatively diagnosed with CT, through identification of mural discontinuity, intramural/intraluminal gas or membranes, intraperitoneal air or ascites. Close inspection of the gallbladder wall may allow (in 70% of cases) identification of defects indicating perforation, most usually at the fundus [3, 7]. As with this case, pericholecystic or hepatic abscesses appear as unilocular hypoattenuating or otherwise complex, septated cystic lesions, usually well-demarcated with rim enhancement, whereas intralesional gas is uncommon [3, 4, 8].

MRI diagnoses acute cholecystitis and complications, proving useful with equivocal sonographic findings: abscesses appear as solitary or multilocular fluidlike lesion, usually with low T1 and high T2 signal intensities depending on their protein content, enhancing walls and identifiable perilesional oedema [4, 9]. In this patient, MRI allowed precise identification of gallbladder fundus perforation with cholecystohepatic fistulisation causing liver abscess formation.

**Differential Diagnosis List:**
- Intrahepatic abscess due to perforated cholecystitis with cholecystohepatic communication, Acute uncomplicated cholecystitis, Emphysematous cholecystitis, Chronic cholecystitis, Amoebic liver abscess, Echinococcosis (hydatid disease), Gallbladder carcinoma with liver invasion

**Final Diagnosis:** Intrahepatic abscess due to perforated cholecystitis with cholecystohepatic communication

**References:**


literature and Niemeier's classification. Eur J Gastroenterol Hepatol 20:240-244 (PMID: 19959520)
**Figure 1**

*a*

**Description:** On unenhanced CT, a dominant calcific stone occupies the gallbladder neck. **Origin:** Tonolini M, Radiology Department, “Luigi Sacco” University Hospital, Milan (Italy)

*b*

**Description:** On unenhanced CT, most of the 4th and 5th liver segments are involved with a large hypodense, apparently septated lesion. **Origin:** Tonolini M, Radiology Department, “Luigi Sacco” University Hospital, Milan (Italy)
Description: During the portal venous phase, the large liver lesion shows internal non-enhancing fluidlike content and peripheral rim enhancement, consistent with an abscess. **Origin:** Tonolini M, Radiology Department, “Luigi Sacco” University Hospital, Milan (Italy)

Description: Coronal reformations better depict trilobular shape of the liver abscess, showing peripheral rim enhancement and hypodensity of the adjacent liver parenchyma. **Origin:** Tonolini M, Radiology Department, “Luigi Sacco” University Hospital, Milan (Italy)
Description: The caudalmost portion of the abscess abuts the thickened, enhancing gallbladder fundus.

Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital, Milan (Italy)
Description: Retrospectively, ultrasound confirms hypo-anechoic liver abscess in the 4th and 5th segments. Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital, Milan (Italy)
**Description:** Moderately distended gallbladder with thickened walls, neck-obstructing stone and remaining lumen occupied by biliary sludge. **Origin:** Tonolini M, Radiology Department, “Luigi Sacco” University Hospital, Milan (Italy)
Description: Communication between the caudalmost portion of the abscess and the gallbladder fundus consistent with cholecystohepatic fistulisation is identifiable (arrow). Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital, Milan (Italy)
Figure 3

Description: Unenhanced T1- (a), STIR (b) and T2-weighted (c) axial images confirm fluid-like internal signal of liver abscess. Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital, Milan (Italy)
**Description**: Unenhanced T1- (a), STIR (b) and T2-weighted (c) axial images confirm fluid-like internal signal of liver abscess. **Origin**: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital, Milan (Italy)

**Description**: Coronal T2-weighted image confirms large trilobular liver abscess with surrounding oedematous parenchyma. **Origin**: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital, Milan (Italy)
Description: Following intravenous gadolinium, on axial T1-weighted image rimlike contrast enhancement is seen in the relatively thin abscess walls, whereas liquefied content remains hypointense. Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital, Milan (Italy)

Description: Detailed T2-weighted (f, g) and postcontrast T1-weighted (h) images identify fistulisation between the gallbladder fundus and the caudalmost portion of the liver abscess (arrows). Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital, Milan (Italy)
**Description:** Detailed T2-weighted (f, g) and postcontrast T1-weighted (h) images identify fistulisation between the gallbladder fundus and the caudalmost portion of the liver abscess (arrows).

**Origin:**
Tonolini M, Radiology Department, “Luigi Sacco” University Hospital, Milan (Italy)
Description: MR cholangiography image confirm distended gallbladder with dominant stone at its neck. No visible abnormalities of the main bile duct. Origin: Tonolini M, Radiology Department, “Luigi Sacco” University Hospital, Milan (Italy)