Biliary Complications After Hydatid Liver Surgery: Incidence and Risk Factors

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The aims of this study were to determine the incidence and risk factors of biliary leakage and biliary fistulae after hydatid liver surgery and to suggest preventive precautions. From January 1999 to June 2000, 70 cysts were examined from 54 patients who were operated on for hydatid liver disease. Age, sex, primary or recurrent disease, liver function tests, number, location, content, radiological type, and diameter and cavity management techniques were examined with univariate and multivariate analyses for biliary complications. Biliary leakage occurred in 14 cysts (26%) from the patients. Purulent and/or bilious cyst content (61.9% vs. 2.0%; \( P = 0.022 \)), male gender (40.9% vs. 10.4%; \( P = 0.038 \)), and pre-operative raised alkaline phosphatase and gamma glutamyl transferase levels (34.6% vs. 11.4%; \( P = 0.047 \)) were found as independent risk factors for post-operative biliary leakage. Nine instances of biliary leakage (16.7%) closed spontaneously within seven days. The remaining five instances of biliary leakage (9.3%) persisted for more than 10 days and were accepted as biliary fistulae. Stepwise logistic regression identified cyst content was the only risk factor for biliary fistulae (19% vs. 2%; \( P = 0.036 \)). Described risk factors for post-operative biliary complications after hydatid liver surgery may be the guidelines for additional pre-operative or intra-operative radiological interventions of the biliary tract and for preventive procedures such as surgical biliary drainage. (J GASTROINTEST SURG 2002;6:706–712) © 2002 The Society for Surgery of the Alimentary Tract, Inc.

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Hydatid disease, particularly of the liver, is a significant surgical burden in areas such as the Middle East, the borders of the Mediterranean Sea, South Africa, Northern Canada, Australia, and New Zealand. In Turkey, the number of patients undergoing hepatic surgery for hydatid disease averages 3000 per year.\(^1\)

Biliary complications are common post-operatively for hepatic hydatid cysts, which are associated with increased risk of morbidity. The incidence of these complications is variable from 2.6% to 28.6%.\(^2,3\) The predisposing factors for biliary complications are not well defined, and there are conflicting results from the few published studies that have addressed this issue.\(^4,5\) Our aim was to study the incidence and identify the risk factors of biliary complications in patients undergoing surgery for hepatic hydatid disease.

Patients and Methods

This was a single center study where all patients who had surgery for hepatic hydatid disease between January 1999 and June 2000 were included for analysis. The diagnosis was made in all the patients by abdominal ultrasonography and computed axial tomography.

Surgical Details

After exploration of the abdomen, the area around the cyst was carefully isolated by gauze packs soaked in a scolicidal agent (0.5% cetrimide and 0.05% chlorhexidine combination; Savlex, Drogan, Ankara, Turkey). The cyst was first aspirated and if the cyst content was clear, the aspirate replaced with the same amount scolicidal. After opening the cyst wall,
all contents were removed and the cavity was then wiped with scolicide-soaked swabs. The cavity was observed carefully for sites of biliary leakage for 5 minutes and if present, the open biliary orifices were sutured with 3-0 silk.

After un-roofing the cysts by partial peri-cystectomy, obliteration of the cavity was performed by omentopexy, introflexion, or external drainage. During introflexion, the edges of the pericystium were inverted into the cyst cavity. The edges of the un-roofed cyst sutured to the bottom of the cavity and also each other with absorbable sutures. The cavity management of the cyst was determined by the choice of the surgeons. All cavities were drained to prevent bilioma or biliary peritonitis.

Drains were removed on the third post-operative day, provided no biliary drainage was seen. Patients who had post-operative biliary drainage through the abdominal drains were accepted as having biliary leakage. Patients who continued with persistent biliary drainage more than 10 days post-operatively were accepted as having a biliary fistula. Biliary fistulae that had a daily drainage <100 ml were treated conservatively and until spontaneous cessation. Biliary fistulae that had a daily drainage >100 ml were considered for endoscopic retrograde cholangiopancreatography (ERCP) and naso-biliary drainage.

Data collected included age, sex, liver function tests, and whether the disease was primary or recurrent. The radiological types of the cysts were classified as unilocular (Gharbi Type I and II), multilocular (Gharbi Type III), and degenerated (Gharbi Type IV). The number, location, diameter and content of the cysts, along with the cavity management technique, were all analyzed. All risk factors were evaluated by using both univariate and multivariate analysis.

For statistical univariate analysis, Pearson Chi-square and Fisher-exact tests were used, and for the hospital stay Mann Whitney U tests were used. A stepwise logistic regression model for multivariate analysis was used to simultaneously investigate the effects of several risk factors. SPSS 10.0.1 (Windows Release, Chicago, Illinois) was used for the statistical analysis. The statistical significance level was defined as $P < 0.05$.

**RESULTS**

A total of 68 patients who had surgery for hydatid liver disease during the period of the study were considered for analysis. Twelve patients who had a total peri-cystectomy or hepatectomy were excluded from the analysis, along with 2 more patients who had common bile duct exploration and biliary drainage. The remaining 54 patients (20 men and 34 women) were studied. The age range was 18–73 years (mean 42.6; SD 1.8).

In total, 70 cysts were treated surgically in 54 patients. The cyst cavity was obliterated in 28 cases (omentumopexy in 13 and introflexion in 15). External drainage was performed in 42 cysts with no further procedures done to reduce the size of the cavity.

In 13 of 14 patients (26%) post-operative biliary leakage occurred. Nine (16.7%) closed spontaneously within 7 days with the amount of drainage varying between 50 to 300 ml. Only 5 patients (9.3%) had persistent biliary drainage (biliary fistula) more than 10 days and the amount of bile drainage was 50 to 200 ml. Two patients required ERCP and naso-biliary drainage that led to closure of the fistulae in 2 weeks. The remaining 3 patients were treated conservatively and the fistulae closed post-operatively at 5, 6, and 8 weeks, respectively.

Risk factors for biliary leakage and biliary fistula after hydatid liver surgery are summarized in Tables 1 and 2.

Age distribution was similar among the groups. Biliary leakage occurred more often in males (40.9% vs. 10.4%; $P < 0.01$) and this appeared to be as an independent risk factor. Although males had a higher risk of biliary leakage, gender was not a risk factor for biliary fistula ($P = 0.64$).

Seventeen patients (31%) had a recurrence of the hepatic hydatid disease during a period ranging from 2 to 14 years. This, however, did not seem to be a significant risk factor for biliary leakage compared with those presenting for the first time (18% for primary cysts vs. 25% for recurrent cysts; $P = 0.52$). Biliary fistula also occurred similarly in both primary and recurrent cysts (6% and 10%, respectively; $P = 0.61$).

Seventeen patients (31%) had a raised pre-operative alkaline phosphatase (ALP) and gamma glutamyl transferase (GGT). Biliary leakage was seen more frequently in this group of patients, as compared with those with normal liver function tests (34.6% vs. 11.4%; $P = 0.02$). This was found in multivariate analysis as an independent risk factor for biliary leakage. Biliary fistulae was also observed more frequently in patients who had raised pre-operative ALP or GGT (2.3% and 15.4%, respectively), but the difference was significant ($P = 0.06$).

The incidence of biliary leakage for one, two, and three cysts was 20.5%, 33.3%, and 50%, respectively ($P = 0.46$). Biliary fistulae occurred similarly in the patients who had one, two, or three cysts ($P = 0.38$).

Thirty-four percent of the cysts were unilocular (Gharbi type I). The risk of biliary leakage was less in these group of patients (12.5%) compared to those with multilocular cysts (Gharbi III) and degenerated cysts...