Background: Conservative surgery (cyst evacuation and partial pericystectomy) for hydatid cysts of the liver is known to be safe but is often associated with bile leak and its sequelae. Methods: Case records of 86 patients undergoing surgery for hydatid cysts of the liver at a tertiary-care center in northern India over a 14-year period were reviewed retrospectively. Results: Sixteen (18%) patients had jaundice and 36 (42%) had a cyst-biliary communication detected at surgery. Biliary complications developed in 14 (16%) patients. Bile leaks and bilio-cutaneous fistulae were observed in 11 (13%) patients; the fistula output was low (<300 mL/day) in 8 of these. Three patients had localized intra-abdominal bile collections; all 3 underwent percutaneous drainage of biloma (subsequent laparotomy and lavage was required in one patient due to failure of percutaneous drainage), producing controlled low-output bilio-cutaneous fistulae in all. All low-output fistulae closed spontaneously after a mean duration of 4 weeks. Patients with high-output fistulae underwent endoscopic intervention (stenting / naso-biliary drainage), resulting in the conversion of these fistulae to low-output category and eventual closure after a mean duration of 7.5 weeks. Conclusion: Postoperative bile leaks lead to significant morbidity after surgical management of hydatid cysts of liver. A majority of them resolve spontaneously. Biliary drainage (endoscopic or surgical) hastens the closure of these bilio-cutaneous fistulae. [Indian J Gastroenterol 2005;24:55-58]

Hydatid disease is an important health problem worldwide, especially in endemic regions like the Mediterranean countries, the Middle East and South America.1 Humans are not a part of the natural life cycle of the parasite Echinococcus granulosus. Incidental human infestation with larval form results in formation of hydatid cysts in various parts of the body, the liver being the most common site (70%-75% of cases).

Several surgical techniques, ranging from formal hepatic resection2,3 to simple cyst evacuation and partial pericystectomy4,5 have been used for the treatment of hepatic hydatid cysts. Conservative operations, although safe and easy, have been criticized for a high frequency of postoperative bile leaks and disease recurrence.6 We report our experience with the management and outcome of biliary complications associated with surgery for hepatic hydatid cysts.

Methods

Records of 89 consecutive patients with hydatid disease of liver who underwent treatment in the Department of Surgical Gastroenterology of our hospital – a tertiary-care institution in northern India – between January 1989 and December 2002 were reviewed retrospectively. Three patients had been treated with percutaneous procedures alone. Data on the remaining 86 patients (age range 7-62 years, mean [SD] 35.5 [11.5] years; 51 women) who underwent surgical management were analyzed.

Pre-operative evaluation had included liver function tests, and imaging in the form of abdominal ultrasonography and contrast-enhanced CT. In addition, endoscopic retrograde cholangiography (ERC) and biliary drainage had been done in patients presenting with jaundice and/or cholangitis. Patients with past history of jaundice but with no icterus, normal liver function tests, and no evidence of biliary obstruction on imaging at the time of presentation did not undergo any further evaluation.

The type of surgical procedure was based on the site of the cyst, and presence or absence of infection and of cyst-biliary communication. The common bile duct (CBD) was explored only in the following situations: i) dilated CBD on pre- or intra-operative evaluation with or without evidence of filling defects; and, ii) for biliary decompression in patients with large cyst-biliary communications, especially those not amenable to closure during surgery. Intra-operative cholangiogram was not performed routinely.

Any patient found to have leakage of bile exceeding 30 mL/day lasting more than 3 days through the drain in the postoperative period was considered to have a bile leak. The fistulae were categorized into low- and high-output types depending on whether the fistula output was less than or greater than 300 mL/day, respectively.

Statistical analysis was done using the Mann-Whitney test.

Results

Upper abdominal pain was the most common presenting symptom (n=75, 87%); history of fever and jaundice was
Bile leaks following surgery for hydatid cyst

present in 29 (34%) and 16 (18%) patients, respectively. Cysts were localized to the right lobe of the liver in 55 (64%) patients, to the left lobe in 25 (29%) patients, and involved both lobes in 6 (7%) patients; 18 (21%) patients had multiple cysts. Additional sites of cysts included the lungs (n=3) and spleen (n=1); 5 patients had disseminated peritoneal disease.

