Complications in The Laparoscopic Management of Benign Cystic Lesions of The Liver

Shamsuddin Ahmed[1], Mohammed Ruhul Amin[2], S M Mahfuzur Rahman[3], Alamgir Hossan[4]

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*Corresponding author

ABSTRACT

Background: Benign cystic liver lesions, including hydatid cysts, simple cysts, and abscesses, are increasingly detected through routine imaging. While laparoscopic surgery offers a minimally invasive alternative to open procedures, sparse data exist on its safety profile and complications. This study aimed to evaluate the adverse events of laparoscopic management for these lesions. **Methods & Materials:** This prospective observational study was conducted from July to December 2014 at five centres in Dhaka- Bangabandhu Sheikh Mujib Medical University, Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders, Dhaka Medical College Hospital, Shaheed Suhrawardy Medical College, and selected private hospitals. The study included 30 patients with BCLL (HC n=18, SC n=8, LA n=4) undergoing LS. Inclusion criteria comprised symptomatic cysts, cysts >5cm, and failed medical management for LA. Data were analysed using SPSS version 22.0. **Results:** Mean operative times (MOT) ranged from 55-95 minutes. Complications occurred in 10% of cases, including port-site infections (PSI) (6.67%), bile leakage (BL) (3.33%), and peritonitis (3.33%). Conversion rate (CR) was 3.33% with no mortality. **Conclusion:** While laparoscopic management of BCLL demonstrates acceptable safety with a 10% complication rate, careful patient selection and meticulous surgical technique remain essential to minimise adverse events and optimise outcomes.

Keywords: *Laparoscopic Surgery, Hydatid Cyst, Simple Liver Cyst, Liver Abscess, Complications*

1. *Assistant Professor, Department of Surgery, Ad-Din Momin Medical College and Hospital, Dhaka, Bangladesh (ORCID: 0009-0000-2765-765X)*
2. *Resident Surgeon, Mugda Medical College and Hospital, Dhaka, Bangladesh*
3. *Assistant Professor, Eastern Medical College and Hospital, Cumilla, Bangladesh*
4. *Assistant Professor, Department of Paediatric Surgery, Ad-Din Momin Medical College and Hospital, Dhaka, Bangladesh*

INTRODUCTION

Though uncommon, benign hepatic cystic lesions (hydatid cysts, simple cysts, and abscesses) are becoming more common in the diagnosis in situations of regular screening using advanced imaging techniques (ultrasound, CT). Although laparoscopic surgery is a minimally invasive form of surgery as compared to the open ones, laparoscopy has distinct complications that must be carefully handled both intraoperative and postoperative. Echinococcus granulosus causes hepatic hydatid disease and it is still endemic in some areas like the Mediterranean, North Africa and Middle East and the Indian subcontinent. The case of sporadic is on the increase as a result of global traveling [1]. Fifty to ninety-three percent of cysts occur in the liver, the cysts being formed by the migration of larvae via the portal system and where multilayered structures are developed that contain a germinal endocyst which is likely to give rise to daughter cysts. The asymptomatic cases are frequent; nevertheless, the symptomatic manifestations comprise the abdominal pain, jaundice, or risk of rupture. Peritonitis or biliary fistulas may result because of rupture. Diagnosis includes serology (e.g., ELISA), eosinophilia as well as imaging. Septa and hydatid sand are detected by ultrasound, and calcifications are detected by CT. Muqim et al. and Koea. have pointed out the feasibility of laparoscopic cystectomy with associated complications of 5-15% such as rupture of the cyst, anaphylaxis due to spillage or biliary leakage. [1,2]. These risks should be minimized by scrupulous aspiration and the use of scolicidal agents [2]. Simple liver cysts are either solitary, multiple or polycystic types, which frequently occur sporadically or as a result of autosomal dominant inherited conditions. Polycystic liver disease is often accompanied by renal or pancreatic involvement. These cysts are usually asymptomatic and non-liver-functionality disabling, but when large they can be painful, haemolytic or mass effecting. Unilocular and thin-walled features can be confirmed with the help of ultrasound and CT. The asymptomatic cysts only need observation but the symptomatic ones respond to laparoscopic deroofing. Choi et al. report that giant cysts can be successfully managed, although this may be accompanied by intra-abdominal bleeding, infection and recurrence (maximally 20%), which are mostly the result of poor excision or haemorrhage of the capsule [3]. Accurate fenestration methods are also highlighted to curb recurrence [3]. Liver abscess may be pyogenic or amoebic, where they are predominant in the tropical areas and are common in diabetics or immunocompromised patients. Pyogenic abscesses are polymicrobial (E. coli or Streptococcus milleri), whereas amoebic forms are derived out of Entamoeba histolytica. The clinical symptoms are fever, malaise, and pain in the right upper quadrant. Small lesions require medical therapy, whereas large lesions and multiloculated abscesses are subject to drainage. Laparoscopic drainage has been promoted instead of percutaneous because it enhances failure rates related to viscous pus (1025) [4-6]. However, laparoscopic drainage can lead to bowel injury, pus relapse (1025), or sepsis because of poor evacuation. Extensive access and extensive irrigation is critical [5,8]. Laparoscopic surgery of these lesions reduces morbidity, hospital stay and recovery and is better than laparotomy, but there remains a problem of visualisation of deep lesions, spillage due to hydatid cases and adhesion-related injuries. The intraoperative complications like vascular trauma or biliary trauma are present in 2-8% instances. The problems postoperative are wound infection, long ileus or cyst recurrence. As highlighted by Alkhyatt et al., preoperative planning is essential in order to reduce these risks. Well trained surgical teams show reduced overall complication rates. Although these advantages are present, the information about laparoscopic results in the cases of benign cystic liver lesions is sparse. This paper will test the profile of adverse events associated with laparoscopic treatment of

