Background: A 62-year-old Turkish man was referred for ultrasonography of a palpable mass in the left upper abdomen. Past medical history revealed emergency laparoscopic cholecystectomy for acute calculus cholecystitis about 6 months earlier in Turkey. On clinical examination there was a small palpable mass with mild tenderness in the left subcostal region. Due to a language barrier it was uncertain if the swelling was present before or after the cholecystectomy. Ultrasonography revealed a calcified lesion. The differential diagnosis at that time was dystrophic calcifications or a soft tissue tumor with calcification. However, additional conventional imaging of the left subcostal region revealed no calcifications. In the work-up of a possible soft tissue tumor MRI was performed.
Work-up

Ultrasonography of the left upper abdomen (sagittal section) (Fig. 1) shows a hypo-echogenic area, measuring 2.4 cm in diameter, and containing a curvilinear hyper-echogenic structure with posterior or acoustic shadowing is observed just dorsal to the left transversus abdominis muscle. Color Doppler clearly depicts hypervascularization in the peripheral hypo-echogenic area.

MRI of the abdomen (Fig. 2) shows on sagittal T2-weighted image (A) a well-defined hypo-intense nodule surrounded by a hyper-intense rim and a zone of intermediate signal intensity. The nodule is located in the abdominal wall just dorsal to the left transversus abdominal muscle, and is penetrating the peritoneal fascia. Coronal fat-suppressed T2-weighted image (B) demonstrates high signal intensity area in the center of the nodule and an outer rim of high signal intensity with probably edema in the surrounding tissue. On axial T1-weighted image (C), the nodule is hypo-intense with a small hyper-intense center and a hyper-intense peripheral rim. The surrounding fatty tissue has an intermediate signal intensity. Axial fat-suppressed gadolinium-enhanced T1-weighted image with horizontal saturation slab (D) shows an irregular area of enhancing mesenteric fat tissue and enhancing abdominal muscle. The nodule itself shows no enhancement.

Axial fat-suppressed gadolinium-enhanced T1-weighted image with horizontal saturation slab (E) visualizes a similar nodule with identical enhancement characteristics in the mesentery just below the linea alba. This nodule was not seen on the initial US examination.

Radiological diagnosis

Based on the imaging features, and taking the previous laparoscopic cholecystectomy into account, the final diagnosis was spilled gallstones with surrounding inflammation. Diagnostic surgery was performed of the palpable mass in the left upper abdomen and confirmed the diagnosis. The other gallstone below the linea alba was asymptomatic and therefore intervention was deferred.

Discussion

Laparoscopic cholecystectomy (LC) is currently the method of choice in the treatment of symptomatic gallstones. Two most frequent complications of LC are bile duct injury and spillage of gallstones due to gallbladder perforation. The incidence of spilled gallstones varies from 5.4-19%. Gallbladder perforation and consequently spillage of stones may occur during dissection of the gallbladder off the liver bed, due to grasping and traction with forceps, or during extraction through one of the narrow incisions. Spilled gallstones are often asymptomatic but in 0.1-0.3% of the cases they can lead to complications. The most common complications are abscess in the abdominal wall, intra-abdominal abscess, subhepatic or subphrenic abscess and, less frequently, fistulas. There is a reported 4 months to 10 years mean duration for the development of an abscess. The unusual sites of complications are probably a consequence of pneumoperitoneum and peritoneal irrigation which may disperse the stones within the peritoneal cavity. Consequently, due to the unusual site of complications and lack of documentation in the patient’s medical history, diagnosing stone spillage is often quite challenging. Hence, with the use of US, CT scan, and MRI, the radiologist plays an important role in the diagnosis of spilled stones.

US usually shows a hypo-echogenic fluid collection in which there are multiple hyper-echogenic foci with posterior acoustic shadowing representing the spilled stones within an abscess.

CT scan can easily depict calcified stones as hyperdense nodules, whereas stones with low calcium content are often missed.

On MRI most gallstones are iso- to hyper-intense on T1-weighted images and hypo-intense on T2-weighted images. Furthermore, most gallstones are best visualised on sequences without fat suppression, so the stones are contrasted against the high signal from the surrounding fat.

Abscess formation due to spilled gallstones can be treated by an open approach or laparoscopically and the indication of which technique to use depends on the patient’s medical history and the site of the lost gallstones.

The best way to prevent complications of lost gallstones is retrieval of the accessible gallstones with a bore suction device or irrigation of the abdominal cavity. If the stones cannot be retrieved, good practice dictates that the patient is informed, the general practitioner is notified and, most of all, that it is clearly documented in the patient’s medical history.

Bibliography