The many faces of gallbladder cancer: a pictorial review

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Learning objectives

- To alert to the importance of gallbladder cancer.
- To describe the clinical and imaging findings of gallbladder cancer based on a review of pathologically confirmed cases diagnosed in our institution.

Background

Epidemiology: fifth most common gastrointestinal cancer; the most common type of biliary cancer; median age of presentation is 72 years; diagnosis is more common in women and in the elderly.

Clinical presentation: early symptoms of gallbladder cancer overlap with those attributed to gallstone disease; unspecific symptomatology (chronic abdominal pain, weight loss, and anorexia) leads to diagnosis at advanced inoperable stages.

Risk factors: *demographic* - female gender, postmenopausal status, age, and increased body mass; *environmental* - cigarette smoking, and exposure to chemicals in rubber, automobile, wood finishing, and metal fabricating industries; *chronic infections* (*Salmonella typhi*); inflammatory status: porcelain gallbladder (figure 1), primary sclerosing cholangitis and cholelithiasis (figure 2); congenital conditions, like low insertion of the cystic duct (figure 3).

Figure 2. Abdominal x-ray showing a porcelain gallbladder (white arrow).

Figure 1. Abdominal x-ray showing radiodense gallstones (white arrow).

Figure 3. Contrast-enhanced CT showing a low insertion of cystic duct (white arrow).

Pathological aspects: the lack of muscularis mucosae and subserosa layers eases the involvement of adjacent organs by the gallbladder carcinoma; based on American Joint Committee on Cancer (AJCC) the gallbladder cancer can be staged according to the TNM system.

Surgical treatment: early stages may benefit from extended resection after cholecystectomy; in advanced stages, radical surgery is controversial.

Ultrasound features of gallbladder carcinoma:

- ✓ gallstones with absence of other sonographic findings (figure 4);
- ✓ an intraluminal polypoid lesion (figure 5);
- ✓ a focal or diffuse asymmetric parietal thickening (figure 6);
- ✓ acute or chronic cholecystitis (figure 7 and 8);
- ✓ gallstones associated with a gallbladder mass (figure 9);
- ✓ intra-hepatic bile ducts dilatation and heterogeneous mass filling the gallbladder lumen and invades the adjacent liver/duodenum (figure 10).

Figure 4. Ultrasound scan showing a normal gallbladder with multiple gallstones (red arrow); the histological finding was an intra-epithelial biliary neoplasia at the fundus.

Figure 5. A) and B) Ultrasound scan showing a polypoid lesion (red arrow) associated with diffuse parietal thickening, and gallstone (yellow arrow); the histologic finding was a poorly differentiated adenocarcinoma, infiltrating the wall, and extending to the perimuscular layer; serosa was intact.

Figure 6. Ultrasound scan showing a gallstone (red arrow) associated with focal parietal thickening of the fundus (yellow arrow); histological proven body and fundus well-differentiated adenocarcinoma extending to the perimuscular layer.

Figure 7. Ultrasound scan showing signs of acute cholecystitis: enlarged gallbladder and diffuse parietal thickening (red arrow); histological proven diffuse well-differentiated adenocarcinoma of gallbladder wall.

Figure 8. Ultrasound scan showing signs of acute cholecystitis: enlarged gallbladder, diffuse parietal thickening, sludge (red arrow) and gallstones (yellow arrow); the histological finding was a gallbladder body poorly differentiated adenocarcinoma within a polypoid mucosal appearance.

Figure 9. Ultrasound scan showing an irresectable gallbladder mass (red star) replacing the normal appearance of the gallbladder associated with gallstones (red arrows); the histological diagnosis of mucinous adenocarcinoma was made from resected peri-vesicular metastatic lymph nodes.

Figure 10. Ultrasound scan showing a gallbladder mass (between the callipers 2) replacing the normal appearance of the gallbladder, associated with gallstones (red arrow) and biliary intra-hepatic ducts dilatation (yellow arrows). Also visible are linear hyperechoic images (small blue arrow) within the gallbladder, that correspond to free gas. The histological finding was a tubular adenocarcinoma.

CT features of gallbladder carcinoma:

- ✓ an intraluminal polypoid lesion (figure 11);
- ✓ an asymmetric, irregular wall thickening that enhances during the arterial phase (figure 12);
- ✓ a heterogeneous mass within the gallbladder fossa
- ✓ a hepatic abscess (figure 14);
- ✓ a mass that invades the adjacent liver parenchyma or the duodenum (figure 15);
- ✓ diffuse liver metastatic disease (figure 16).

Figure 12. Axial non-contrast-enhanced CT showing diffuse gallbladder wall thickening (yellow arrow). Exploratory laparotomy revealed an irresectable gallbladder tumor. Biopsy of adjacent lymphadenopathies (red arrow) diagnosed a metastatic mucinous adenocarcinoma.

Figure 13. Axial contrast-enhanced CT showing a gallbladder mass (yellow arrow). Intra-hepatic biliary dilatation is also seen (red arrows). The histological finding was a poorly differentiated adenocarcinoma.

Figure 14. Axial contrast-enhanced CT showing a gallbladder wall thickening and ulceration (yellow arrow), adjacent to a large hepatic abscess (red arrows); the histological finding was a well-differentiated papillary adenocarcinoma with muscular layer invasion and extensive hepatic necrosis.

Figure 16. Contrast-enhanced computed tomography showing multiple hepatic metastases (red arrows). Ascites is also seen (yellow arrow). The histological finding after cholecystectomy revealed a mucinous differentiated gallbladder adenocarcinoma infiltrating the wall layers.

Figure 15. Non-contrast-enhanced computed tomography in a 94-year-old woman showing a gallbladder mass that infiltrates the adjacent liver parenchyma. We can also see oral contrast within the gallbladder lumen (red arrow), because of a duodenum-gallbladder fistula. Also present is a radiodense gallstone (yellow arrow). The histological diagnosis of tubular adenocarcinoma was made from endoscopic biopsy of the tumor invaded intestinal mucosa.

Figure 11. Axial contrast-enhanced CT showing a polypoid endoluminal gallbladder mass (red arrow). The histological finding was a well-differentiated papillary adenocarcinoma.

Our series: 53% of our patients were women; median age at presentation was 66,2 years; 73% presented in the emergency department with an acute onset of symptoms; in 2/3 of our patients, gallbladder carcinoma was an incidental histological finding after cholecystectomy; all patients underwent a CT scan for staging; six patients were submitted to an extended resection.

Conclusion: The awareness of “the many faces of gallbladder cancer” is crucial to promptly recognise suspicious signs of this pathology to provide an early diagnosis and to prevent the high mortality related to this type of cancer.