benign liver cystic lesions (hydatid cysts, simple cysts, and abscesses) and establish the instances of the clinical settings where the laparoscopic treatment presents a clear benefit over open surgery.

METHODS & MATERIALS

The study was a prospective observational study that was carried out within a 6-month period, between July 2014 and December 2014 in the Department of Surgery in Bangabandhu Sheikh Mujib Medical University (BSMMU), Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM), Dhaka Medical College Hospital (DMCH), Shaheed Suhrawardy Medical College (ShSMC) and various local hospitals in the city of Dhaka. The study involved 30 male and female patients diagnosed to have benign cystic lesions of the liver. A purposive sampling method was used to select the patients who were selected by sampling the patients that were admitted to the participating hospitals so long as they met the inclusion and exclusion criteria. The inclusion criteria included patients having hydatid cyst of the liver, single or multiple large cysts, large or multiloculated liver abscess, and failed medical therapy against hydatid cyst or liver abscess. The exclusion criteria were the presence of deep-seated hydatid cysts, a number of small simple liver cysts, and the refusal of patients to laparoscopic surgery. The laparoscopic management and surgical outcome of benign cystic lesions of the liver was the main outcome variable. All the participants had their informed written consent prior to being included in the study after clarifying the nature of the study, its purpose, and the possible risks involved in the study. The study received ethical approval of the Institutional Review Board (IRB) of the relevant institutions.

Statistical Analysis

The data collection was based on the clinical examination, operative results, and postoperative outcomes, such as the operative time, and complications. The obtained data were tabulated and analysed in the Statistical Package of Social Sciences (SPSS) version 22.0 and summarised using the descriptive statistical techniques to summarise the patient data in terms of demographics, cyst characteristics, surgical procedures, complications, and outcomes of follow-ups.

RESULTS

The mean age was 43.6 years (range 17–63) in the hydatid cyst group, 46.7 years (range 43–65) in the simple liver cyst group, and 59.6 years (range 52–69) in the liver abscess group. The youngest patient was 17 years old, and the oldest was 69 years old in the overall study population (*Table I*).

Table I
Age Distribution of 30 Patients Operated by Laparoscopic Approach (*n*=30).

Type of Lesion	Total (n)	Youngest Patient (years)	Oldest Patient (years)	Mean Age (years)
Hydatid cysts	18	17	63	43.6
Simple liver cysts	8	43	65	46.7
Liver abscess	4	52	69	59.6

Males predominated in the hydatid cyst (55%) and liver abscess (75%) groups, whereas females (63%) were more common in the simple liver cyst group (*Table II*).

