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Surgical management of symptomatic simple hepatic cysts

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SUMMARY: **Surgical management of symptomatic simple hepatic cysts.**

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The authors present three cases of symptomatic, large, benign, non-parasitic hepatic cysts. The diagnosis was determined by US and CT scan, the latter enabling differential diagnosis with neoplastic or hydatid cysts. All patients were treated with open hepatic resection. In 2 cases, laparoscopy was performed to enable complete diagnosis. The authors used LigaSure™ (Covidien, USA) instrument, avoiding bleeding complications and reducing surgery time. Histological examination confirmed the diagnosis of benigntic cysts. CT follow-up at 6 months and 1 year demonstrated the efficacy of the surgery, with no recurrences.

RIASSUNTO: **Trattamento chirurgico delle cisti semplici sintomatiche del fegato.**

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Gli Autori presentano tre casi di cisti semplici del fegato, di grosse dimensioni e sintomatiche. La diagnosi ecografica è stata confermata in tutti i casi dalla TC, eseguita anche per dirimere dubbi diagnostici sulla natura della formazione. Il trattamento in tutti i pazienti è consistito in resezioni epatiche con approccio open in considerazione delle cospicue dimensioni delle cisti e della loro sede nel fegato. In due dei tre pazienti la laparoscopia ha comunque avuto un ruolo diagnostico. In tutti i casi è stato utilizzato il LigaSure™ senza complicanze emorragiche e con riduzione dei tempi operatori. L'esame istologico deponeva per la natura benigna delle lesioni. L'efficacia del trattamento è stata confermata dalla assenza di recidive a distanza.

KEY WORDS: Liver - Cyst - Hepatic resection.
Fegato - Cisti - Resezione epatica.

Introduction

Simple hepatic cysts are a congenital liver disease that affects 2.5-7% of the population (1, 2). They are usually found incidentally during imaging examinations performed for other reasons; in fact they have been found in 0.14-1% of autopsies (3) and in 4.5-7% of retrospective radiological examinations (4).

Signs and symptoms, if present, depend solely on the cyst's size. There may be compression of adjacent structures, with jaundice, portal hypertension, gallstones, biliary stones, or more complicated effects such as esophageal varices, ascites, or liver failure, particularly in giant congenital cysts of the liver (5). The diagnosis is made easily by ultrasound (US) and computed tomography (CT), the latter with a specificity of 90% (6). However, magnetic resonance imaging (MRI) may be required for a complete diagnosis. Differential diagnosis with post-traumatic or neoplastic and hydatid cyst is more difficult, but is necessary to decide on the best surgical approach. Treatments range from simple US-guided aspiration to laparoscopic deroofing, from liver resection to liver transplant.

The authors present three cases of simple hepatic cysts, with particular attention to various aspects of diagnosis and surgical treatment.

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Case reports

Case 1

PM, male, 66 years old. Emergency admission for abdominal right pain of several weeks' duration. US showed a liver cyst of 17 cm diameter. Abdominal CT confirmed the US diagnosis, showing the cyst to occupy the entire right lobe, with dislocation of the gallbladder and the concomitant presence of multiple renal cysts (Fig. 1). The diagnosis was completed by MRI, which showed some linear hypointensities of the inner cyst wall, excluding infectious or hemorrhagic lesions.

We carried out atypical hepatic resection of the cyst. Tissue coagulation was controlled with radiofrequency (Ligasure™, Covidien, USA), reducing the risk of bleeding complications. The resection was completed by omental transposition. The large size of the cyst and its deep position indicated the need for open surgery. A laparoscopic approach was also excluded due to the presence of adhesions from previous operations. Surgical exploration confirmed the large size and benign nature of the cyst (Fig. 2). Histological examination revealed a cyst having a well-defined fibrous wall, lined with a single-layer cuboidal to cylindrical epithelium and containing dilated bile ducts, as in the von Meyenburg Complex (Fig. 3).

The patient was discharged on the eighth day. Abdominal CT at 1 year demonstrated the success of the treatment, with no recurrences observed.

Case 2

TI, female, 54 years old. Admitted for an abdominal mass that was identified on US as a hepatic cyst, diameter 12 cm, in segments IV and V, in contact with the duodenum and the right colic flexure and compressing the gallbladder. Other small parenchymal cysts were also observed. Differential diagnosis by CT scan excluded complications or neoplastic transformation. Laparoscopic exploration confirmed the radiological diagnosis of hepatic cyst extending to the inner parenchyma. The size and location of the cyst required treatment by open surgery.

We performed an atypical right hepatic resection using the Ligasure™, thus minimizing blood loss. The treatment was completed by omental transfer into the cyst cavity. Histological examination confirmed the diagnosis of cyst lined with a single-layer cuboidal to cylindrical epithelial wall, formed in part from dystrophic and fibrotic liver tissue.