Pre-operative ERC and biliary drainage were performed in 4 patients presenting with jaundice and cholangitis.

Radical surgical procedures like cystopericystectomy (n=12) and anatomical hepatic resection (n=2) were performed in 14 (16%) patients; a majority of patients (n=72, 84%) underwent conservative procedures that included cyst evacuation and partial pericystectomy (n=57) or capsulorrhaphy (n=15). Internal drainage of the residual cavity in the form of Roux-en-Y cysto-jejunostomy was performed after partial pericystectomy in 12 patients, while the cavity was drained externally in 8 patients. Cyst-biliary communications were detected in 36 (42%) patients and these were individually ligated with synthetic absorbable suture; in 16 (18%) patients, CBD exploration and T-tube drainage was also done. Cholecystectomy was added to the surgical procedure in 24 (28%) patients either because of the presence of gall bladder calculi (n=13) or because of the gall bladder was densely adherent to the cyst (n=11). Externally drainage was performed in patients with infected cysts.

Postoperative bile leaks occurred in 14 (16%) patients; none of these patients had undergone a cyst-excision procedure (cysto-pericystectomy or left lateral segmentectomy). Cyst-biliary communication had been detected at the time of surgery in 11 of 14 patients; in 4 of these patients, in addition to suture ligation of cyst-biliary communication, a biliary decompression procedure (CBD exploration and T-tube drainage) had been performed (Fig). One patient died in hospital of an unrelated medical condition (dilated cardiomyopathy with congestive heart failure). Right lobar cysts, cysts with biliary communications, and those undergoing external drainage were significantly more often associated with bile leaks (Table).

Bile leaks manifested as controlled external biliary fistula through the drain placed during surgery in 11 and as postoperative intra-abdominal bile collection (biloma) in 3 patients. The latter three patients underwent percutaneous drainage of the biloma (subsequent laparotomy and lavage was required in one patient due to failure of percutaneous drainage). Thus a controlled external biliary fistula was finally established in all the 14 patients.

Median fistula output was 75 mL/day (range 50-500); the fistulae had a low output in 11 patients and high output in 3 patients. The median fistula closure time was 30 days. All the 11 low-output fistulae closed spontaneously after 11 to 84 days (median 30); the time to closure was significantly shorter (p=0.04) in 4 patients with peroperative T-tube drainage (median 13 days) than in the 7 patients without biliary drainage (35 days).

The 3 patients with high-output bilio-cutaneous fistulae underwent endoscopic stenting or endo-nasal biliary drain placement within 2 weeks of surgery that led to immediate reduction in fistula output and fistula closure at 17, 18 and 90 days, respectively. This was not different from the time to closure for low-output fistulae with T-tube drainage (p=0.23).

Discussion

Surgical management of hepatic hydatid disease has ranged from radical procedures like hepatic resection\(^2,3\) and total cystopericystectomy\(^7,8\) to conservative ones like cyst evacuation followed by capsulorrhaphy\(^4\) or external drainage.\(^5\) The aim is to remove the entire disease while minimizing complications.

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**Table: Clinical features of patients with and without postoperative bile leaks**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Patients with bile leak (n=14)</th>
<th>Patients without bile leak (n=72)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jaundice</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Fever</td>
<td>6</td>
<td>22</td>
</tr>
<tr>
<td>Mean diameter of cyst (cm)</td>
<td>11.9</td>
<td>10.4</td>
</tr>
<tr>
<td>Site of cyst</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right lobe</td>
<td>12</td>
<td>43*</td>
</tr>
<tr>
<td>Left lobe</td>
<td>1</td>
<td>24</td>
</tr>
<tr>
<td>Both lobes</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Cyst-biliary communication at surgery</td>
<td>11</td>
<td>25*</td>
</tr>
<tr>
<td>External drainage of cyst</td>
<td>6</td>
<td>2*</td>
</tr>
<tr>
<td>Internal drainage (cysto-jejunostomy)</td>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>

\(*p<0.01\)
Conservative procedures are safe and technically simple, and are useful in the management of uncomplicated hydatid cysts. However, their main disadvantage is the high frequency of postoperative complications, the most common being bile leak from a cyst-biliary communication and its sequelae like bilio-cutaneous fistulae, bilomas and bile peritonitis (4%-28%). The frequency of biliary complications in our series was 16%, similar to those in other series with predominantly conservative surgical techniques of management.

