INTRODUCTION

Hydatid disease is a rare zoonotic infection caused by adult or larval stages of the cestode Echinococcus granulosus, primarily affecting the population of developing countries. Its prevalence among humans was determined as 9.1% in a WHO study in central peruvian Andes. The hydatid cysts occur mostly in liver and 75% of these are solitary; other common organs are lung, spleen and kidney. Surgery is the gold standard and primary treatment, with a variety of techniques based on the principles of eradication and elimination of recurrence while avoiding spillage. Laparoscopic treatment of hydatid cyst liver has been increasingly popular parallel to the progress in laparoscopic surgery. However, controversies about the role of laparoscopy in the management of hepatic hydatid cyst have not been resolved, because of limited experience worldwide. These controversies included selection of patient, surgical technique and follow up protocol. This study presents our experience and results in laparoscopic management of hydatid cyst liver.

PATIENTS AND METHODS

This prospective study included 53 patients of both genders and different age groups. The study was conducted in the Department of General Surgery, Ghulam Mohammad Mahar Medical College Hospital and Hira Medical Centre, Sukkur, Pakistan from February 2009 to January 2012. The demographic data of all the patients and routine investigations like CBC, X-ray chest, blood sugar, and L.F.T were recorded. The diagnosis was made by abdominal ultrasonography, CT scan and sorological tests (Echinococcus antibodies). Inclusion criteria were solitary Cyst with a diameter between 7-10 cms. Exclusion criteria were multiple hydatid cysts liver, cysts located near vascular liver element, cysts with biliary communication and those located in segment i, ii, and vii, as these are blind areas for laparoscopy as well as deeply seated intra parenchymal cysts. Albendazole therapy was...
given to these patients before and after surgery; but no reduction in size of cyst was noted pre-operatively.

Laparoscopic surgery was performed with a 0° Laparoscope through 10 mm supraumbilical port. Another 10 mm port used at the epigastrum as a working channel and one additional 5mm port was placed according to the location of the cyst. The cystic fluid was aspirated with a large needle inserted percutaneously and then pure pyodine solution was injected in to the cyst as scolicidal agent. The germinal membrane (daughter cysts) was removed by direct suction by 10mm sucker through the epigastric trocar or placed in a glove's bag. The cyst cavity was explored under direct vision and irrigated with normal saline. Percystectomy and /or deroofing of cyst was done using electrical curved scissors and a hook. A drain was placed in the residual cavity for 48 hours. All patients were followed at one, three and six months, and then yearly by ultrasound and serology. The duration of surgery, morbidity, hospital stay and evidence of recurrence were recorded to evaluate the efficacy, feasibility and safety of laparoscopic management. The statistical analysis was carried out using SPSS software.

RESULTS
Out of 53 patients, 21 (39.62%) were male and 32 (60.37%) female. Out of these, in 21 patients underwent pericystectomy while in 32, de-roofing of cyst was done. The age of patients ranged between 14-70 years (mean 43 years). The patients presented with pain in right hypochondrium and dyspepsia. The hydatid cyst was diagnosed in all patients by abdominal ultrasonography, CT scan abdomen and serological tests (immunoelectrophoresis).

Table 1. Hospitalization data (n=53).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number</th>
<th>%</th>
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<tbody>
<tr>
<td>Operative time</td>
<td>Mean 50 minutes (45-110 minutes)</td>
<td></td>
</tr>
<tr>
<td>Total Hospital Stay</td>
<td>Mean 2.5 days (1.5-3.5 days)</td>
<td></td>
</tr>
<tr>
<td>Open conversion</td>
<td>02(3.77%)</td>
<td></td>
</tr>
<tr>
<td>Recurrence</td>
<td>00</td>
<td></td>
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Fifty one patients had solitary cyst and two patients had two cysts. Twenty four cysts were located in segment iv, eighteen in segment v, six in segment iv and five in segment iii. The mean operative time was 50 minutes (range between 45-110minutes) (Table 1). Two patients developed anaphylaxis during the procedure and in the early post operative period, and were managed by i/v steroids and recovered completely. Post-operative hematomata developed in one (1.88%) patient and resolved conservatively. Bile leakage was observed in two (3.77%) patients, which gradually ceased after one week (Table 2).

