



Original Article

Laparoscopic Management of Hepatic Hydatid Cysts: A Case Series

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Abstract

Objective: This study aimed to evaluate the efficacy of laparoscopic methods in managing hepatic hydatid cysts.

Methods: A prospective descriptive case series was conducted in the Surgery Department at Lahore General Hospital, located in Lahore, from August 2020 to June 2021. This study included 100 patients who met the inclusion criteria. After acquiring ethical clearance from institution informed consent from all patients was acquired before surgery under general anesthesia. Operative time was recorded during the procedure. Patients were followed-up in the OPD for the detection of port site infection, bile leak, and recurrence. Data was entered and analyzed through statistical package for social studies (SPSS).

Results: Participants in the study had a mean age of 39.63±9.32 years. The sample comprised 61% males (61 individuals) and 39% females (39 individuals). Port site infection was observed in six (6%) patients, bile leakage in 11 (11%) patients, and recurrence in two (2%) patients. No statistically significant association between the duration of the surgical procedure, patient age, sex, cyst location, body mass index (BMI), symptom duration number of cyst and Gharbi classifications ($p>0.05$).

Conclusion: The laparoscopic procedure for hepatic hydatid cyst disease is a highly effective and beneficial approach with a low rate of adverse outcomes.

Keywords: Hepatic Hydatid Disease, Laparoscopic Procedure

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Introduction

Cystic echinococcus, also known as hydatid disease, is prevalent in various regions of the world where sheep farming is common. As global travel and migration rates increase, medical professionals and surgeons in areas where the disease is not typically found may occasionally encounter cases of this condition.^{1,2} Echinococcal larvae may be found in various organs, including the lungs, brain, heart, spleen, and bone, if they bypass the portal system. Hydatid cysts predominantly form in the liver and are affected in approximately 75% of cases. The larvae travel through the portal system from the duodenal wall and settle in hepatic sinusoids, where they develop into cysts, a condition known as cystic echinogranulosis.^{3,4}

Hydatid disease is benign but progressive in nature, which may lead to numerous complications, including suppuration, compression of surrounding tissues, and rupture into adjacent structures.⁵ Anaphylactic shock is an infrequent but serious complication that may occur as a result of rupture and may lead to fatality.⁶ Therefore, Timely diagnosis and management are vital to avert complications and fatalities.⁷

In the modern era, multiple treatment options are available for hydatid cysts, including medical, percutaneous, and combined approaches.^{7,8} However, surgery remains the primary and definitive treatment option in many cases,⁹ depending on the Gharbi score. Surgical options range from complete resection^{10,11} to minimally invasive procedures (percutaneous

aspiration, laparoscopic).^{7,12} The initial report of using laparoscopy to treat liver disorders was published in 1992.⁹ Many studies have documented the use of laparoscopic techniques for treating hepatic hydatid cysts.^{7,9,12,13}

Over the past few years, laparoscopic procedures for treating hepatic hydatid disease have become increasingly common, coinciding with major improvements in laparoscopic and minimally invasive surgical methods.^{3,9,12,14} Despite being a new and promising approach for managing hepatic hydatid cysts with low morbidity and mortality rates, this technique has not yet been documented in the local setting.^{13,14}

Studies on hydatid cyst removal via laparoscopy have yielded varying results. In one study, the average operation duration was 46.27 ± 13.84 minutes. Postoperative issues included port-site infection (6.97%), bile leakage (9.30%), and recurrence (4.65%).¹⁵ A separate study reported a mean surgical time of 52 min for the same procedure. This research noted complications such as port-site infection (3.0%) and bile leakage (13.5%), with no instances of recurrence.¹⁶

This study aimed to assess the effectiveness, potential complications, and patient outcomes associated with laparoscopic techniques used to treat hepatic hydatid disease in a particular group of individuals, allowing us to apply the findings and suggest a more suitable method for improving the management of hepatic hydatid cysts. By implementing the results of this study, we can enhance our future practice and strengthen our ability to treat patients suffering from hepatic hydatid disease more effectively.

Methods

This prospective descriptive case series was conducted from August 2020 to June 2021 at the Department of Surgery of Lahore General Hospital, Lahore. The study utilized an sample of 100 participants, determined using a 5% margin of error, a 5% significance level.

The study included individuals between 20 and 60 years of age who were diagnosed with Echinococcus tapeworm infestation through computed tomography scans. The exclusion criteria included patients with a previous laparotomy, those presenting with ruptured hydatid cysts requiring emergency intervention, and cases involving both sides of the body.

The participants were briefed on the illness, its management, and potential complications before obtaining informed consent. Various personal and

clinical details were recorded, including the patient's name, age, sex, body mass index (BMI), symptom duration, cyst number & location, and Gharbi classification. A single surgical team, aided by a researcher, conducted the operations on all patients under general anesthesia. The operative time was recorded during the procedure. Upon completion of the surgical procedure, the patients were moved to postoperative care units before being sent home. A follow-up appointment was scheduled in the outpatient department 10 days later to assess any signs of infection at the port site or bile leakage. The patients were followed up for 6 weeks to assess recurrence.

