Symptomatic Nonparasitic Hepatic Cysts

Options for and Results of Surgical Management

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Background: Management options for symptomatic nonparasitic hepatic cysts (SNHC) lack verification through comparative studies with respect to safety and long-term effectiveness.

Hypothesis: Open cystectomy is the treatment of choice for patients with SNHC.

Setting: University hospital department of surgery.

Patients: Data were retrospectively analyzed from the clinical charts of 34 patients (26 women and 8 men) undergoing surgery for SNHC from January 1, 1975, through January 1, 1999. Charts were obtained from the original hospital referral.

Main Outcome Measures: Morbidity rates and long-term recurrence. We considered the following variables for analysis: age, sex, hepatic cyst location, diameter of the cyst at primary surgery, symptoms, surgical procedure, postoperative morbidity and mortality, length of postoperative hospital stay, and long-term outcome.

Results: The 34 patients underwent 47 operations for SNHC (mean diameter, 15.0 cm), with a mean follow-up of 50.0 months. Ten patients underwent open and 8, laparoscopic deroofing of the cyst. Enucleation of the cyst and hepatic resections were performed as primary procedures in 4 and 2 patients, respectively, and as secondary procedures in 6 and 7 patients, respectively. Two recurrences (25%) were found after laparoscopic deroofing and 3 (30%) after open deroofing. Two (50%) and 6 (100%) recurrences were found after cystojejunostomy and needle aspiration, respectively. No symptomatic recurrences occurred after 10 cystectomies and 9 hepatectomies. One operative death (3%) occurred; however, morbidity rates were 18% (6/34) and 15% (2/13) after primary and secondary surgery, respectively.

Conclusions: These results support our policy of performing open radical procedures in the treatment of SNHC; cystectomy is performed for primary surgery and hepatic resections for recurrences and complications. Conservative procedures have shown higher rates of recurrence and the need for further surgery. Only further technological improvements will allow a systematic and safe use of laparoscopy for radical surgery for SNHC.

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SYMPTOMATIC nonparasitic hepatic cysts (SNHC) are frequent incidental findings at laparotomy and more so recently because of the increasing use and refinement of abdominal imaging and ultrasonography. Determining the precise incidence of this disease is difficult; reports range from 0.10% to 4.7% according to autopsy, surgical, and ultrasonographic series. Symptomatic nonparasitic hepatic cysts may be congenital or acquired and are encountered more often in women and in individuals older than 60 years. They arise from the aberrant development of intrahepatic biliary radicals. These cysts are lined by a single layer of cuboidal or columnar epithelium resembling that of bile ducts. Evidence of a biliary origin is also provided by the composition of the fluid contained in the cyst. Rare SNHCs may be lined by squamous epithelium, and these cysts may be complicated by the development of squamous cell carcinoma. Most SNHCs are asymptomatic and require no treatment; treatment is indicated when they become highly symptomatic, cause complications, or demonstrate rapid growth. Despite the rare occurrence and the more rare indication for treatment of these lesions, many options for their management have been proposed. We assessed our experience in the treatment of symptomatic SNHC for more than 2 decades. Although the term nonparasitic includes cysts secondary to trauma or inflammation, only congenital cysts are discussed herein.
RESULTS

PATIENTS AND METHODS

Unless otherwise indicated, data are given as mean ± SD.

PATIENTS

Patients who required surgical treatment for various hepatic lesions were identified by means of a computer-based indexing system containing data for all patients undergoing surgery for hepatic growths at the First Department of Surgery, University of Rome “La Sapienza” Medical School, Rome, Italy. From January 1, 1975, through January 1, 1999, 436 patients were considered. Patients with histologically proven SNHC were recruited for this study. Thirty-four patients met this condition, and their medical records were analyzed retrospectively. The details of the primary surgery were abstracted from clinical charts of the original hospital referral. Variables considered for analysis were age, sex, hepatic cyst location, diameter of cyst at primary surgery, symptoms, surgical procedure, postoperative morbidity and mortality, length of postoperative hospital stay, and long-term outcome.

SURGERY

Surgical procedures included open needle aspiration and sclerotherapy, open and laparoscopic de-roofing of the cyst, cystojejunostomy, hepatic resection, and cystectomy. In all cases, surgical access consisted of laparotomy. Hepatic resection and cystectomy were the only procedures used in patients with recurrent cysts.

FOLLOW-UP

Patients underwent yearly clinical examinations, biochemical tests for liver function and cholestasis, radiological examinations, and ultrasonographic and computed tomographic liver scans when available.

OUTCOME

Major postoperative complications were considered pleural effusion, cholangitis, cholangitis, suppuration in the surgical field, liver or renal failure, cardiac deficit, urinary tract sepsis, and pneumonia. Long-term outcome was classified as poor when recurrence of the disease was evident.

Table 1. Demographic and Clinical Data

<table>
<thead>
<tr>
<th>Age, mean ± SD, y</th>
<th>42.2 ± 10.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex, No. M/F</td>
<td>8/26</td>
</tr>
<tr>
<td>Cyst location</td>
<td></td>
</tr>
<tr>
<td>Right lobe</td>
<td>26</td>
</tr>
<tr>
<td>Left lobe</td>
<td>8</td>
</tr>
<tr>
<td>Cyst diameter, mean ± SD, cm</td>
<td>15.0 ± 4.2</td>
</tr>
<tr>
<td>Symptoms, No. of patients</td>
<td></td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>30</td>
</tr>
<tr>
<td>Fullness</td>
<td>13</td>
</tr>
<tr>
<td>Nausea</td>
<td>10</td>
</tr>
<tr>
<td>Vomiting</td>
<td>10</td>
</tr>
<tr>
<td>Early satiation</td>
<td>15</td>
</tr>
<tr>
<td>Fatigue</td>
<td>7</td>
</tr>
<tr>
<td>Dypsnea</td>
<td>6</td>
</tr>
<tr>
<td>Length of follow-up, mean ± SD, mo</td>
<td>50.0 ± 9.3</td>
</tr>
</tbody>
</table>

Table 2. Primary Surgery*

<table>
<thead>
<tr>
<th>Operative time, min</th>
<th></th>
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<tbody>
<tr>
<td>Hepatic resection</td>
<td>172 ± 17</td>
</tr>
<tr>
<td>Cystectomy</td>
<td>142 ± 27</td>
</tr>
<tr>
<td>Cystojejunostomy</td>
<td>162 ± 45</td>
</tr>
<tr>
<td>Open de-roofing</td>
<td>89 ± 21</td>
</tr>
<tr>
<td>Laparoscopic de-roofing</td>
<td>78 ± 20</td>
</tr>
<tr>
<td>Needle aspiration and sclerotherapy</td>
<td>71 ± 20</td>
</tr>
<tr>
<td>Blood transfused, U</td>
<td>0.4 ± 0.7</td>
</tr>
<tr>
<td>Morbidity, No. of patients</td>
<td>6</td>
</tr>
<tr>
<td>Mortality, No. of patients</td>
<td>1</td>
</tr>
<tr>
<td>Postoperative length of hospital stay, d</td>
<td></td>
</tr>
<tr>
<td>Open surgery</td>
<td>9.6 ± 4.0</td>
</tr>
<tr>
<td>Laparoscopic surgery</td>
<td>6.0 ± 5.0</td>
</tr>
</tbody>
</table>

*Unless otherwise indicated, data are given as mean ± SD.

PRIMARY SURGERY

Primary operative management of the SNHCs consisted of 6 needle aspirations and sclerotherapies, 4 cystectomies, 2 hepatic resections, 4 cystojejunostomies, and 10 open and 8 laparoscopic de-roofings. Details concerning primary surgical management are given in Table 2. After 1994, laparoscopic and open procedures were performed. Supplementary surgical procedures on the biliary tract were never performed. The mean amount of transfused blood was 0.4±0.7 U (range, 0-2 U). In all cases, the perihepatic space was drained, and results of pathological examination confirmed the existence of a nonparasitic solitary cyst. The mean follow-up time was 50.0±9.3 months.

