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Original Research Article

Comparative study of laparoscopic and open surgery in management of 50 cases of liver hydatid cyst

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ABSTRACT

Background: Echinococcosis is caused by parasite called *Echinococcus granulosus* and *Echinococcus multilocularis*. The modern treatment of hydatid cyst of the liver varies from surgical intervention to percutaneous drainage or medical therapy.
Methods: This clinical study was done on 50 patients who had liver hydatid disease admitted in Sir T Hospital, Bhavnagar from August 2013 to February 2016. Patients were divided into two groups consisting of 25 cases in each. Group A: managed by open surgery. Group B: managed by laparoscopic surgery. All patients followed up for 6 months after surgery.
Results: The mean operative time in Group A was 65.2 minutes (range 35-100 minutes) while in Group B it was 76.32 minutes (range 50-100 minutes). Group B patients were mobilised early and resumed duty very fast then Group A. The mean duration of stay in hospital was 12.4 days (range 4-20 days) in Group A and 6.2 days (range 4-12 days) in Group B. Wound infection seen in 16% in Group A and 0% in Group B. General complication rate was 32% in Group A and 8% in Group B. No recurrence noticed in either group during follow up.
Conclusions: Overall laparoscopic management of liver hydatid cyst is cost effective in terms of early mobilization, early discharge and early resumption of work along with cosmetic benefit.

Keywords: Hydatid cyst of liver, Laparoscopy, Open surgery

INTRODUCTION

Echinococcosis is cyclozoonosis caused by the larval stages (metacestode) of cestodes belonging to the genus *Echinococcus*. Humans are the intermediate host (dead end) and animals are both intermediate and definitive hosts.[1] The most common site of occurrence of hydatid cyst in the humans, is the liver (from 50 to 70%).[2] Surgical techniques to remove cysts were first attempted in the 1600's, which has proven to be an effective treatment that and has evolved with medical technology.[3] Treatment of hydatid liver cyst has to be considered mandatory in symptomatic cysts and recommended in viable cysts because of the risk of severe complications. Surgery is still the treatment of choice and can be performed by the conventional open surgery or laparoscopic approach.

Laparoscopic techniques for drainage and unroofing of hydatid cyst have been reported in a number of series with encouraging results.[4] Laparoscopic surgery may be the better option as compared to open surgery due to less morbidity, better cosmetic outcome and overall cost effectiveness. This study compares the result between them in treatment of liver hydatid cyst.

METHODS

This comparative clinical study was carried out on 50 patient who diagnosed as a liver hydatid disease treated in Surgery Department, Govt. medical college and Sir T. Hospital, Bhavnagar from August 2013 to February 2016.

Inclusion criteria

Patients consisting of cyst size greater than 3 cm, single superficial cyst likely to rupture, large cyst with multiple daughter cysts, infected cyst, cyst giving compression to near vital organ and cysts in communication with the biliary tree

Exclusion criteria

Deep intra parenchymal cysts and occupying more than 50% of liver area, posterior cyst, cysts with thick and calcified walls and patients with cysts characterized by heterogeneous complex mass.

Ultrasonography and computed tomography are first choice of imaging tools for diagnosis of liver hydatid cyst and are helpful for identifying any associated complications and for planning treatment.[2]

Preoperative investigations were done. Treatment modalities were planned once the definitive diagnosis of liver hydatid disease is made. All 50 Patients were randomly divided into two groups, either undergoing open or laparoscopic surgery. All patients given tab. Albendazole 10-15 mg/kg/day for 3-4 weeks.[5] Informed consent were taken. Palanivelu hydatid trocar system (PHS) was used in laparoscopic surgery. All patients were sent for pre-operative anaesthetic checkup and only those patient s were posted for surgery who were fit for surgery.

Open surgery

All patient treated under general anesthesia. Antibiotic prophylaxis was given. Steroid and adrenaline should be ready. A midline laparotomy was done in Group A.

Safe decompression of the cyst[1]

All cysts considered infectious were packed with Mop soaked in 15% to 20% saline or 5% cetrimide solution. 10 mm laparoscopy trocar was used to puncture and decompress the hydatid cyst.[6] Large bore suction tips are used to aspirate the cyst. Once the intracystic pressure reduced stay sutures are taken and cyst is incised by electrocautery. The laminated membrane of cyst can be extracted with plain forceps.

Sterilization of the cyst and search for bile duct communication[1]

The sterilization of cyst cavity is achieved by mechanical cleansing and local application of scolicidal agent. The cyst cavity is looked for bile leaks, and loosely packed with the dry, white colored packs soaked in cetrimide. Bile stains are indicative of cysto biliary communication. The exposure time for the scolicidal agents are 10 minutes for 20% saline, 96% alcohol, 10% povidine iodine, 10% formalin, 5% chlorhexidine gluconate. For cetavlon, it is only 5 minutes.

Management of cystobiliary communication and residual cystic cavity[1,7]

In majority of patient cystobiliary communication is sutured with interrupted 3-0 vicryl/PDS. Large, shallow cavities that cannot be obliterated may be left open or covered with the omental flap sutured to the rim The sterilized cyst cavity is closed with the saline solution and closed by the approximating the edges with the running absorbable sutures. Omentoplasty is performed by placing viable omental flap in residual cyst cavity and sutured with vicryl.[8]

Laparoscopic approach

Surgical techniques

The principal of the technique is to puncture, evacuation of the cyst without spillage, sterilization of the cavity, detection of major biliary communications, and management of the residual cavity.[7] Antibiotic are administered 30 min before the operation.

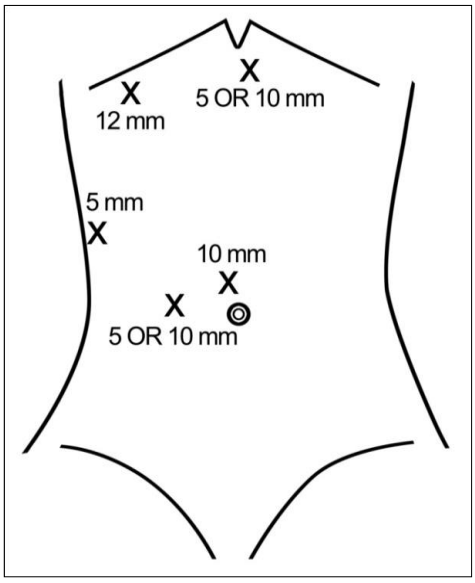

Figure 1: Placement of port for laparoscopy in liver hydatid cyst.

All procedures are performed in the supine position with the patient under the general aneasthesia, pneumoperitoneum is created and an intra-abdominal pressure of 12 mm is achieved. A 30 degree- laparoscope is introduced through a 10mm umbilical port and 10mm

Suction cannula through a subxiphoid port.[8] Two other 5mm trocar are placed at the standard sites i.e. 2-3 cm below sub costal margin in mid clavicular line. The fourth trocar is placed in variable region, generally in the anterior axillary line, several cm below the funds of the gall bladder. A fifth trocar Palanivelu hydatid cyst trocar system is placed in right hypochondriac region according to site of hydatid cyst (Figure 1).

Palanivelu hydatid cyst trocar system (Figure 2) is inserted into the cyst cavity directly through abdominal wall under vision.[6]

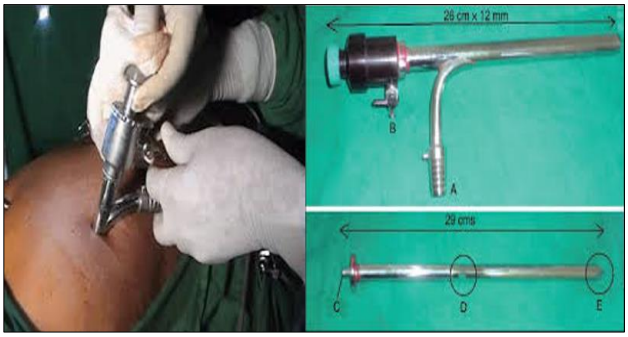

Figure 2: Palanivelu hydatid system.

The cyst content is aspirated and if aspirated material is not stained with bile, an equal amount of hypertonic saline is then introduced into the cyst cavity and left into place for 10 min. The hypertonic saline is then aspirated and a wide cystectomy is done with scissor or hook. The cyst cavity is explored under the direct view with the camera inserted inside the cyst to exclude the residual daughter cyst (Figure 3).

Figure 3: Intra-operative picture of a large hydatid cyst showing multiple daughter cysts within.

Communications with the biliary tree are also checked and sutured if present. Sometimes the communication became evident even after evacuation of the cyst, so it is important always to check with the cavity directly with the camera. The laparoscopic approach gives better visual control of the cyst cavity because of the advantage of the magnification which allows the detection of small open bile ducts.[9,10] Finally a partial pericystectomy was performed (Figure 4), of the protruding walls The germinating membrane is removed in the plastic bag and extracted through the epigastric port suction drainage, and the omentoplasty of residual cavity (Figure 5). Abdomen is washed with the saline.

Figure 4: Appearance of cyst after removal from left lobe of the liver.

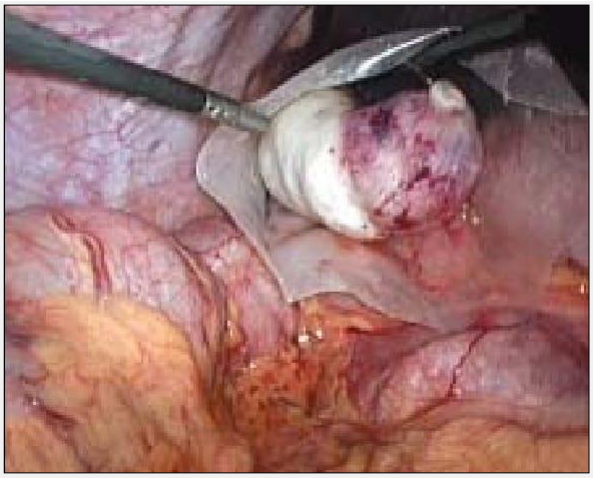

Figure 5: Liver hydatid cyst removal with sterile plastic bag.

Postoperative complication

The most frequent postoperative complications were wound infection, sub phrenic abscess, biliary leak, liver abscess, recurrence. The most frequent complications in the post-operative period were cavity infection and biliary fistula. Most of these complications are treated

with conservative management such as percutaneous USG guided aspiration with course of antibiotic.

RESULTS

For this study, authors have reviewed the data of all patients admitted in the Surgery Department Govt. medical college and Sir T. hospital Bhavnagar, with liver hydatid cyst between December 2006 to August 2016.

A total number of 50 cases of liver hydatid cyst were operated and divided in two groups Group A treated by open surgery (25 cases) and Group B treated by laparoscopy (25 cases).

Age distribution

In present study 80% patients were below 50 yr age, 20% patients were more than 50 years in Group A. In Group B 92% patients were below 50 yr age and 8% were more then 50 yrs. Mean age in Group A was 49.80 years while in Group B it was 47.36 years.

Table 1: Age distribution.

Age group (in years)	Group A N (%)	Group B N (%)
<50	20 (80)	23 (92)
>50	5 (20)	2 (8)
Mean age	49.80 years	47.36 years

Gender distribution

As per data collected total female patients were 29 (58%) and male patient were 21 (42%) in both groups.

Table 2: Gender distribution.

Group	Male N (%)	Female N (%)
Group A	11 (22)	14 (28)
Group B	10 (20)	15 (30)
Total	21 (42)	29 (58)

Table 2: Presenting symptoms.

Symptoms	N (%)
Abdominal pain	40 (80)
Dyspepsia	23 (46)
Vomiting	15 (30)
Fatigue	8 (16)
Asymptomatic	9 (18)
Weight loss	4 (8)
Jaundice	5 (10)
Fever	4 (8)
Allergy	3 (6)

Presenting symptoms

The most common presenting symptoms were abdominal pain (80%) followed by dyspepsia (46%) and vomiting (30%). Very few patients had weight loss, jaundice, fever and allergy. Out of total 50 patients 9 were asymptomatic.

Mean operative time

Mean time duration for Group A (open surgery) is 65 min. (range 35-100 minutes) and in Group B (laparoscopy) is 76 min (range 50-100 minutes) which slightly more but acceptable (p value 0.029). This time difference can be overcome by experts and trained staff facility.

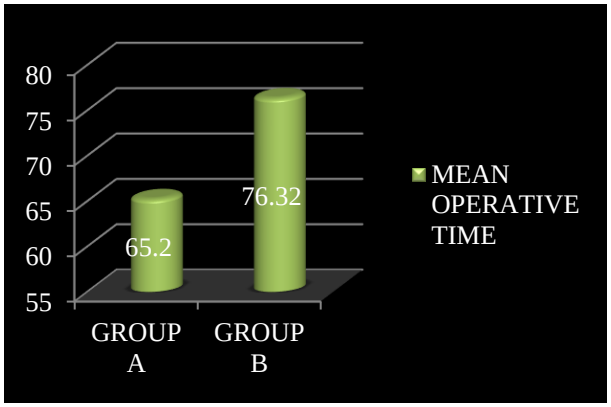

Figure 6: Mean operative time.