Table 2. Complications (n=53).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number</th>
<th>%</th>
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<tbody>
<tr>
<td>Anaphylaxis</td>
<td>02</td>
<td>3.77%</td>
</tr>
<tr>
<td>Post-operative Haematoma</td>
<td>01</td>
<td>1.88%</td>
</tr>
<tr>
<td>Post-operative Bile-leakage</td>
<td>02</td>
<td>3.77%</td>
</tr>
<tr>
<td>Post-operative Collection</td>
<td>02</td>
<td>3.77%</td>
</tr>
<tr>
<td>Mortality</td>
<td>00</td>
<td>00</td>
</tr>
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In two (3.77%) patients, an infected subhepatic collection developed after discharge from the hospital. They were rehospitalized and the collection was drained percutaneously with ultrasound guidance. The mean hospital stay was 2.5 days (range 1.5-3.5 days). Conversion to open surgery was done in two (3.77%) patients; in one patient due to bleeding and in other due to multiple cysts found incidentally. No recurrence by radiological and serological examination was observed during the follow-up period of 18 months.

DISCUSSION
Laparoscopic treatment of hydatid cyst liver is increasingly popular, as it offers lower morbidity and shorter hospital stay with faster surgery. In addition, it offers an advantage of better visual control of the cyst cavity under magnification, which allows better detection of small open bile ducts that leak bile. We had one case which needed direct cauterization of small leaking bile duct and another patient where despite caring for leaking, small bile duct continued to drain bile for a week. A disadvantage of laparoscopy is the lack of precautionary measures to prevent spillage under the high intra abdominal pressure caused by pneumoperitoneum. But the length of hospital stay is generally shorter and morbidity rates lower than for open procedures. We had two patients who developed anaphylaxis during the procedure. The peritoneal cavity must be carefully protected during
cyst evacuation and especially at the time of needle insertion in to the cyst and aspiration of the fluid. We used gauzes soaked with scolicidal agents like hypertonic saline or povidone-iodine and the suction catheter on guard. We also inject about 10-20cc of scolicidal agent in the cyst before deroofing and evacuation. The anaphylaxis may also be develop secondary to direct contact of hydatid fluid to blood stream after accidental laceration of the liver; so the cysts surfaces should be included in to peritoneal cavity laparoscopically to avoid such reactions. The cyst should be approached through its fibrotic capsule to avoid liver parenchymal injury. Several techniques and instruments have been described for the removal of the germinative membrane of hydatid cyst. Alper et al used an aspirator-grinder apparatus and Bickel and Eitan recommended the use of a large-bore suction catheter. We used a wide-bore sucker (10mm) for evacuation of the germinative membrane and it was very effective. Some authors used omentoplasty to obliterate the cyst cavity and others used drainage procedure such as tube drainage or suction drain. We obliterated the cavity by omentoplasty in few cases (30%), while in majority (70%) we used tube drainage for 48-72 hours. But no added advantage of omentoplasty was observed and it was time consuming.

Some studies reported 23% to 27% open conversion rate. We converted to open surgery in two (3.77%) patients, due to bleeding and multiple cysts. Patient selection has been addressed by many authors, especially, at an early experience. Some groups have reported 4% to 25% morbidity rate, which is comparable with our study. The recurrence rate ranges from 3-10% following open surgery for hydatid cyst liver. In our series, we did not observe any recurrence. Recurrence has not been reported by another laparoscopic series.

CONCLUSION
It is concluded that laparoscopic management of hydatid cyst of liver is safe, feasible and effective in selected patients with low morbidity and early recovery.

REFERENCES