

Laparoscopic Approach Versus Open Approach in the Treatment of Hydatid Cyst of the Liver, a Prospective Trial

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Background: Hepatic hydatid cyst has been traditionally managed by the open approach. Laparoscopy has provided an alternative approach for the open technique in many procedures. The aim of this study was to evaluate the role of the laparoscopic approach versus the open approach in the management of the hepatic hydatid cyst.

Patients and methods: A prospective study was conducted over three years including 30 patients suffering from hepatic hydatidosis. They were divided into two groups each 15 patients. One group was treated by open approach while the other laparoscopically. The two groups were compared in relation to the intraoperative bleeding, anaphylactic reaction, operative time, postoperative bile leak, infection and length of the hospital stay.

Results: The mean time of the open approach (group I) was 111.33 minutes while in the laparoscopic approach was 96.73 minutes. One patient suffered from bleeding and another patient from reaction in the laparoscopic group. One patient suffered from bile leak and 3 patients suffered from postoperative wound infection in the open group. The length of the hospital stay was significantly shorter in the laparoscopic group than the open group.

Conclusion: The laparoscopic approach is safe and effective in the management of the hepatic hydatid cyst with less morbidity and shorter hospital stay.

Key words: Laparoscopic hydatid cyst excision, hepatic hydatid, management of hydatid disease.

Introduction:

The hydatid disease is an infestation caused by the larval (cyst stage) of the tapeworm *Echinococcus granulosus* which lives in the dogs.¹

The liver is the major organ affected (75% of cases) either in the alveolar (multilocular) or cystic form. The cyst is made of internal cellular layer (the germinal layer) and an outer laminated acellular layer. The host reaction to the parasite causes a fibrous tissue layer (the pericyst).²

Hepatic hydatid cyst is most commonly located in the right lobe of the liver mostly the anterior inferior segment. The cyst may be asymptomatic or discovered accidentally. Symptoms include dull pain in the right upper quadrant or distention. Complication may occur including infection, spread or rupture with the life threatening anaphylactic reaction.

Patients may also present with abdominal mass or vomiting, yet jaundice is rare.³

Methods of diagnosis include ultrasonography which is considered the method of choice followed by the computed tomography (CT scan) and magnetic resonance imaging (MRI).⁴ Serological tests are helpful based on the detection of anti-hydatid antibodies.⁵

Treatment options include medical treatment with albendazole and mebendazole which have proven to be useful in patients with hydatidosis of the liver and the lung.⁶

The main methods of management of liver hydatid disease include surgery (open or laparoscopic) and percutaneous drainage (puncture and aspiration injection and reaspiration; PAIR).⁷

The laparoscopic approach for treatment of hepatic hydatid disease was first proposed

in 1992. The advantages of the laparoscopic approach include shortened hospital stay and less postoperative pain. The disadvantages include difficult access and increased risk of spillage intraoperatively.⁸

Patients and methods:

The study was conducted for 3 years from December 2011 till December 2014 and consisted of 30 patients with hepatic hydatid cyst. The study took place in the department of general surgery, El-Demerdash hospital, Ain Shams University in Cairo. The study included 18 males and 12 females. Age ranged from 29-58 years.

Exclusion criteria were:

- Patients unfit for general anesthesia,
- Multiple cysts (more than 2),
- Recurrent cysts,
- Cysts with biliary connection
- Patients with coagulation abnormalities.
- Cysts in segment 1 and 7 (posterior location).

The patients were divided into two groups: group I (open approach) and group II (laparoscopic approach) each containing 15 patients. Informed consent was obtained from each subject.

The main complaints were dull abdominal pain mainly in the epigastrium or the right hypochondrium, mass or accidentally discovered.

All patients underwent plain x-ray abdomen, abdominal ultrasound, computed tomography scan and serum hydatid antibody titre.

Preoperative antiparasitic albendazole with a dosage of 10 mg/kg/day for continuous 7 days was administered in all patients.

Procedures:

Open approach: All patients were subjected to general anaesthesia. Prophylactic antibiotic was administered intraoperatively. A midline or right sub-costal (Kocher's) incision was done according to the site of the cyst. Deepening of the wound was done cutting through the sheath and the peritoneum till reaching the abdominal cavity.

Meticulous exploration of the abdominal

cavity was done and dissection of any adhesions around the cyst was performed. The site of the cyst was surrounded with gauze pieces soaked with 20% hypertonic saline to guard against any spillage. A small incision was made in the cyst and suction of the contents was done. Injection of 20% hypertonic saline was done and left for 5 minutes before being aspirated. This process was done 2-3 times. Extraction of the germinal membrane was done and removal of any daughter cysts was carried out.

This was followed by placing the omentum in the cyst cavity and securing any bleeding points. Insertion of an intrabdominal drain was done and closure of the abdominal wall in layers was performed.

Laparoscopic approach: All patients were subjected to general anesthesia. Establishment of pneumoperitoneum was done using carbon dioxide. A 10 mm trocar was inserted through a periumbilical incision. A 30° scope was inserted and exploration of the abdominal cavity was done followed by localization of the cyst site. Another 10 mm trocar was inserted in the epigastrium as a working port. One or two 5 mm ports were inserted according to the site of the cyst.

Isolation of the site of the cyst was done using gauze pieces soaked with 20% hypertonic saline to guard against any spillage of the cyst contents. A small puncture was made in the cyst with a suction cannula inserted through the other port to aspirate any content of the cyst that may spill out. Complete suction of the hydatid fluid was done followed by injection of 20% hypertonic saline and left in place for 5 minutes then aspirated. This process was done 2-3 times. This was followed by complete removal of the germinal membrane and all the contents of the cyst. An omental flap was put to fill the cavity after cyst removal. Insertion of an intraabdominal drain was done with closure of the port sites.

Statistical methods: All statistical analysis were performed using the SPSS 17 software package. Statistical comparative analysis were performed using the χ^2 test and the t test. A p value lower than 0.05 was considered to

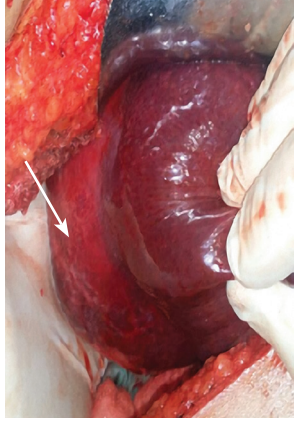


Figure (1): Hydatid cyst in the right lobe of the liver (arrow).

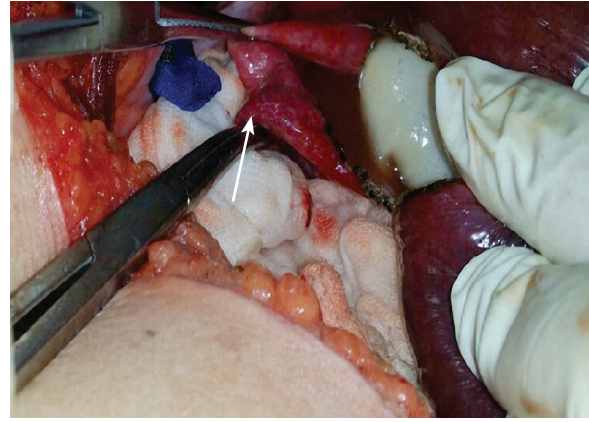


Figure (2): Cyst wall after aspiration(arrow).



Figure (3): Cyst excised and applying omentum on raw area (arrow).



Figure (4): Cyst wall after excision.

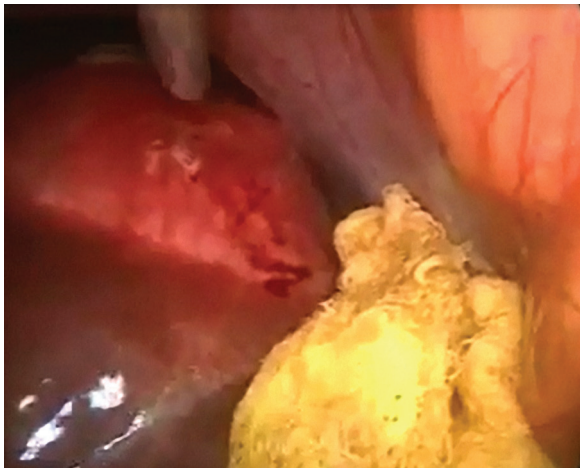


Figure (5): Haydatid cyst of the dome of the Rt. Lobe of the liver.



Figure (6): Aspiration of the haydatid cyst.

denote statistical significance.

Results:

Thirty patients were included in the study 18 males and 12 females. They were divided into two groups: group I (open approach) and group II (laparoscopic approach). The study was conducted in the department of general

surgery, El-Demerdash hospital, Ain Shams University in Cairo from May 2012 till May 2015.