The patient was discharged on the seventh day. Abdominal CT and US follow-up at 1 year demonstrated the success of the treatment, with no recurrences observed.

Case 3

BF, female, 48 years old. Admitted for abdominal pain in the right quadrant, without jaundice or liver impairment. US scan showed the presence of a 14 cm diameter cyst in the right liver. Abdominal CT scan confirmed the size and characteristics of the cyst, which involved the segments V, I and VIII.

Surgical treatment was planned in relation to the symptoms and large size of the cyst. A laparoscopic exploration was performed, confirming size and location of the cyst. Its size excluded resection by minimally invasive technique. Open atypical liver resection was performed, using radiofrequency coagulation (Ligasure™) to minimize bleeding and biliary fistulas. Finally, the parenchyma was covered with an omental flap.

Fig. 1 - Case 1. Abdominal CT showing hepatic cyst (Ø 17cm) occupying the entire right lobe with dislocation of the gallbladder.

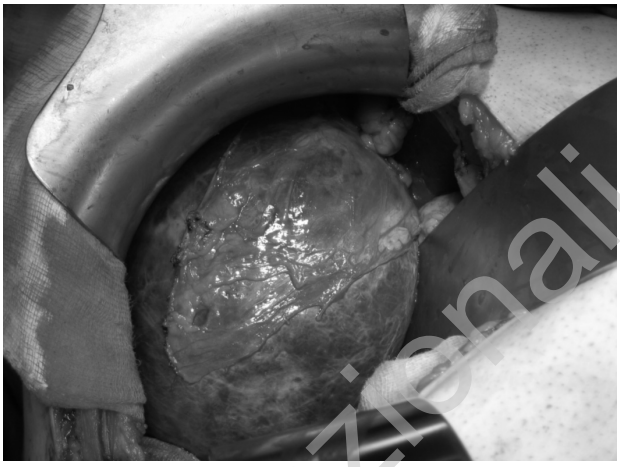

Fig. 2 - Case 1. The simple cyst in right hepatic lobe.

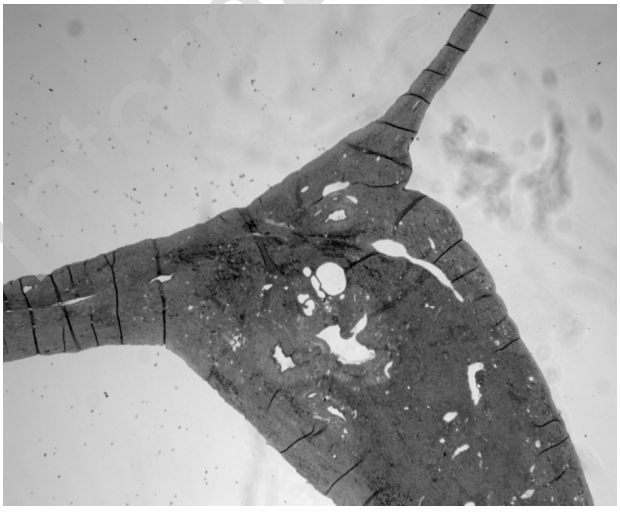

Fig. 3 - Case 1. Histological examination. Well-demarcated cyst with fibrous wall lined with a single-layer cuboidal to cylindrical epithelium and containing dilated bile ducts, as in the von Meyenburg Complex.

As in the other two cases, histological examination revealed a single-layer cuboidal to cylindrical epithelial wall, with the presence of fibrotic tissue. The patient was discharged on day 8 in good general condition. CT at 6 months showed no recurrence.

Results

Atypical hepatic resection for simple hepatic cysts proved successful in all patients, with no evidence of recurrence. Hemostasis was achieved with a modern radiofrequency coagulation technology (LigaSure™), which ensures a low risk of intra- and postoperative bleeding reducing the duration of surgery and enabling faster recovery. In two cases, laparoscopy enabled better localization of the cysts. The size and location were not suitable for treatment with a minimally invasive technique.

The US scan proved to be reliable for the diagnosis of these lesions, although their characteristics and size were better defined by abdominal CT scan, which also enabled the exclusion of any neoplastic degenerative processes of the cyst. Histological examination confirmed the benign nature of the cysts.

Discussion

A review of literature and the authors' own experience enable some general and specific comments to be made on the diagnosis and treatment of the cases reported herein. Epidemiologically, these patients were similar to those in most of the large literature caseloads, with the highest incidence between the fourth and sixth decades, no or non-specific signs and symptoms in two cases and symptomatic signs in the other. However, it should be noted that in the literature the more complex complications were related to expansive growth of non-parasitic cysts of the liver causing compression of surrounding anatomical structures, which could be responsible for jaundice, liver failure with ascites and esophageal varices in 10-16% of cases observed (2, 7-9).