Table 3: Comparison of postoperative events.

Parameters	Group A	Group B	P value
Ryle's tube removal	3rd pod	1st pod	0.45
Liquid allowed (mean post op day)	3rd pod	1st pod	0.28
Mobilization of patient	3rd pod	1st pod	0.34
Abdominal drain removal	7th pod	3rd pod	0.38
Post operative analgesia	10 days	4 days	

Comparisons of post-operative events

In Group A Ryles's tube was removed and patient started liquids orally on 3rd pod while in Group B, Ryle's tube was removed and patient started orally on 1st pod. In our study mean time period for removal of abdominal drain in Group A was 7th days and Group B was 3rd days. This conclude that patient can be early mobilized in Group B than Group A. In this study mean time period for removal of abdominal drain in Group A was 7th days and Group

B was 3rd days. This conclude that patient can be early mobilized in Group B than Group A. In our study group A patient required analgesia for more days (10days) as compared to group B (4 days). Hence less morbidity in Group B than Group A.

Comparison of mean duration of hospital stay-in days

The mean duration of stay in hospital was 12.4 days (range 4-20 days) in Group A and 6.2 days (range 4-12 days) in Group B (p=0.023). The mean duration of hospital stay in Group B was less than the Group A.

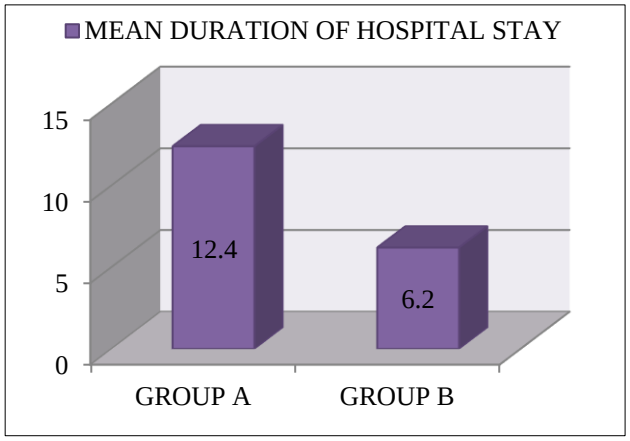

Figure 7: Mean duration of hospital stay.

Table 4: Post-operative complications.

Parameter	Our study	
	Group A N (%)	GroupB N (%)
Anaphylactic shock	1 (4)	0
Wound infection	4 (16)	0
External biliary fistula	3 (12)	1 (4)
Liver abscess	4 (16)	1 (4)

Post operative complications

In this study, we had seen anaphylactic shock in 1 case in the Group A. Patient was managed by intravenous steroid and inj. Adrenaline by anesthetist. Group B has no anaphylactic shock. It was due to availability of instrument like PHS which decreased the rate of spillage. Wound infection had been noticed with seropurulent discharge from laparotomy wound site in 4 patients (16%) in Group A, while it was nil in Group B. These complications were treated conservatively by daily aseptic dressing and antibiotic according to sensitivity report. In Group A 16% of patient had complained of the liver abscess in post-operative follow up, but only 4% in Group A has liver abscess.

The most common complication is external biliary fistula seen in 12% of cases in group A, while it is 4% in Group B. The most of patient were treated conservatively and amount of bile drain decreases dramatically after the bowel transits resumption with complete closure of biliary fistula in 4-8 days. None of the patient required further surgical intervention in any group. All patients in both the groups were followed up for 6 months after surgery. No recurrence of hydatid cyst seen in any group of patients in this study.