SPSS V.25.0. was utilized for data entry and analysis. Numerical variables, including age, symptoms duration, body mass index (BMI), and surgery duration, are presented as means and standard deviations. Qualitative variables such as sex, Gharbi classification, cyst location, and outcome (port site infection, bile leakage, and recurrence) were described as frequency and percentage. The number of cysts was also described as the frequency. Data were stratified according to age, sex, BMI, Gharbi classification, location and number of cysts, duration of symptoms, and duration of surgery. Following post-stratification, statistical analysis was conducted using the chi-square test to evaluate differences in port site infection, bile leakage, and recurrence among stratified groups. Furthermore, a separate independent samples t-test was performed to evaluate the difference in average operative duration. A p-value less than 0.05 was considered statistically significant.

Results

This study included 100 participants. The mean age of the subjects was 39.63 ± 9.32 years. The mean BMI, Symptoms duration and Surgery was 23.15 ± 2.89 kg/m², 7.80 ± 3.48 and 116.5 ± 26.04 . The study included 61 men (61%) and 39 women (39%). (Table: 1)

In our study, cysts in the right location were found in 68(68%) patients and cysts in the left location were found in 32(32%) patients. The mean number of cyst was 3.78 ± 1.59 with minimum and maximum numbers of cysts of 1 and 8, respectively. Type I gharbi clarification was found in 25(25%) patients, type II gharbi clarification in 26(26%) patients, and type III gharbi clarification in 49(49%) patients. In this study, port site infection was found in six (6%) patients, bile leakage was found in 11(11%) patients, and recurrence was found in two (2%) patients.

Table 1: Summary Statistics of Age, BMI & Duration of Symptoms & Surgery

	Mean±SD
Age(Years)	39.63±9.32
BMI (Kg/m2)	23.15±2.89
Duration of Symptoms (months)	7.80±3.48
Duration of Surgery (minutes)	116.5±26.04
Gender	
Male	61(61%)
Female	39(39%)

In patients aged ≤ 40 years, port site infection was noted in two (3.6%) patients, and in patients aged >40 years, port site infection was found in four (8.9%) patients ($p = 0.404$). In male patients, port site infection was noted in four (6.6%) patients, and in female patients, port site infection was found in two (5.1%) patients ($p > 0.999$). Among patients with a BMI of 25 kg/m² or less, 5 (6.8%) experienced port-site infection. In contrast, for those with a BMI > 25 kg/m², only 1 (3.8%) developed port-site infection ($p > 0.999$). In patients with a duration of symptoms of ≤ 8 months, port-site infection was noted in five (8.5%) patients, and in patients with symptoms lasting > 8 months, port-site infection was found in one (2.4%) ($p = 0.396$). Similarly, the number of cysts, gharbi clarification, and cyst location showed statistically insignificant differences between the port-site infections ($p > 0.05$). (Table 2)

Comparison of bile leakage between age, sex, BMI, duration of symptoms, and no. for cyst and gharbi classifications, as shown in Table 4. Statistical analysis revealed no significant differences in the number of cysts, Garbi clarification, or cyst location among the cases of bile leakage ($p > 0.05$). (Table 3)

The study found no statistically significant association between the duration of the surgical procedure and several variables, including patient age, sex, cyst location, body mass index (BMI), and symptom duration. This lack of significant association was also applied to cyst and Gharbi classifications, with p-values exceeding 0.05 in all cases. (Table 4)

Table 2: Stratification of Port site infection with Age, Gender, BMI, Duration of Symptoms, No. of Cyst, Gharbi Clarification & Location of sites

		Port Site Infection		P value
Factors		Yes n(%)	No n(%)	
Age	<40	2(3.6)	53(96.4)	0.404
	>40	4(8.9)	41(91.1)	
Gender	Male	4(6.6)	57(93.4)	0.99
	Female	2(5.1)	37(94.9)	
BMI	≤ 25	5(6.8)	69(93.2)	0.396
	>25	1(3.8)	25(96.2)	
Duration of Symptoms	≤ 8	5(8.5)	54(91.5)	0.24
	> 8	1(2.4)	40(97.6)	
No. of Cyst	≤ 4	4(6.2)	60(93.8)	0.89
	>4	2(5.6)	34(94.4)	
Gharbi Clarification	I	3(12)	22(88)	0.216
	II	1(3.8)	25(96.2)	
	III	2(4.1)	47(95.9)	
Cyst Location	Right	4(5.9)	64(94.1)	0.76
	Left	2(6.2)	30(93.8)	

Table 3: Comparison of bile leakage between age, gender, BMI, duration of symptoms, no. of cyst and gharbi classification

