Case 4080

Contrast-enhanced gray-scale harmonic ultrasound and CT-scan of a gallbladder tumor and liver metastases

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Patient: 56 years, female

Clinical History:

We present gray-scale, Power Doppler, contrast-enhanced Power Doppler, gray-scale harmonic ultrasound, and CT-scan imaging of a gallbladder tumour and of liver metastases.

Imaging Findings:

A 56 year woman was admitted to hospital because of asthenia and right upper quadrant pain. She had no special medical history. Native gray-scale ultrasound showed a heterogeneous liver and inhomogeneous material fulfilling the lumen of the gallbladder. At Power Doppler, some vessels in the wall of gallbladder were showed, and after intravenous injection of a second generation agent (Sonovue®, Bracco Imaging, Milan, Italy), some vessels inside the masse of the lumen of the gallbladder were noticed, excluding haematoma or sludge in the gallbladder. A better demonstration of vascularity of the tumour of the gallbladder was done by contrast-enhanced gray scale harmonic ultrasound. This modality also suggested multiple metastases in the liver. A CT-scan of thorax and abdomen confirmed the ultrasound findings, and showed no other lesion. A poorly differentiated carcinoma was found on a metastase liver biopsy. The final diagnosis of an adenocarcinoma of the gallbladder with liver metastases was retained.

Discussion:

Among every types of cancer, gallbladder carcinoma is infrequent. It is the 6th most common gastrointestinal malignancy, after colon, pancreas, stomach, liver, and oesophagus. Although it represents only 3% of intestinal neoplasms, its prognostic is very poor. Except early-stage cases detected incidentally at cholecystectomy for gallstone disease, more than 75% are unresectable at presentation, and have a 95% 1-year mortality rate. Symptoms are late and not specific, and include right upper quadrant pain, weight loss, jaundice, and palpable mass. Women are more frequently affected (M:F = 1:3 – 1:4). Median age is around 60-70 years. Gallstones coexist in 60-90% of patients. Tumours of the gallbladder present as diffusely infiltrating lesion in about two third of cases, or as an intraluminal polypoid growth in about one third. About 75% of gallbladder cancers are adenocarcinoma (papillary, intestinal, mucinous, signet-ring cell, clear cell). Other rarer histological types exist, divided into epithelial (adenosquamous, squamous, small oat cell, undifferentiated) and non epithelial types (carcinoid, carcinosarcoma, basal cell, lymphoma). Main differential diagnosis for intraluminal mass of the gallbladder are polyps (cholesterol, adenomatous, hyperplastic, or granulation polyps), tumefactive sludge, haematoma, empyema,
xanthogranulomatous cholecystitis, tumours invading gallbladder fossa (liver, biliary tract, pancreas, duodenum), and metastases (melanoma, leukaemia, lymphoma). Ultrasound is the first line diagnostic procedure for analysing the gallbladder. Usual features are a heterogeneous mass replacing the gallbladder lumen or an irregular gallbladder wall. Color Doppler, and Power Doppler can improve the differentiation between tumours and tumour-like lesions. For example, tumefactive sludge, haematoma, and empyema will not show intrinsic vessels. Contrast agent can improve the sensitivity of Color and Power Doppler ultrasound. Contrast-enhanced harmonic ultrasound of the liver is now recognised as a powerful tool to detect and characterise focal liver lesions, including metastases. Our case suggests that contrast-enhanced harmonic ultrasound of gallbladder can be an interesting modality: vascularity of the tumour was indeed very well demonstrated, better than Power Doppler, and as good as CT-scan imaging. CT-scan or MRI is very useful to demonstrate invasion of surrounding structures, lymphatic and intraperitoneal spread. Cholangiography, angiography, and cholecystosintigrams are other less frequently used imaging modalities. Treatment is surgical for localized cancer (cholecystectomy, extended cholecystectomy, or anatomic liver resection), or palliative for advanced cancer (for example endoscopic or percutaneous biliary stent to relieve obstructive jaundice, or percutaneous celiac ganglion nerve block to reduce pain). Chemotherapy and radiotherapy are poorly efficient.

**Differential Diagnosis List:** Adenocarcinoma of the gallbladder with multiple liver metastases

**Final Diagnosis:** Adenocarcinoma of the gallbladder with multiple liver metastases

**References:**


Figure 1

Description: 1. ultrasound of the liver: heterogeneous aspect of the right hepatic lobe

Origin:
Figure 2

Description: 2. contrast-enhanced harmonic ultrasound of the liver, in the delayed phase (> 2min): a large “punched out” hypoechoic lesion in the segment V of the liver is easily identifiable, suggestive of a metastase (arrows) Origin:
Description: 3. ultrasound of the gallbladder: the lumen of the gallbladder is almost completely fulfilled by a heterogeneous mass, suggestive of a gallbladder tumour (cursors) Origin:
Description: 4. Power Doppler ultrasound of the gallbladder: some vessels are seen in the gallbladder, mainly in its wall (arrows) Origin:
Description: 5. contrast-enhanced Power Doppler ultrasound of the gallbladder: vessels are better seen, especially in the center of the gallbladder tumour (arrows) Origin:
Figure 6

Description: 6. contrast-enhanced harmonic ultrasound of the gallbladder (10 seconds after intravenous injection of Sonovue®): slight enhancement is observable in the posterior part of the gallbladder tumour Origin:
Description: 7. contrast-enhanced harmonic ultrasound of the gallbladder (30 seconds after intravenous injection of Sonovue®): strong enhancement of the posterior part of the lumen mass, corresponding to the vessels of the gallbladder tumour (arrows) Origin:
Description: 8. native CT-scan of the superior abdomen: isodense (around 45 H.U.) material fulfilling the lumen of the gallbladder (arrow); some fluid is seen around the liver Origin:
Description: 9. arterial CT-scan of the superior abdomen: enhancement (around 90 H.U.) of the mass of the lumen of the gallbladder (arrow) Origin:
Figure 10

Description: 10. venous CT-scan of the superior abdomen: large metastase of the segment V of the liver, corresponding to the focal lesion seen in the contrast-enhanced harmonic ultrasound (arrow); two additional small metastases are also demonstrated in the segment IVB (arrowheads) Origin: