

Comparative study of laparoscopic versus open surgery in cases of liver hydatid cysts



Padmane Sagar Gajanan¹, Ajay Patidar², Ashish Pratap Singh³, Priyank Sharma⁴

¹Postgraduate Resident, ²Senior Resident, ³Assistant Professor, ⁴Professor, Department of Surgery, Shyam Shah Medical College, Rewa, Madhya Pradesh, India

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ABSTRACT

Background: Hydatidosis is a zoonotic infection, and treatment is mandatory to avoid complications. The infection can be asymptomatic or severe, causing extensive organ damage and even death of the patient. **Aims and Objectives:** The main aim of this study is to find out the merits and demerits of laparoscopy over that of open surgery in the treatment of hydatid cysts of liver. **Materials and Methods:** This prospective observational study was done on 50 patients who had liver hydatid disease admitted in the Department of Surgery, Shyam Shah Medical College Rewa (M.P.). Patients were divided into two groups consisting of 25 cases in each. Group A: managed by laparoscopic surgery and Group B: managed by open surgery. **Results:** The mean operative time in Group A was 99.6 min, while in Group B, it was 140.4 min. Group A patients were mobilized early and resumed duty very fast then Group B. The mean duration of stay in hospital was 8.64 days (range: 4–20 days) in Group A and 11.84 days (range: 4–12 days) in Group B. Wound infection seen in 9 patients in Group B and 0% in Group A. General complication rate was 32% in Group B and 8% in Group A. No recurrence noticed in either group during follow-up. **Conclusion:** 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.

Key words: Hydatid cyst of liver; Laparoscopy; Open surgery

INTRODUCTION

Hydatid disease is a zoonotic disease caused by the larval phase of *Echinococcus granulosus*.¹

The distribution of this disease is worldwide, and the disease is endemic in certain areas. Hydatidosis is the most general cause of liver cyst in the world has become a worldwide health problem as a result of increased travel and emigration.²

Dog is a definitive host and sheep is an intermediate host, humans are the accidental intermediate host. Humans ingest tapeworm eggs excreted in feces of infected dogs.³ These eggs will hatch in the intestine of human and form larva. The larva penetrates the wall of the intestine and enters the blood circulation. The majority settles in the

liver and a few go to the brain, lungs, kidney, spleen, heart, bone, and several other unusual sites.⁴

Treatment involves antihelminthic regimen followed by surgery. Conventional surgery requires a large incision with concomitant morbidity for this benign condition.⁵ With the advent of laparoscopic surgery, the same goals can be achieved with less morbidity and early recovery.⁶

Liver hydatid cysts have been subjected to laparoscopic surgery since 1992. Nevertheless, most of the experience has been in the form of anecdotal case reports or a small number of case series,² and the controversies about the laparoscopic treatment of liver hydatidosis have not been resolved. Due to the possibility of serious complications, treatment of hydatid liver cysts should be regarded as mandatory in cases of symptomatic cysts and recommended

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Address for Correspondence:

Dr. Padmane Sagar Gajanan, Postgraduate Resident, Department of Surgery, Shyam Shah Medical College, Rewa, Madhya Pradesh, India. **Mobile:** +91-7666067391. **E-mail:** sagarpadmane@gmail.com

in cases of viable cysts. Surgery is still the preferred course of treatment and can be carried out through laparoscopic or open procedures. This study compares the result between them in treatment of liver hydatid cyst.

Aims and objectives

The main aim of this study is to find out the merits and demerits of laparoscopy over that of open surgery in the treatment of hydatid cysts of liver.

MATERIALS AND METHODS

This comparative clinical study was carried out on 50 patients who diagnosed as a liver hydatid disease treated in Surgery Department, Government Shyam Shah Medical College from April 2021 to June 2022.

Inclusion criteria

1. Able to freely give written informed consent to participate in the study and have signed the informed consent form for the particular procedure
2. Patient completed with preoperative albendazole treatment as per protocol (mention below) and requiring surgery.

Exclusion criteria

1. Patients with blood coagulation abnormalities
2. Patients with the presence of extrahepatic hydatid cyst
3. Patients who were pregnant
4. Patients with liver hydatid cysts having thick and calcified wall.

Patient data collection

The patients under study according to inclusion criteria were admitted in surgical wards. Patients were examined clinically and relevant hematological and radiological investigations were done. After preanesthetic fitness, patients underwent surgery and were shifted to recovery room. Pre-operative and post-operative data were acquired and enter in predesigned pro forma till the patient was discharge. Follow-up of patients was done after 3 months from date of discharge. All these demographic details, diagnosis, and associated comorbidities were entered in predesigned pro forma and all these data were tabulated in master chart for further detail analysis.

Methods

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 (Group A=laparoscopic surgery and Group B=open Surgery), either undergoing laparoscopic or open surgery. Informed written consent for surgery and for the study was taken.

Table 1: Mean operative time

S. No.	Group	Mean	SD	P-value
1	Group A	99.6	10.890	0.0010
2	Group B	140.4	22.81	

Table 2: Mean duration of hospital stay

S. No.	Group	Mean	SD	P-value
1	Group A	8.64	1.186	0.0268
2	Group B	11.84	1.599	>0.10

Table 3: Post-operative complications

S. No.	Complications	Group A	(%)	Group B	(%)
1	Fever	05	17.85%	13	59.09
2	Wound Infection	00	00	09	40.90
3	Biliary leak	00	00	06	27.27
4	Abscess	00	00	02	9.09
5	URTI	00	00	05	22.72
6	Cholangitis	00	00	00	00
7	Remaining cavity	00	00	00	00
8	Septicemia	00	00	04	18.18
9	Anaphylitic shock	00	00	01	4.54

Table 4: Comparison of postoperative events

S. No.	Postoperative events	Group A	Group B	P-value
1	Ryle's tube removal	1 st pod	3 rd pod	0.45
2	Liquid allow (mean postop day)	1 st pod	3 rd pod	0.28
3	Mobilization of patient	1 st pod	3 rd pod	0.34
4	Abdominal drain removal	3 rd pod	7 th pod	0.38
5	Post-operative analgesia	4 day	10 days	

Laparoscopic approach

The principal of the technique is to puncture, sterilization of the cavity, evacuation of the cyst without spillage, detection of major biliary communications, and management of the residual cavity. IV antibiotic (Ceftriaxone+Sulbactam 1.5 g) is administered preoperatively.

All procedures are performed in the supine position with the patient under the general anesthesia, pneumoperitoneum is created, and an intra-abdominal pressure of 12 mmHg is achieved. A 30° laparoscope is introduced through a 10 mm umbilical port and 10 mm suction cannula through a subxiphoid port. Two other 5 mm trocars are placed at the standard sites, i.e., 2–3 cm below subcostal margin in midclavicular line. The fourth trocar is placed in variable region, generally in the anterior axillary line, several centimeter below the fundus of the gallbladder. A fifth trocar is placed in right hypochondriac region according to site of hydatid cyst (Figure 1).

The hydatid cysts are identified and confirmed, and content is aspirated and if aspirated material is not stained with bile,

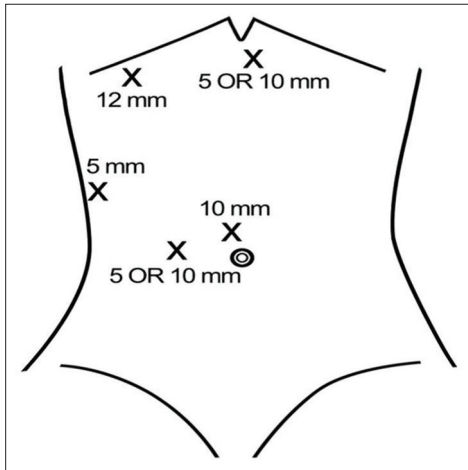


Figure 1: Placement of port for laparoscopy in liver hydatid cyst

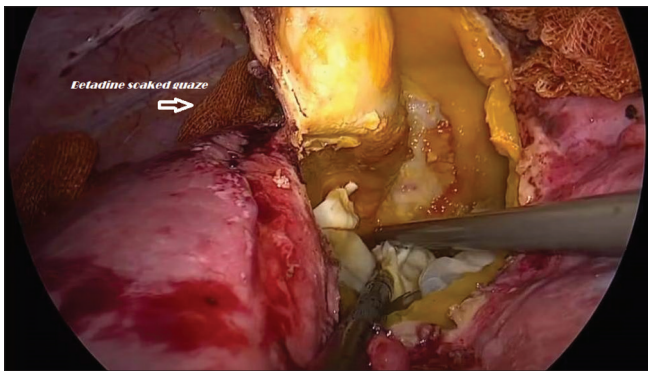


Figure 2: Laparoscopic image of open big hydatid cyst

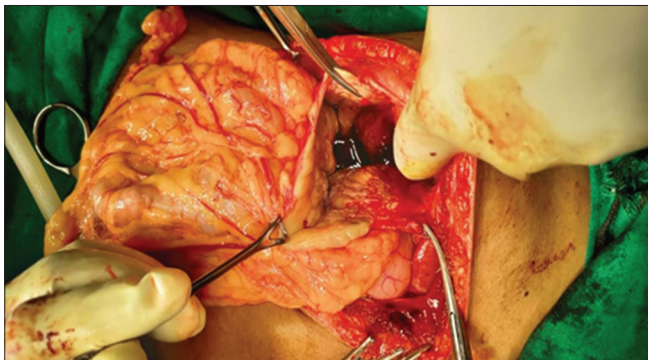


Figure 3: Open cavity of hydatid cyst with viable momentum

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 2).

Finally, a partial pericystectomy was performed, 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 done and drain placed in the cavity.

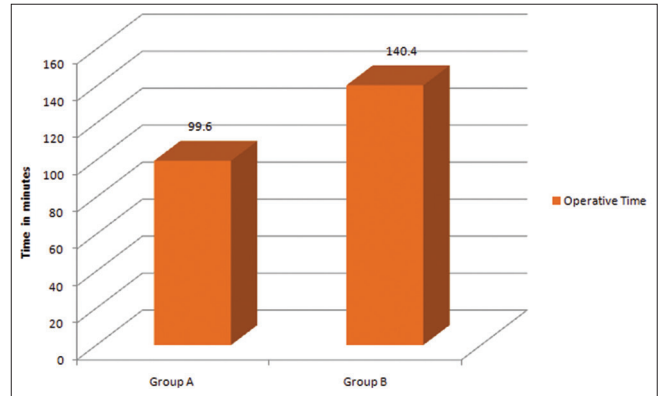


Figure 4: Mean operative time

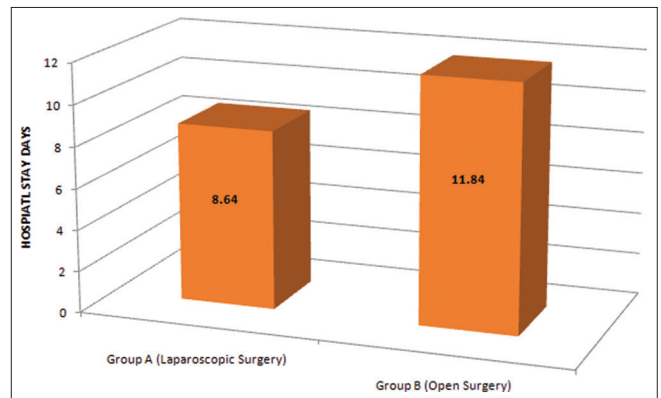


Figure 5: Mean duration of hospital stay

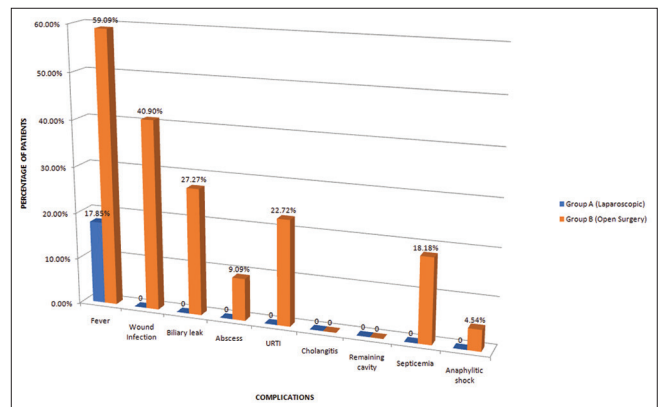


Figure 6: Post-operative complications

Open surgery

Antibiotic prophylaxis was given. A subcoastal abdominal incision was made. All cysts considered infectious were packed with Mop soaked in 20% saline. 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 (Figure 3).

The disinfection of cyst cavity is achieved by suction drainage and local instillation of scolicidal agent (15%

hypertonic saline). The cyst cavity is looked for bile leaks and loosely packed with the dry, white-colored packs soaked in cetrimide. Omentoplasty is performed by placing viable omental flap in residual cyst cavity and drain placed in cavity.

Post-operative care

After the surgery of patients (laparoscopic or open surgery) shifted to recovery room and was monitored for drain output, Ryle's tube output, urine output, chest auscultation, and as per need post-operative investigation were done.

Follow-up

Both patients (laparoscopic or open surgery) after discharge were followed up for 3 months at regular interval.

RESULTS

For this study, authors have reviewed the data of all patients admitted in the Surgery Department of Government Shyam Shah Medical College Rewa (M.P.) associated with Sanjay Gandhi Memorial Hospital, Rewa, with liver hydatid cyst between April 2021 and July 2022.

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

Mean time duration for Group A (laparoscopic Group) is 99.6 ± 10.890 min and in Group B (open Surgery) is 140.4 ± 22.81 min which slightly more but acceptable (P value for Group A and Group B is 0.0010). This time difference can be overcome by experts and trained staff facility (Table 1 and Figure 4).

The mean duration of stay in hospital was 8.64 days in Group A with 0.0268 P=11.84 days in Group B with $P > 0.10$. The mean duration of hospital stay in Group A was less than the Group B (Table 2 and Figure 5).

In this study, wound infection had been noticed with seropurulent discharge from laparotomy wound site in 9 patients (40.90%) in Group B, whereas it was nil in Group A. These complications were treated conservatively by daily aseptic dressing and antibiotic according to sensitivity report. In Group A, no patient had complained of the liver abscess in post-operative follow up, but only 2 patients, 9.09% in Group B has liver abscess.

The most common complication is fever seen in 17.85% of cases in group A, whereas it is 59.09% in Group B. The most of patients 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 patients required further surgical intervention in any group. All patients in both the groups were followed up for 3 months after surgery. No recurrence of hydatid cysts seen in any group of patients in this study (Table 3 and Figure 6).

In Group A, Ryle's tube was removed, and the patient started liquids orally on 1st POD, whereas in Group B, Ryle's tube was removed and patient started orally on 3rd POD. In our study, mean time period for removal of abdominal drain in Group A was 3rd day and Group B was 7th day. This concludes that the patient can be early mobilized in Group A than Group B. In this study, mean time period for removal of abdominal drain in Group A was 3rd days and Group B was 7th days. This concludes that patient can be early mobilized in Group A than Group B. In our study Group A, patient required analgesia for more days (4 days) as compared to Group B (10 days) and hence less morbidity in Group A than Group B (Table 4).

DISCUSSION

In this study, mean time duration for Group A (laparoscopy) is 99.6 ± 10.890 min (range 90–150 min) and in Group B (Open Surgery) is 140.4 ± 22.81 min (range 100–200 min) which slightly more but acceptable ($P = 0.0010$). The mean time durations of our study were very much comparable with study of Zaharie et al.,⁶ 2013 where mean time duration of surgery in open method was 65 min, and in laparoscopy method, it was 72 min. Furthermore, in a study done by Gohil et al.,⁷ 2020, they reported that those patients who had laparoscopic surgery had 76 min mean time duration.

In the present study, Group A Ryle's tube was removed and orally liquids started on 1st post-operative day with abdominal drain removed on 3rd day with less analgesia requirement, while in Group B, Ryle's tube was removed and orally liquids started on 3rd post-operative day with abdominal drain removed on 7th day with analgesia requirement for 10 days. The mean duration of stay in hospital was 8.64 ± 1.186 days in Group A with $P = 0.0268$ and 11.84 ± 1.599 days in Group B with $P > 0.10$. The study data show that the mean duration of hospital stay in our study in Group A was less than the Group B. The data were comparable to the study conducted by Gohil et al.,⁷ 2020, Zaharie et al.,⁶ 2013 study. Group B had less burden in terms of money and time of patient as well as hospital management.

We had noticed wound infection with seropurulent discharge from laparotomy wound site in 9 patients (40.90%) in Group B, whereas it was nil in Group A. These complications were treated conservatively by daily aseptic dressing and antibiotic according to sensitivity report. In Group B, 9.09% of patients had complained of the liver abscess in post-operative follow-up, but in Group A, there was no liver abscess. Gohil et al.,⁷ 2020, also had similar results in all aspects.

In Group A, 17.85% of patients had complained of fever, and in Group B, 59.09% patients showed fever after surgery. It is very normal to complain of fever after any type of surgeries.

In Group B, 18.18% and 22.72% of patients after surgery complain septicemia and URTI, respectively.

The most common complication is external biliary fistula seen in 27.27% of cases in Group B, whereas it is nil in Group A. The most of patients 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 patients required further surgical intervention in any group. Same complication was found in Zaharie et al.,⁶ 2013 study as 4.65% in case of Group A, and it was 2.78% in Group B. All patients in both the groups were followed up for 3 months after surgery. No recurrence of hydatid cyst was 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 3 months is required to rule out recurrence.

Laparoscopic surgery is better compared to open surgery in the management of liver hydatid cyst due to less postoperative pain and analgesic requirement, early removal of Ryle's 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, and overall cost-effective.

Limitations of the study

For better comparison this study needs be done on a larger study group.

CONCLUSION

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 requires

preoperative perfect diagnosis and location of liver hydatid cyst. Intraoperative 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 the management of liver hydatid cysts with less morbidity and mortality.

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Authors' Contributions:

PSG- Concept and design of the study, prepared first draft of manuscript; **PS**- Interpreted the results; reviewed the literature and manuscript preparation; **APS**- Concept, coordination, preparation of manuscript and revision of the manuscript; **AP**- Preparation of manuscript, statistical analysis and interpretation and revision of the manuscript.

Work attributed to:

Shyam Shah Medical College and Associated Sanjay Gandhi Medical Hospital and Gandhi Medical Hospital Rewa, Madhya Pradesh, India.

Orcid ID:

Padmane Sagar Gajanan - <https://orcid.org/0009-0002-3876-9723>

Ajay Patidar - <https://orcid.org/0000-0002-8513-3325>

Ashish Pratap Singh - <https://orcid.org/0000-0002-4898-995X>

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