Patients' demographics: Sex: In group I, there were 10 males (66.7%) and 5 females (33.3%), While group II, there were 8 males (53.3%) and 7 females (46.7%).

Age: In group I, the mean age was

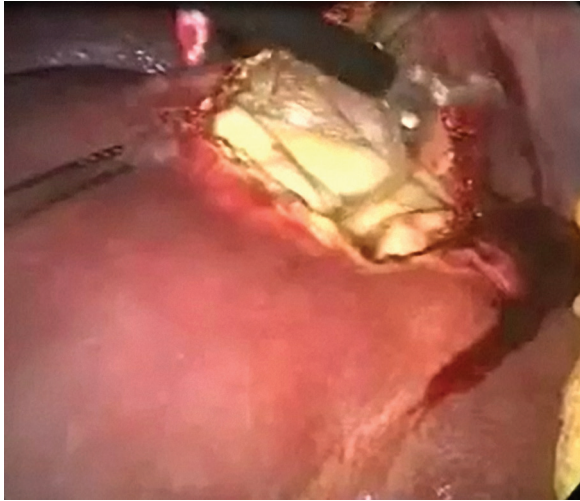


Figure (7): Deroofing of the cyst.

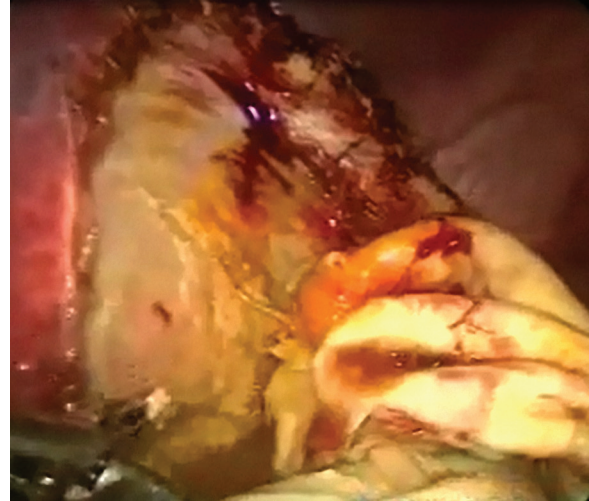


Figure (8): The inner membrane of the cyst.

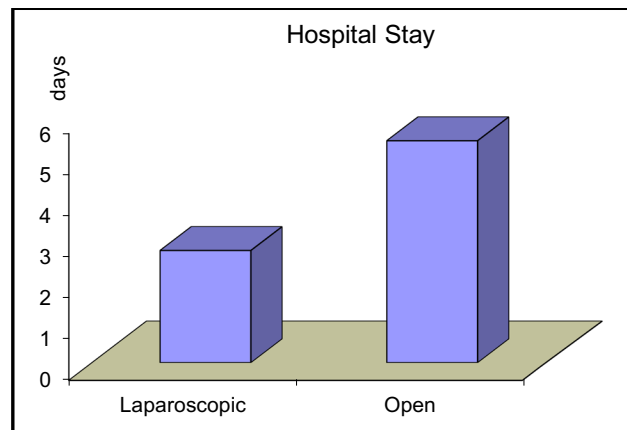


Figure (9): Comparison between the open and laparoscopic approach regarding the length of hospital stay (statistically significant).

Table (1): preoperative complaints in the two groups.

No. (%)		Group I	Group II	P value
		No. (%)	No. (%)	
Complaint	Asymptomatic	1 (6.7%)	1 (6.7%)	>0.05
	Mass	4 (26.7%)	3 (20.0%)	
	Pain	10 (66.7%)	11 (73.3%)	

Table (2): comparison of the cyst number, location and size between the two groups.

No.		Group I		Group II		P value
		No.	%	No.	%	
No. of cysts	One	12	80%	12	80%	1.000
	Two	3	20%	3	20%	
Location	Both lobes	1	6.7%	1	6.7%	0.654
	Left lobe	2	13.3%	4	26.7%	
	Right lobe	12	80%	10	66.7%	
Size of cyst	Mean±SD	4.97±0.83		5.20±0.80		0.440
	Range	4-6.5		4-7		

Table (3): comparison between the two groups regarding the operative time, intraoperative complications and the postoperative complications.

No. (%)		Group I	Group II	P value
		No. (%)	No. (%)	
Time of the procedure	Mean ± SD	111.33 ± 22.34	96.73 ± 21.97	0.082
	Range	88 - 165	72 - 139	
Intraoperative complications	Reaction	0 (0%)	1 (6.7%)	0.343
	Bleeding	0 (0%)	1 (6.7%)	
Postoperative complications	Bile leak	1 (6.7%)	0 (0%)	0.099
	Infection	3 (20%)	0 (0%)	

42.33±8.17 years (29-58 years), while group II was 43.27±6.73 years (30-53 years) (P-value: >0.05 statistically insignificant).

Patients' preoperative complaints **Table (1):**

In group I, one patient was asymptomatic and was accidentally discovered during a routine abdominal ultrasound while 4 patients suffered from an abdominal swelling and 10 patients complained from right hypochondrial pain.

In group II, one patient was asymptomatic and was accidentally discovered while 3 patients suffered from an abdominal swelling and 11 patients complained from right hypochondrial pain.

Pathologic characteristics of the cysts among the two groups **Table (2):**

In group I (15 patients), 12 patients had one cyst (of them 10 patients had one cyst in the right lobe and 2 patients had one cyst in the left lobe) while 3 patients had two cysts (of them 2 patients had two cysts in the right lobe and one patient had one cyst in each lobe). The size of the cyst ranges from 4 cm to 6.5 cm with a mean size of 4.97 cm.

In group II (15 patients), 12 patients had one cyst (of them 8 patients had one cyst in the right lobe and 4 patients had one cyst in the left lobe) while 3 patients had two cysts (of them 2 patients had two cysts in the right lobe and one patient had one cyst in each lobe). The size of the cyst ranges from 4 cm to 7 cm with a mean size of 5.2 cm.

Thus there is no statistically significant difference between the two groups p value >0.05.

Time of the procedure, intraoperative and postoperative complications **Table (3):**

The mean time of the open approach (group I) was 111.33 minutes ranging from 88 minutes to 165 minutes with the 3 patients having two cysts acquiring more time 132–165 minutes while the patients with one cyst ranging from 88–128 minutes. The meantime for the laparoscopic approach (group II) was 96.73 minutes ranging from 72 minutes to 139 minutes with the 3 patients having two cysts acquiring more time 130–139 minutes while the patients with one cyst ranging from 72–107 minutes. As for the intraoperative complications, none of the patients of the open approach had anaphylactic reaction, bleeding or any other complication while in the laparoscopic approach one patient had intraoperative bleeding from the liver bed which was managed laparoscopically with the harmonic and one patient had minor anaphylactic reaction that was managed with IV hydrocortisone and IV fluids without further consequences. In the postoperative period, one patient in the open approach group had a minor bile leak manifested in the drain and was treated conservatively, and 3 patients had infection of the surgical wound and received IV antibiotics according to the culture with daily dressing till wound healing while none of the patients of the laparoscopic group had postoperative complications.

Length of hospital stay: In the open group (group I), the mean hospital stay was 5.40±3.18 days ranging from 3–14 days with the patients suffering from post-operative complications requiring more hospital stay

(1 case with bile leak took 14 days while 3 cases with wound infection took 6, 9 and 10 days). In the laparoscopic group (group II), the mean hospital stay was 2.73 ± 0.88 days ranging from 2–5 days with most patients discharged within the first 3 days and only the two patients with the intraoperative complications discharged later (1 patient with intraoperative bleeding discharged on the 5th day and 1 patient with intraoperative reaction discharged on the 4th day). The p value was 0.004 which is statistically significant ($p < 0.05$).

Discussion:

Hydatid disease of the liver had many presentations. It may be asymptomatic or it may present with abdominal pain or mass or hepatomegaly. Nonetheless, abdominal pain and mass remain the main presentations. Ultrasonography and Computed tomography (CT) are the most commonly used imaging methods for the diagnosis of hepatic hydatid disease.⁹

Surgery is the gold standard in terms of treatment for patients with hydatid disease of the liver. Laparoscopy is ideal in patients with superficial and fluid-filled cysts.⁹

The development in technology and the increasing number of more experienced surgeons in laparoscopic surgery has led to the introduction of laparoscopic management of hydatid disease of the liver.^{10,11}

Recently, laparoscopic treatment of hepatic hydatid disease became popular and underwent a revolution hand in hand with the progress in laparoscopic surgery. It is an encouraging approach with minimum morbidity and mortality.¹²

In this study, 30 patients with hepatic hydatid cysts were divided into two groups (each 15 cases) where one group was managed by open approach and the other group by the laparoscopic approach. The main surgical principals were adopted in the two approaches where the cyst was isolated, aspirated, injected with scolecidal hypertonic saline 20% and reaspirated. This was followed by excision of the cyst and application of omentum in place.

The characteristics of the cysts were similar in the two groups excluding those in segments 1 and 7. The most common finding was a single cyst in the right lobe of the liver. The operative time was slightly shorter in the laparoscopic group (average 96.73 minutes and range from 72–136 minutes) which is similar to the study done by Goyal et al.⁹ in 2013 (50–120 minutes) in comparison with the open group (average 111.33). This is due to the fact that the laparoscopic group lacks the time for exposure and closure of the abdomen and also due to increased surgical experience in laparoscopy.

As for the intraoperative morbidity, there was no statistical significance ($p > 0.05$) between the two groups which is similar to the study done by Tuxunet al.¹³ in 2014. The open group showed no intraoperative bleeding or reaction while the laparoscopic group had one patient (6.7%) with bleeding from the liver bed that was managed laparoscopically and one patient (6.7%) with mild anaphylactic reaction that was managed with IV hydrocortisone and IV fluids.

In respect to the postoperative morbidity, the open group showed more complications (26.7%) than the laparoscopic group in the form of the surgical wound infection (3 cases, 20%) and one case of bile leak (6.7%) which is statistically not significant ($p > 0.05$). This is in agreement with the study done by Tuxunet al.¹³ and Zaharie et al.¹⁴ Yet the statistical analyses of the postoperative outcome showed that the incidence of wound complications were more common in the open group.

The length of the hospital stay was significantly lower in the laparoscopic group than the open group (p value < 0.05). The mean hospital stay for the laparoscopic group was 2.73 days while in the open group was 5.4 days. This is in agreement with the study done by Tuxunet al.¹³ and the study done by Zaharie et al.¹⁴

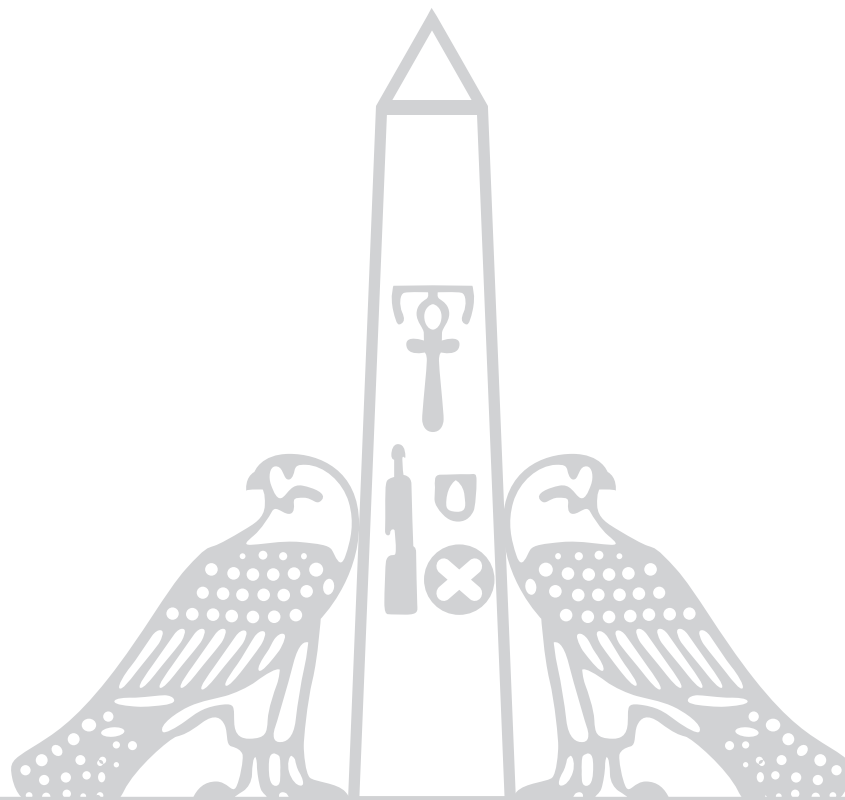
Conclusion:

The hepatic hydatid cyst can be managed safely by the laparoscopic approach in selected patients. It had all the advantages of the laparoscopy with less morbidity in

comparison to the open approach with significantly shorter hospital stay. It should be considered as an effective approach especially in experienced hands.

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