

Outcome of laparoscopic versus open surgery in patients with hydatid cyst of liver

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Objective: To compare the laparoscopic and open surgery in patients with hydatid cyst of liver in terms of clinical outcome and post-operative complications.

Methodology: This randomized trial was carried over 4 years at the Department of Surgery, Hayatabad Medical Complex Peshawar from December 2015 to December 2019. Out of 95 patients operated during this period, 82 patients following the inclusion criteria were enrolled in the study and were randomly allocated into two groups A and B. 41 patients of group A underwent open surgery and 41 patients of group B underwent laparoscopic surgery. All patients were followed for one year.

Results: Among the 82 patients, the mean age of our patients was 40.26 ± 9.68 years with a male:

female ratio of 1.15:1. Both the groups were similar in terms of age and gender. The mean operative time, median postoperative pain (VAS) score and the duration of hospitalization were lower for the laparoscopic group ($p < 0.001$). Biliary fistula ($p = 0.305$) and cyst recurrence rate ($p = 0.314$) were comparable in both groups and there was lower frequency of wound infection in the laparoscopic group ($p = 0.011$).

Conclusion: Laparoscopic approach is superior to open approach and we found that laparoscopic surgery is safe, effective and feasible management option in hydatid cyst of liver. (Rawal Med J 202;45:806-809).

Keywords: Hydatid cyst, echinococcus granulosus, pericystectomy.

INTRODUCTION

Hydatid disease of the liver is caused by a Cestode *Echinococcus Granulosus*, and is endemic in Central Asia, Far East and Eastern Europe.^{1,2} Due to the increase in international travel, the disease is now common in non-endemic areas.³ The incidence is 50/100,000 population per year in endemic areas.⁴ Humans are intermediate hosts and they get infection when they ingest parasitic ova accidentally. Hydatid cyst consists of three layers: the pericyst, the endocyst and the germinal layer. The fluid inside the hydatid cyst can cause acute allergic reaction.^{5,6} In humans, liver is the most common organ involved (50-93%) followed by lungs, spleen, peritoneum and brain.^{7,8}

Management can be conservative, percutaneous and surgical.¹ Surgery for hydatid cyst was first tried in the 1600's, evolved with time and is now considered the gold standard treatment option.^{9,10} Traditionally, hydatid cysts were treated by open surgical method but now the laparoscopic technique is gaining

popularity. Surgical techniques include deroofing with omentoplasty, cystectomy, pericystectomy and resection of liver segments.^{7,11}

Laparoscopic approach has the advantages of smaller incision with better cosmetic results and recent studies reveals the safety and effectiveness of laparoscopic approach in hepatic hydatid cyst.¹² The aim of our study was to compare the outcome of laparoscopic and conventional open approaches in hydatid cyst of liver in terms of duration of operation, hospital stay, post-operative pain and post-operative complications.

METHODOLOGY

This randomized trial was carried out at the Department of Surgery, Hayatabad Medical Complex, Peshawar, after approval from institutional ethical committee. It included 95 patients with hepatic hydatid disease seen from December 2015 to December 2019 out of whom 82 patients fulfilled the inclusion criteria and were

enrolled in the study via non probability consecutive sampling technique. Patient aged 15- 60 years with cyst only in the liver; size ≥ 5 cm and stage CE 2 and CE 3b on WHO-IWGE classification were included. Those with recurrent disease, concomitant cyst in other organs, cysto-biliary communication and patients with ruptured cyst were excluded.

All were diagnosed based on history, examination, ultrasound and CT scan. They were randomly allocated into two groups A and B using lottery method, with 41 patients in each group. Group A underwent open procedure while Group B had laparoscopic procedure. Albendazole (10 mg/kg) was started in all patients 1 week prior to surgery and continued for 3 months following surgery. Both groups were followed for 1 year with follow-up visits at three months, six months and 1 year.

Open Approach involved opening the abdominal cavity via right subcostal incision, hypertonic saline soaked packs placed around the cyst. 20% saline was injected into the cyst and left for 10 minutes and then contents were aspirated with large bore suction tip. Starting from the puncture site, cystostomy was performed and the bulged pericyst wall was excised using electrocautery. All the germinal membrane and daughter vesicles were extracted and omentoplasty of residual cavity was performed.

Laparoscopic Approach involved pneumoperitoneum and insertion of 30-degree laparoscope through the 10mm umbilical port. Another 10mm trocar was placed at the epigastrium with two other 5mm trocars placed at standard sites in mid clavicular line and anterior axillary line. Hypertonic saline soaked gauze was placed around the cyst. 20% saline was injected in cyst and left for 10 minutes contents were aspirated. A wide cystostomy was done with hook. The cyst cavity was explored and viewed with the camera to extract any remaining daughter cysts. The bulged pericyst wall was excised using ligasure. The excised pericyst wall and germinal membrane were put in plastic bag and removed through epigastric port and omentoplasty of residual cavity was performed.