		Bile leakage		p-value
Factors		Yes n(%)	No n(%)	
Age(years)	≤ 40	6(10.9)	49(89.1)	>0.999
	>40	5(11.1)	40(88.9)	
Gender	Male	6(9.8)	55(90.2)	0.747
	Female	5(12.8)	34(87.2)	
BMI	≤ 25	10(13.5)	64(86.5)	0.28
	>25	1(3.8)	25(96.2)	
Duration of symptoms	≤ 8	7(11.9)	52(88.1)	>0.999
	>8	4(9.8)	37(90.2)	
No. of cyst	≤ 4	9(14.1)	55(85.9)	0.319
	>4	2(5.6)	34(94.4)	
Gharbi clarification	i	4(16)	21(84)	0.309
	ii	3(11.5)	23(88.5)	
	iii	4(8.2)	45(91.8)	
Location cyst	Right	10(14.7)	58(85.3)	>0.999
	Left	1(3.1)	31(96.9)	

Table 4: Comparison of duration of surgery between age, gender, location of cyst, BMI, duration of symptoms, and no. of cyst

Factors		Duration of surgery			p-value
		n	Mean	Standard deviation	
Age (Years)	≤ 40	55	116.45	25.89	0.965
	>40	45	116.68	26.52	
Gender	Male	61	116.31	29.79	0.897
	Female	39	116.95	19.1	
Location of cyst	Right	68	113.47	24.84	0.084
	Left	32	123.12	27.7	
BMI	≤ 25	74	115.66	28.67	0.563
	>25	26	119.11	16.63	
Duration of symptoms	≤ 8	59	111.44	28.09	0.018
	>8	41	123.93	20.98	
Number of cyst	≤ 4	64	114.03	25.48	0.197
	>4	36	121.05	26.79	

Discussion

Physicians worldwide should be cognizant of the symptoms and treatment of hydatid disease, an ailment endemic to specific regions, as they may occasionally encounter it due to increased global travel and population movement. While the most common mode of transmission is through consumption of unwashed, contaminated fresh produce, direct interaction with infected canines can also lead to contracting the disease, particularly among children. This latter method of transmission is especially concerning due to the unhygienic nature of such contact.¹⁷

The research participants had a mean age of 39.63±9.32 years, with 61% (61 individuals) being male and 39% (39 individuals) being female. A study by C Palanivelu et al revealed that while the youngest participant was 14 years old, the mean age of 38.6 years aligned with the typical age of onset in regions where the condition is endemic.^{16,18} In contrast, areas where the condition is not endemic tend to see an equal distribution across age groups, with patients generally presenting at an older age on average.¹⁹ Contrary to previous research indicating either gender parity in infection rates^{28–30} or a higher prevalence among females, this investigation discovered that males were the primary group affected.^{19,20} One study found that for hydatid cyst removal, the laparoscopic procedure had a mean operative time of 46.27 ± 13.84 min and their observed complications included port-site infections in 6.98% of cases, bile leakage in 9.30%, and recurrence in 4.66% of instances.²¹

A different study reported that 2 (3%) patients developed infections, and 9 (13.7%) experienced biliary leakage. Both complications were managed conservatively.²² Another study found that for hydatid cyst removal, the laparoscopic procedure had a mean operative time of 52 min. reporting complication profile i.e. port-site infection occurring in 3.0% of cases and bile leakage in 13.7% of patients, while no recurrence was observed.²³

Research indicates that older cysts are linked to a higher likelihood of external daughter cyst development, which significantly increases the chance of disease recurrence after surgical intervention.²⁴ Multiple investigations have reported that traditional open surgery carries a recurrence risk ranging from 0.9% to 22%.^{12,13}

Research conducted by Little, et al.²⁵ revealed that the occurrence of cysts, particularly in the retroperitoneal region, increased progressively over time. The recurrence rate had increased to 22.0% after 30 months. No recurrence was observed during this period. The longest follow-up period was seven years. However, not all cases of recurrence require surgery. Asymptomatic cysts of small size have been observed, and some patients shrink even if they do not receive further treatment.

The laparoscopic open approach affords a shorter hospital stay, less invasiveness, a lower frequency of wound infection, and less postoperative pain.^{1,3,9} As very limited data are available on this topic, it is suggested that in the future, more studies should be conducted with larger sample sizes and with better methodology to evaluate the findings of our study.

Conclusion

Research findings indicate that the laparoscopic approach for treating hepatic hydatid cyst disease is highly effective and beneficial, with fewer reported complications. Laparoscopic techniques for managing hepatic hydatid cysts are strongly recommended in settings with limited resources. Notwithstanding the encouraging results observed with laparoscopic approaches for the management of hepatic hydatid cysts, additional research is warranted to comprehensively elucidate their long-term efficacy and potential adverse effects. Subsequent investigations should prioritize comparative analyses of laparoscopic techniques and conventional open surgical methods across heterogeneous patient cohorts with diverse cystic characteristics. Moreover, an assessment of the cost-effectiveness of laparoscopic procedures in resource-constrained environments may yield valuable insights for policymakers and clinicians.

Ethical Approval: The IRB/EC approved this study via letter no 2020/ERC/17 dated March 6, 2020.

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Authors' Contribution

AZ, NA: Conception

MSK, MKR: Design of the work

NS, SM: Data acquisition, analysis, or interpretation

MSK, MKR, NS, SM: Draft the work

AZ, NA: Review critically for important intellectual content

All authors approve the version to be published

All authors agree to be accountable for all aspects of the work

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