PRIMARY OUTCOME

The mean postoperative hospitalization was 9.6 days for patients undergoing open procedures and 6.0 days in patients treated with a laparoscopic approach. One death occurred during the hospital stay, with an overall mortality rate of 3%. Six patients experienced morbidity, for an overall rate of 18%. Good results were achieved in 21
patients (62%). Recurrences after primary surgery are described in the following tabulation:

<table>
<thead>
<tr>
<th>Primary Surgery</th>
<th>No. (%) With Recurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatic resection</td>
<td>0</td>
</tr>
<tr>
<td>Cystectomy</td>
<td>0</td>
</tr>
<tr>
<td>Cystojejunostomy</td>
<td>2/4 (50)</td>
</tr>
<tr>
<td>Open deroofing</td>
<td>3/10 (30)</td>
</tr>
<tr>
<td>Laparoscopic deroofing</td>
<td>2/8 (25)</td>
</tr>
<tr>
<td>Needle aspiration and sclerotherapy</td>
<td>6/6 (100)</td>
</tr>
</tbody>
</table>

SECONDARY SURGERY

The operative management of recurrences consisted of hepatic resection and cystectomy in 7 and 6 patients, respectively. The mean operative times were 183 ± 20 minutes and 146 ± 16 minutes, respectively. All secondary procedures were performed with the open approach, and the mean amount of transfused blood was 1.7 ± 0.7 U (range, 1-3 U).

SECONDARY OUTCOME

The mean postoperative length of stay was 11.2 ± 3.0 days. No deaths occurred, and 2 (15%) of 13 patients experienced postoperative morbidity. No evidence of recurrence of SNHC was found during follow-up.

Because of the low incidence of SNHC, uniform management of this disease has not been defined clearly, and multiple therapeutic options have been advocated. These procedures can be categorized as nonsurgical, including simple needle aspiration and aspiration with injection of sclerosing agents, and surgical. Surgery includes conservative procedures represented by external drainage of the cyst by means of tube cystostomy, internal drainage into a Roux-en-Y loop jejunal limb, and deroofing procedures. Radical procedures include total cyst excision and hepatic resection. The simplest method is percutaneous aspiration, which may prove effective in the immediate palliation of symptoms, but invariably results in recurrence of the cyst. Moreover, needle aspiration may lead to severe complications if the gallbladder and the colon are inadvertently perforated. Hence, this procedure could not be recommended for the treatment of SNHC except when pursuing short-term relief of symptoms in patients awaiting definitive treatment and in selected patients with high operative risk or limited life expectancy. Attempts at improving percutaneous management have included instillation of sclerosing agents into the cyst. This procedure, although achieving limited improvement compared with aspiration alone, may lead to irreversible sclerosing cholangitis because of the presence of undetected communication with the biliary system.

Marsupialization and external tube drainage are also associated with a high rate of recurrence and a significant risk for introducing infection. The procedure should be reserved for alleviating symptoms in patients with an infected cyst in which a definitive treatment has to be postponed. Deroofing of the cyst for drainage of its content into the peritoneal cavity has been advocated to provide effective, long-standing decompression while minimizing the risk for injury to adjacent vascular and biliary structures entailed by radical surgery. However, recurrences have been reported even with meticulous and radical fenestration of the cyst, and destruction of the residual fluid-producing epithelial lining has occurred. Moreover, leaving the residual surface of the cyst should be ruled out because of possible recurrences, septic complications, and malignant transformation of epithelium lining the residual cavity. The use of omentum to fill the residual cavity is also debatable. Although an excellent barrier against infections, the omentum is not equally effective against the bile that may cause necrosis. Furthermore, when packed into the cavity, the omentum hinders the interpretation of ultrasonography or computed tomographic scans during follow-up.

In recent years, many conventional open surgical procedures have been replaced by minimally invasive surgery. Symptomatic nonparasitic hepatic cysts have also become the subject of laparoscopic surgery. A minimally invasive technique offers unquestionable advantages, ie, it is less stressful and less painful to the patient and is associated with earlier recovery. Depending to a great extent on the site and location of the cyst, the laparoscopic approach at present is best limited to those lesions located in easily accessible areas, mainly in the anterior and lateral segments.