Statistical Analysis: SPSS version 22 was used for analysis. Data including patient's demographics, duration of operation, hospital stay, postoperative

pain (VAS score) and postoperative complications were obtained on a structured Performa.

RESULTS

The demographic characteristics of both groups are shown in Table 1. The mean operative time was 60.29 ± 5.29 min for open surgery group compared to 54.24 ± 8.67 min of the laparoscopic group ($p < 0.001$). The length of hospitalization and postoperative pain were lower in laparoscopic group and differences were statistically significant ($p < 0.001$) (Table 2).

Table 1. Demographic characteristics.

Demographics		Open group	Laparoscopic group	Overall	p value
Gender	Male	23(56.1%)	24(58.54%)	47(57.32%)	0.823
	Female	18(43.9%)	17(41.46%)	35(42.68%)	
Age		39.88 ± 10.52	40.63 ± 8.87	40.26 ± 9.68	0.726

Table 2. Mean hospital stay, Mean duration of operation and postoperative pain.

Variables	Open Group	laparoscopic Group	P Value
Duration of operation	60.29 ± 5.29 min	54.24 ± 8.67 min	$p < 0.001$
Hospital stay	4.85 ± 1.35 days	3.46 ± 1.32 days	$p < 0.001$
Postoperative pain (VAS Score)	2	4	$p < 0.001$

Table 3. Postoperative complications.

Post-operative complications	Open Group	laparoscopic Group	P Value
Wound infection	6(14.63%)	0	0.011
Biliary fistula	3(7.31%)	1(2.43%)	0.305
Recurrence	0	1(2.43%)	0.314
Total	9(21.95%)	2(4.86%)	0.03

On comparison of overall post-operative complications in both groups, 9 cases in Group A and 2 in Group B developed complications ($p = 0.03$). When these complications were further analyzed, 6 patients in group A with no patient in group B developed wound infection ($p = 0.011$). Post-operative biliary fistula was observed in 1 patient undergoing laparoscopic surgery and 3 patients undergoing open surgery ($p = 0.305$) (Table 3). No recurrence was observed in open group and 1 patient in the laparoscopic group had recurrence ($p = 0.314$). No mortality was noted in either group.

DISCUSSION

Hepatic cystic echinococcosis is mainly diagnosed through imaging techniques. In 1981 Gharbi classification was introduced which is based upon appearance of hydatid cysts on ultrasound. Nowadays, the Gharbi classification has been replaced by WHO Informal Working Group on Echinococcosis (WHO-IGWE) classification which categorized the hydatid cyst into six groups i.e., CL, CE1, CE2, CE3, CE4, and CE5.¹³ Among all treatment modalities, surgical treatment is regarded as gold standard for complete cure of hydatid cyst of liver.¹⁴

With the advancement in technology and experience, laparoscopic approach is becoming more common in the surgical management of Hepatic Hydatid disease.¹⁵ The benefits of laparoscopic procedure compared to open approach include lower hospital stay, decreased incidence of surgical site infection, lower postoperative pain and the ability to explore the cyst cavity that enables to detect cysto-biliary communications.^{16,17} The disadvantages are an increased risk of cyst fluid spillage, anaphylactic shock and peritoneal contamination.^{18,19}

We had more males in our study. A study by Bostanci et al had similar findings.¹² In contrast to our study, Gupta and Kumar had more common in females.³ Our operative time was shorter in laparoscopic approach. Same was found in I another study.² In contrast to our study, Gohil et al reported shorter operative time for the open group. The shorter hospitals stay in the laparoscopic group can be explained by the minimal invasiveness of the laparoscopic procedure. Gohil et al had mean hospital stay of 6.2 days in the Group B compared to 12.4 days in Group A. This minimal tissue dissection also explains the lower post-operative pain that we observed in the laparoscopic group. Similar to our findings, Nooghabi et al also reported a lower post-operative pain for the laparoscopic group.²⁰

We observed 14.63% wound infection rate in the open group with no infection in the laparoscopic group. Study by Bayrak and Altintas also reported an infection rate of 13% in the open group with no infection in laparoscopic group.² We also observed

that 7.31% patients in group A and 2.43% patients in group B developed post-operative biliary fistula ($p=0.305$). During the 12 months follow up we observed only 1 recurrence in Open group with no recurrence in the laparoscopic group ($p=0.314$) while Gohil et al had no recurrence in both groups.¹⁰ On the basis of our results we recommend that laparoscopic surgery is safe, effective and feasible management option in hydatid cyst of liver.

CONCLUSION

Laparoscopic surgery is superior to open approach in terms of duration of operation, hospital stay and postoperative pain. Wound infection rate was also lower in patients who were operated laparoscopically.

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