Sonographic findings in Gallbladder Carcinoma

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Learning objectives

To describe the sonographic findings of gallbladder carcinoma, in order to carry out an accurate and early diagnosis, and therefore contribute to improving the diagnosis of this disease.

Background

MATERIAL AND METHODS:

A descriptive and retrospective study was carried out. We reviewed the gallbladder carcinoma patients who had been given a sonogram and whose disease was confirmed by pathological anatomy, from the Reina Sofía University General Hospital in the period from 2000 until 2011. The sonographic findings have been described and analyzed.

RESULTS:

14 cases were found. All the patients were of Spanish nationality, with a mean age of 77 years; 8 (57 %) were female and 6 (43 %) male.

The following featured as associated risk factors: Cholelithiasis in 12 cases (86 %), smoking in 2 cases (14 %) and obesity in 3 cases (21 %).

Regarding clinical symptoms, the most frequent was intense abdominal pain which was present in 11 cases (79 %), followed by fever (4 cases), weight loss (3 cases), jaundice (3 cases), abdominal pressure (1 case) and 3 patients did not have any symptoms. TABLE Nº1.

It is because of these clinical symptoms together with the sonographic images that the most common presurgical diagnosis was acute cholecystitis (7 cases, 50 %), and gallbladder carcinoma was suspected before surgery in only 3 cases (21 %).

The most common gallbladder carcinoma in our study was adenocarcinoma registered in 11 cases (79 %), with only one case of anaplastic carcinoma (FIG. ¹) and one case of lymphoepithelioma-like carcinoma.

With regard to the sonographic characteristics found, we could include them as part of the morphological sonographic patterns already reported in the literature. In our study, the most prevalent pattern was focal or diffuse thickening of the wall present in 8 cases (57 %) (FIG. ² to 4). In one case (7 %) the pattern involved a mass replacing the gallbladder (FIG. ¹ 5), and in the other 4 cases (29 %) the pattern was of an intraluminal mass, where
3 of them also had focal wall thickening (FIG. o 6 to 7). One patient with gallbladder carcinoma did not present with any of these patterns, reporting a sonographically atrophic and contracted gallbladder (FIG o 8). TABLE Nº2.

Following the TNM classification system for gallbladder cancer of the American Joint Committee on Cancer (AJCC), 4 patients in our study (29%) were reported with a Tis category primary gallbladder tumour (carcinoma in situ), of which two presented with an intraluminal growth mass in the sonographic images; whereas the other two cases involved a diffuse thickening of the wall. One T1b was recorded in a patient with diffuse and irregular thickening of the gallbladder wall. Of the cases of primary T2 tumour (6 cases, 43 %), 3 involved diffuse thickening of the wall in the ultrasound, 1 case had an intraluminal mass with diffuse thickening of the wall, one case had focal thickening with a polypoidal mass with intraluminal growth and another case was shown to be an atrophic and contracted gallbladder in the ultrasound images. Of the two cases with a primary T3 tumour, one of these had a mass pattern replacing the gallbladder and the other case had a diffuse thickening of the wall and a mass protruding from the wall, with growth towards the outside of the organ. In our only case of primary T4 tumour, the ultrasound and tomographic images revealed an irregular and abnormal gallbladder with a loss of its morphology, and a mass protruding outside the wall of the gallbladder. TABLE Nº 3.

It was found that in 7 cases (50%), the only initial test carried out before the surgical act was an ultrasound, given that the clinical diagnosis was cholecystitis and an abdominal CT scan with i.v. contrast was only carried out in two of these patients due to suspected gallbladder perforation. An abdominal CT scan was also performed on the 3 patients with presurgical suspicion of carcinoma, in one case of cholelithiasis with an antecedent of acute pancreatitis and in one case of choledocholithiasis.

DISCUSSION:

Gallbladder carcinoma is a rare neoplasia that accounts for between 2 and 4 % of malignant tumours. It is the most frequent malignant neoplasia of the biliary system and the fifth most common of the digestive apparatus. It is more common in Latin American countries (a high-risk population), and less common in northern Europe (a low-risk population). Spain has an intermediate incidence level.