In order to reduce postoperative bile leaks, all efforts should be made during surgery to detect cyst-biliary communications. The various techniques that help in this include: i) avoiding the use of colored scolicidal agents like povidone-iodine since they interfere with identification of cyst-biliary communications; ii) meticulous inspection of the residual cavity after evacuation of cyst contents; iii) placing a white laparotomy pad in the residual cavity for few minutes and then inspecting it for evidence of bile staining; and, iv) injecting a colored dye into the biliary tree and looking for staining in the residual cavity. An intra-operative cholangiogram may also be useful. All cyst-biliary communications identified should be meticulously ligated using sutures. Biliary decompression should be performed in patients with large cyst-biliary communications or when closure is unsatisfactory. A recent report has suggested that routine biliary decompression with a T-tube in patients with cyst-biliary complications may reduce the frequency of postoperative bile leaks.

External biliary fistulae following surgery for liver hydatid disease tend to close spontaneously. In a review of 304 cases, all the 10 external biliary fistulae closed spontaneously over a period of 2-4 months. In another series, 7 of 12 fistulae closed spontaneously, with the maximum time to closure being 38 days. Though most fistulae close spontaneously, the prolonged biliary drainage causes significant morbidity. In our series, the median hospital stay in patients with bile leaks was 18 days as compared to 7 days in those without biliary complications. Re-exploration was usually not required in these patients and most of them were managed successfully by percutaneous and/or endoscopic methods.

Most series on hepatic hydatid disease report on a small number of patients with postoperative external biliary fistulae; it is generally accepted that endoscopic management in the form of endoscopic sphincterotomy, with or without stenting or naso-biliary drainage, plays a key role in the management of such patients. Endoscopic sphincterotomy is believed to reduce the high intra-biliary pressure, and promote early closure of these fistulae even in the absence of distal biliary obstruction.

No guidelines are available regarding the most appropriate timing of endoscopic intervention. The time of intervention has varied from a few days to several months after surgery. The time taken for closure of fistulae after endoscopic intervention too has varied widely (2 to 30 days) in different reports. In our series, it was about 2 weeks after biliary decompression (surgical or endoscopic). The reason for this delay may lie in the nature of underlying disease. The fibrotic and chronically inflammed pericyst may prevent the collapse of the residual cavity and delay the closure of cyst-biliary communications.

Some authors have classified post-operative biliary fistulae in these patients into high- and low-output categories to help in making treatment decision. Whereas early endoscopic biliary decompression has been recommended for high-output fistulae, no or delayed intervention has been adopted for low-output fistulae.

In our patients, per-operative biliary decompression using a T-tube was associated with a quicker fistula closure. It may thus be expected that early postoperative endoscopic biliary decompression will also hasten fistula closure. In fact, a recent report suggested that routine biliary decompression using a T-tube in patients with cyst-biliary complications was associated with lower incidence of postoperative bile leaks. The median closure time of high-output fistulae after endoscopic intervention in our study was 18 days.

We conclude that bile leaks are not uncommon after conservative surgery for hepatic hydatid disease. Patients with high-output fistulae should undergo early endoscopic biliary decompression in order to hasten fistula closure and to reduce morbidity. In contrast, a majority of low-output fistulae close spontaneously with conservative management; however, even these may benefit from early endoscopic intervention.

References


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Received August 16, 2004. Received in final revised form December 23, 2004. Accepted December 28, 2004

Acknowledgement

The Editorial Board of the *Journal* expresses sincere gratitude to Dr Ramesh Roop Rai and the Organizing Committee of the 45th Annual Conference of the Indian Society of Gastroenterology, Jaipur for the generous contribution of Rs 200,000 to the *Journal*.