The US scan is generally the first procedure enabling diagnosis because it is specific, non-invasive, readily available, and sensitive. Diagnosis is often an incidental finding during abdomen US performed for other indications. CT and MRI can resolve doubtful cases, providing more information on the location of the cyst. They also reveal any neoplastic degeneration and enable differential diagnosis with parasitic cysts (10). For example, neoplastic degenerative cysts contain residual parts of the walls alternating with nodular and hemorrhagic areas, often with typical calcifications related to cystadenocarcinoma, as established by MRI (9). CT and MRI are thus essential for the correct planning of surgical treatment. Careful differential diagnosis is in fact essential before starting any surgical treatment, to avoid fenestration or simple aspiration of the cyst, which could be dangerous. A prompt, diagnosis is required in presence of certain complications, such as bleeding, infections or necrotizing metastases, which may require immediate surgery (1, 11).

Our experience confirmed the specificity of US, while CT and MRI were used in just one case with a particularly large extension of the lesion. The histological findings in the three cases showed the benign nature of the cysts, that consisted of part mesothelial and part biliary cellular lining (12, 13), as also reported in larger caseloads, where neoplastic degeneration after some years is generally determined by the simultaneous presence of mesenchymal cells with a high number of calcifications (14).

Surgery is necessary for cysts of more than 4 cm in diameter, due to the risk that compression of the surrounding liver parenchyma might lead to various clinical signs, culminating in liver failure with esophageal varices and ascites, or complications such as bleeding or infection (4, 11, 15). In our experience, the primary indications for surgery were continuous, oppressive pain and the large size of the cysts. The treatment of choice was atypical hepatic resection with the use of LigaSure™ to minimize bleeding and postoperative complications, including biliary fistulas. The large size and the 'difficult' location of the cysts were contraindications to minimally invasive surgery, although in two cases laparoscopy provided a specific diagnostic evaluation of the size and site of the cyst. The literature supports use of laparoscopic surgery in cases which do not require an enlarged resection (11), and it is also indicated for resection of the anterior or left segments (16). In recent years laparoscopy has found favor with surgeons due to reduced postoperative hospitalization and pain and, as in the cases reported herein, its ability to reveal the size and location of hepatic cysts, while still enabling conversion to traditional open surgery where necessary (5). However, laparoscopy is not suitable for fenestration in cases of hepatic lesions other than type 1 or for bigger cysts adjacent to the hepatic veins (9). Its limitations in cases of relapsing cysts, polycystic and larger cysts should also be borne in mind, given the technical implications (17, 18). Furthermore, the high risk of bleeding during hepatectomy confirms the difficulty of laparoscopic surgery, if not performed by surgeons with advanced training in this technique (19).

Advanced devices such as the LigaSure™ are useful to minimize the risk of bleeding during open or minimally invasive surgery. The controlled application of radiofrequency permanently fuses vessels up to 7 mm in diameter. In our cases, LigaSure™ minimized bleeding

and reduced surgery duration and costs, as also reported in larger caseloads (14). The difficulty of correct liver mobilization and exposure of the hepatic vessels, particularly in young subjects, calls the role of laparoscopic surgery into question.

Use of an omental flap is well recognized as an ideal technique to reduce the risk of recurrence (17), but is contraindicated in cysts complicated by infections (5). Atypical resection of large hepatic cysts is necessary to reduce the risk of biliary fistulas as a postoperative complication (11) .

The long-term results confirm the validity of the technique used, especially in the light of literature demonstrating a greater number of recurrences in patients treated with aspiration, with or without use of sclerosing substances, which is contraindicated in cysts complicated by infection or in contact with the bile ducts, due to the high risk of developing primary cholangitis (19, 20).

Conclusions

Simple cysts of the liver are benign conditions that require surgical treatment when they reach a size of over 4 cm, causing symptoms due to expansive growth and compression of the surrounding liver tissues. In our cases, the size and location of the cysts and the concurrent involvement of the gallbladder imposed an atypical liver resection with cholecystectomy, using radiofrequency coagulation to minimize bleeding. The absence of long-term recurrences confirms the validity of the treatment.

We believe that atypical hepatic resection is the best technique to treat large, simple hepatic cysts, especially those located in the intermediate and posterior segments, to minimize biliary fistulas and the risk of recurrence. Minimally invasive surgery should be limited to treatment of smaller cysts in the anterior segments or in the left liver without any inflammatory process and not contiguous with hepatic veins or portal vein branches.

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