In the present study, and as reported in the literature, the most common associated risk factor was cholelithiasis (86%), something that could cause the chronic irritation and inflammation of the gallbladder, potentially leading to dysplasia and the subsequent appearance of carcinoma.

Its clinical presentation is often confused with acute benign inflammatory pathology (acute cholecystitis), as occurred in 50 % of cases in our study. Similarly in our series, of the 3 cases with preoperative suspicion of carcinoma, only 2 patients experienced abdominal pain and in the other case there were no associated signs or symptoms.
Therefore, the ultrasound, in some cases supported by the tomography, guided us towards the diagnosis of gallbladder neoplasia.

With regard to the sonographic patterns, the most common type of presentation found in the literature is a mass replacing the gallbladder (40-65 %), seen as a mass of heterogeneous echoes with irregular edges, with areas of necrosis or calcification on the inside. The echogenic foci and acoustic shadows associated with the tumour could be related to the coexistence of lithiasis. Direct spread to the liver and biliary tree is common, without being able to establish a sonographic limit between the mass replacing the gallbladder and the liver parenchyma. A differential diagnosis should be made mainly between metastasis, hepatocarcinoma, and cholangiocarcinoma. In our study, the case with a mass pattern directly spread to the liver being classified as T3.

The second most frequent pattern is diffuse or focal thickening of the wall (20-30%), which is the most difficult type of presentation to diagnose, given that it is very unspecific and occurs in many kinds of gallbladder and extra-gallbladder pathologies. However there are some data suggestive of malignancy that we should take into account: Irregular wall thickening greater than 12 mm: marked wall asymmetry; loss of the interface between the gallbladder and the liver; wall calcifications; adenopathies; and biliary obstructions. In our study this pattern occurred in both early stage tumours (carcinoma in situ), and T2 and T3 stage tumours.

The third intraluminal mass pattern occurred in 15- 25 % of cases, and presents as well-defined, homogenous nodules or polyps which are fixed to the wall, without posterior shadowing. When they are less than 10 mm they are indistinguishable from cholesterol or adenoma polyps. They usually represent early-stage neoplasias. In our study there were 2 cases of carcinoma in situ and another 2 cases of primary tumour (stage T2), so that as stated in the literature, this pattern is usually associated with neoplasias confined to the wall.

In our study we have used the TNM classification of the AJCC for staging primary gallbladder tumours.

**Imaging findings OR Procedure details**

All images are cases of Reina Sofia Hospital within the period stated in the job.

**Images for this section:**
Fig. 2: MODERATELY DIFFERENTIATED CARCINOMA (T2): Diffuse and irregular thickening of gallbladder wall, with contents of heterogeneous echoes and acoustic shadowing. Case Nº 1
Fig. 3: CASE Nº 1: Several stones above necrotic wall. Neoplasm infiltrating the muscular layer.
CARCINOMA POBREMENTE DIFERENCIADO. T2: IMPORTANT DESCAMADO PARIETAL, CON MASA DE ECOS HETEROGÉNEOS QUE CAMBIAN CON POSICIÓN CON MOVIMIENTOS DEL PACIENTE Y PRODUCEN SOMBRA ACÚSTICA, COMPATIBLE CON LITIASIS Y BARRO BILIAR O DETRITUS.

**Fig. 4:** POORLY DIFFERENTIATED CARCINOMA (T2): Significant thickening wall, with heterogeneous echoes mass that change position with movements of the patient and produce acoustic shadowing. This corresponds to stones, biliary sludge or detritus.
Fig. 5: GALLBLADDER CARCINOMA LINFOEPITHELIOMA LIKE (T3): Mass that replaces the gallbladder, and diffuse thickening of the wall.
Fig. 6: ANAPLASTIC CARCINOMA T2: Polypoid intraluminal mass with focal wall thickening.
Fig. 7: CARCINOMA IN SITU: Intraluminal hyperechoic mass with diffuse thickening of the wall.
Fig. 8: MODERATELY DIFFERENTIATED CARCINOMA (T2): Atrophie and contracted gallbladder with echogenic material inside and acoustic shadowing, suggestive of stones.
**CUADRO Nº 1: SÍNTOMAS PRINCIPALES EN LOS PACIENTES CON CARCINOMA DE VESICULA BILIAR**