Eight open and 7 minimally invasive deroofings were performed at our institution in the present series; 1 recurrence in each group required further surgery. In the laparoscopic group, 1 reoperation was required in the immediate postoperative period because of persistent bleeding from the rim of the excised cyst wall; complete hemostasis was achieved through an open access. Three patients, previously treated elsewhere by an open (2 cases) or a laparoscopic fenestration (1 case), underwent hepatic resection because of complicated recurrences. The laparoscopic approach did not offer better results in our experience compared with the immediate and long-term results of open deroofing. The deroofing technique leaves a part of the cyst wall and is accompanied by the release of cyst contents into the peritoneal cavity. Consequently, intraperitoneal drainage is unavoidable when the cyst fluid is bile stained, because an intraperitoneal bile leakage would result. A cystoenteric anastomosis using a Roux-en-Y jejunal limb has been considered appropriate in these cases, but this procedure carries the danger of ascending infection and additional demanding surgery.

Three patients in our institution were treated, in the present series, by means of cystojejunostomy. Relapsing cholangitis developed in all of them, requiring repeated antibiotic treatment. In 1 case, a hepatic resection was performed; 1 year later, primary surgery was performed to remove a hepatic abscess that had developed at the site of the deroofed cyst. An additional hepatic resection was performed on a patient with a he-
though controversy about the adoption of cystectomy arises for cysts located deep in the hepatic parenchyma.7 The considerable number of cystectomies in the present series reflects the referral pattern to a hospital where for 3 decades cystectomy has been the elective procedure of choice for the treatment of hydradid hepatic disease. Among the 10 patients in our series who underwent total cystectomy, cysts were deep-seated in all but 2; 6 procedures were performed on cysts previously treated with sclerosing agents and 4 as primary surgery. In the former group, a more consistent cystic membrane and a sufficiently marked plane of cleavage were found, thus easing the excision of the cyst. Both of these findings were probably due to the action of the sclerosing substances on the cystic membrane and on the pericystic hepatic parenchyma. The injection of sclerosing agents, whether related to the thickening of the cystic membrane or the creation of a plane of cleavage, might be adopted as a preoperative measure after any biliary communication with the cyst has been ruled out. Three minor complications in the immediate postoperative period were all successfully treated medically. No recurrence was observed at follow-up.

Total cystectomy has been confirmed by our experience as a safe and effective procedure for superficial cysts and for lesions with a deep location. Laparoscopic cystectomy is a challenging procedure, even for surgeons with extensive open surgical experience and laparoscopic expertise.32,40 A major problem of laparoscopic surgery is control of bleeding; severe bleeding is inevitable when a large common boundary of the cyst with the liver parenchyma and proximity to large blood vessels are encountered. Therefore, the laparoscopic approach to extensive and deep-seated cysts should be contraindicated.

Hepatic resection is a safe and effective procedure for malignant and benign hepatic lesions.37,41 Nine hepatic resections were performed in the present series, 2 as primary procedures on very large cysts completely substituting the hepatic parenchyma of the left lobe and 7 as treatment for cyst recurrence or complication secondary to previous conservative surgery. No atypical resection was performed. No complication affected the outcome of primary procedures, although 2 subphrenic abscesses occurred in the second group. Both patients recovered without sequelae. Current data compare well with previous evidence of anatomic hepatic resection as a procedure providing an excellent outcome in terms of symptom recurrence and acceptable rates of morbidity.4,12,36-38 The laparoscopic approach has not been widely developed for liver resections. However, technological refinement in laparoscopic instruments and experience in laparoscopy and hepatic surgery have led some groups to explore the place of laparoscopic liver resections.13,15,29 Available data suggest laparoscopic resection as safe and feasible only if restricted to small left-sided and peripheral right-sided lesions requiring limited resections. Future technological advances may overcome difficulties such as adequate liver exposure and vascular difficulties that, at present, prevent a more general adoption of this procedure.

The best results in the present series were obtained after radical procedures; lesser procedures predispose to substantial risk for recurrence and secondary infection of the cyst, which is not justifiable given the benign nature of the lesion. The laparoscopic approach to radical procedures, more often impractical, is at present more complex and dangerous compared with the open approach. Because use of the laparoscopic approach should not change the indications for open surgery, further effective improvement in laparoscopic technology and consequent consistent results in large series should be awaited before the minimally invasive approach is proposed as an alternative to the traditional open radical procedures.

**CONCLUSIONS**

Based on our results, we recommend open cystectomy as the procedure of choice for SNHC, regardless of location. A procedure of the magnitude of hepatectomy should be restricted to the treatment of giant cysts that completely engulf the hepatic parenchyma and of complex recurrent cysts.

**REFERENCES**