DISCUSSION

The laparoscopic management of liver echinococcosis goes by the same principles as in open surgery only using a minimal access approach with limited. maneuverability.[1] In Present study total patient below 50 yr age were 43 in both group (96%) with mean age in Group A was 49.80 years and in Group B, it was 47.36 year. Similar result seen in Zaharie's et al study where mean age is 45.7 years in Group A and 43.8 years in Group B In our study the most common presenting symptoms were abdominal pain (80%) followed by dyspepsia (46%). Similar results were found in study by Milicevic et al where 84.42% patients had complained of abdominal pain and 38.53% patient had dyspepsia.[1]

In this study mean time duration for Group A (Open surgery) is 65 min (range 35 - 100 minutes) and in Group B (laparoscopy) is 76 min (range 50 - 100 minutes) which slightly more but acceptable (P-value 0.029). The mean time durations of our study were very much comparable with study of Zahirie's et al, where mean time duration of surgery in open method was 65 min and in laparoscopy method it was 72 min.[11]

In present study group B ryle's tube was removed and orally liquids started on first post-operative day with abdominal drain removed on third day with less analgesia requirement while in group A ryle's tube was removed and orally liquids started on third post-operative day with abdominal drain removed on seventh day with analgesia requirement for 10 days. The mean duration of stay in hospital was 12.4 days (range 4 - 20 days) in Group A and 6.2 days (range 4 - 12 days) in Group B (p=0.023). The above table shows that the mean duration of hospital stay in our study in Group B was less than the Group A. The data is comparable to the study conducted by Zaharie's and Ciprian et al study. Group B had less burden in term of money and time of patient as well as hospital management.[11,12]

In this study, authors had seen anaphylactic shock in 1 case in the Group A. Patient was managed by intravenous steroid and inj. Adrenaline by anesthetist. Group B has no anaphylactic shock. It was due to availability of instrument like PHS which decreased the rate of spillage. We had noticed wound infection with seropurulent discharge from laparotomy wound site in 4 patients (16%) in Group A, while it was nil in Group B. These complications were treated conservatively by daily aseptic dressing and antibiotic according to sensitivity

report. In Group A 16% of patient had complained of the liver abscess in post-operative follow up, but only 4% in Group A has liver abscess.

The most common complication is external biliary fistula seen in 12% of cases in group A, while it is 4% in Group B. The most of patient were treated conservatively and amount of bile drain decreases dramatically after the bowel transits resumption with complete closure of biliary fistula in 4-8 days. None of the patient required further surgical intervention in any group. Same complication was found in Zaharie's study as 4.65% in case of Group A and it was 2.78% in Group B.[11] All patients in both the groups were followed up for 6 months after surgery. No recurrence of hydatid cyst seen in any group of patients. A post-operative long term follow up is essential. Early post-operative imaging provides a baseline for later comparison. Repeated ultrasonography examination every 6 months is required to rule out reccurence.[1]

Laparoscopic surgery is better compared to open surgery in management of liver hydatid cyst due to less postoperative pain and analgesic requirement, early removal of ryles tube and abdominal drain, and early mobilization of patient, early return of bowel activity so early resumption to liquid diet and soft diet, less duration of postoperative hospital stay, less chance of wound infection, biliary fistula formation, last but not the least, patients had better cosmetic benefit (Figure 8) and overall cost effective.

Figure 8: Postoperative scar in laparoscopy in liver hydatid cyst.

Patient with open surgery had large laparotomy incision scar mark (Figure 9), more postoperative pain and analgesia requirement, delayed oral intake late mobilization, more postoperative wound infection may lead large incisional hernia which may require further surgical treatment in future, more duration of hospital stay. So overall open surgery gives more burden to patient in terms of money and time.

Figure 9: Postoperative large scar of laparotomy in liver hydatid cyst.

Indication of laparoscopic approach in treatment of liver hydatid cyst is constantly changing. It was limited to small cyst only, 15 year ago. Now it can be performed in most of liver hydatid cyst, real contraindication is posteriorly located liver hydatid cyst.[1]

CONCLUSION

In present study suggest that patient of liver hydatid cyst treated by laparoscopy had less postoperative pain with minimal requirement of analgesia, early resumption of diet and daily routine activity, short hospital stay, least or no postoperative complications compared to open surgery. It is overall cost effective and last but not the least is better cosmetic outcome.

The laparoscopic management offers a better alternative to conventional open surgery for the management of liver hydatid cysts and is worthy to be considered for suitable situations. Treatment with laparoscopy require preoperative perfect diagnosis and location of liver hydatid cyst. Intra operative bleeding and slightly more operative time can be overcome by experienced surgeon with expert team in laparoscopy. However Encouraging results of our present study expand the role of minimal invasive surgery in management of liver hydatid cyst with less morbidity and mortality, but it still requires more number of study.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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