<table>
<thead>
<tr>
<th>SÍNTOMA</th>
<th>Nº DE PACIENTES</th>
<th>PORCENTAJE DE PACIENTES (%)</th>
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</thead>
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<tr>
<td>Dolor abdominal intenso</td>
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<td>79</td>
</tr>
<tr>
<td>Mal estado general</td>
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<td>7</td>
</tr>
<tr>
<td>Ninguno</td>
<td>2</td>
<td>14</td>
</tr>
</tbody>
</table>

**Table 1:** Table 1: Main Symptoms in Patients with Gallbladder Carcinoma.
### CUADRO N° 2: NÚMERO DE PACIENTES SEGÚN PATRÓN ECOGRÁFICO.

<table>
<thead>
<tr>
<th>PATRÓN ECOGRÁFICO</th>
<th>N° DE PACIENTES</th>
<th>PORCENTAJE DE PACIENTES %</th>
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</thead>
<tbody>
<tr>
<td>Masa que reemplaza la vesícula biliar</td>
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<td>7</td>
</tr>
<tr>
<td>Engrosamiento de la pared vesicular focal o difuso</td>
<td>8</td>
<td>57</td>
</tr>
<tr>
<td>Masa intraluminal</td>
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<td>29</td>
</tr>
<tr>
<td>Ninguno</td>
<td>1</td>
<td>7</td>
</tr>
</tbody>
</table>

**Table 2:** TABLE 2: PATIENT NUMBER ACCORDING ECHO PATTERN

<table>
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<th>PATRÓN ECOGRÁFICO</th>
<th>ESTADIO DEL TUMOR PRIMARIO</th>
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<tr>
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<td>Tis</td>
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<tr>
<td>Masa que reemplaza la vesícula biliar</td>
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<td>Masa intraluminal</td>
<td>2</td>
</tr>
<tr>
<td>Ninguno</td>
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</tbody>
</table>

**Table 3:** TABLE 3: RELATIONSHIP BETWEEN ULTRASOUND PATTERN AND STAGE OF THE PRIMARY TUMOR. (Number of cases)
Fig. 1: ANAPLASTIC CARCINOMA OF GALLBLADDER: Epithelial neoplastic growth, intense nuclear pleomorphism and low tendency to be arranged in glands. H-E x250
Conclusion

1.- Gallbladder carcinoma is a pathology that has a delayed diagnosis because of its unspecific clinical symptoms which are similar to those of other benign diseases. However the sonographic study, the first test to be carried out in gallbladder pathology assessment, provides us with findings which we should bear in mind given that they can guide us towards the diagnosis of a probable neoplastic gallbladder disease.

2.- The sonographic images of gallbladder carcinoma in situ and at its early stages (T1b), had a wall-thickening pattern in our study, which is a diagnostic challenge given that the most common acute and chronic inflammatory pathologies of the gallbladder have a similar sonographic pattern. Two cases of in situ carcinoma had an intraluminal growth mass, a pattern that is usually associated with early stages of carcinoma according to the literature requiring a differential diagnosis to be carried out between carcinoma and very common benign pathologies.

3.- The pattern of a sonographic mass replacing the bladder is associated with more advanced stages of the disease.

4.- In our study, the most common pattern was thickening of the bladder wall (57%), while in the literature it is a mass replacing the bladder (65%). This could be due to the fact that only one diagnosis of delayed staging was registered, (7 % of cases), which is more associated with this latter pattern.

5.- The demographic characteristics (age group, sex) and the presence of cholelithiasis as an associated risk factor, are in line with the tendency established in the literature.

References


**Personal Information**