Table II
Sex Distribution of 30 Patients Operated by Laparoscopic Approach (*n*=30).

Type of Lesion	Total (n)	Male n (%)	Female n (%)
Hydatid cysts	18	10 (55)	8 (45)
Simple liver cysts	8	3 (37)	5 (63)
Liver abscess	4	3 (75)	1 (25)

Pain was the predominant symptom in all groups. Fever was frequent in liver abscess patients, while abdominal swelling was seen only in hydatid cyst cases (*Table III*).

Table III
Clinical Presentations of Patients Undergoing Laparoscopic Surgery for Benign Cystic Lesions of the Liver (*n*=30).

Presentation	Hydatid Cysts (n=18) n (%)	Simple Liver Cysts (n=8) n (%)	Liver Abscess (n=4) n (%)
Abdominal pain	13 (72.22)	5 (62.5)	4 (100)
Nausea/Dyspepsia	8 (44.44)	3 (37.5)	2 (50)
Abdominal swelling/Mass	5 (27.78)	0 (0.0)	0 (0.0)
Fever	1 (5.55)	0 (0.0)	4 (100)

Most lesions were single and predominantly located in the right hepatic lobe across all groups, with no bilateral involvement observed (*Table IV*).

Table IV
Number and Location of Benign Cystic Lesions of the Liver (*n*=30).

Type of Lesion	Total (n)	Single Cyst n (%)	Multiple Cysts n (%)	Right Lobe n (%)	Left Lobe n (%)	Bilateral n (%)
Hydatid cysts	18	16 (88.89)	2 (11.11)	15 (83.33)	3 (16.67)	0 (0.0)
Simple liver cysts	8	7 (87.5)	1 (12.5)	7 (87.5)	1 (12.5)	0 (0.0)
Liver abscess	4	4 (100)	0 (0.0)	4 (100)	0 (0.0)	0 (0.0)

Unroofing and omentoplasty were the mainstay procedures for hydatid cysts, while all simple liver cysts underwent unroofing and all liver abscesses required drainage (*Table V*).

Table V
Types of Laparoscopic Procedures Performed (*n*=30).

Type of Lesion	Total (n)	Procedure Type	No. of Patients n (%)
Hydatid cysts	18	Unroofing and omentoplasty	17 (94)
		Partial pericystectomy	1 (6)
Simple liver cysts	8	Unroofing of the cyst	8 (100)
Liver abscess	4	Drainage of the abscess cavity	4 (100)

The mean operative time was longest for hydatid cyst surgeries (95 minutes) and shortest for simple liver cysts (55 minutes), reflecting procedural complexity differences (*Table VI*).

Table VI
Operative Time for Laparoscopic Procedures (*n*=30).

Indication	Number of Cases (n)	Operative Time (minutes) (Range)
Hydatid cysts	18	95 (80–120)
Simple liver cysts	8	55 (45–65)
Liver abscess	4	65 (55–75)

Minor complications included port site infection (6.67%), bile leakage (3.33%), and peritonitis (3.33%). One procedure required conversion to open surgery, and no mortality was reported (*Table VII*).

Table VII
Postoperative Complications of Laparoscopic Surgery (*n*=30).

Complication	No. of Patients	Percentage (%)
Anaphylactic shock	0	0
Port site infection	2	6.67
Bile leakage	1	3.33
Peritonitis	1	3.33
Conversion to open surgery	1	3.33
Mortality	0	0

DISCUSSION

The laparoscopic revolution of the hepatobiliary surgery has revolutionized the treatment of benign cystic hepatic masses which has been seen to be better than the old open methods. The present study proves the flexibility of minimally invasive procedures in a wide variety of pathologies such as hepatic hydatid cysts (n = 18), simple liver cysts (n = 8), and liver abscesses (n = 4). Demographic analysis showed age specific distribution- hydatid cysts was observed in men at 43.6 years of age, simple cysts in 46.7 years, and liver abscesses at 59.6 years of age- consistent with Palanivelu et al. and Muqim et al. [1,9,10]. Gender distribution was different based on pathology- males had been predominant in hydatid disease (55%), and simple cysts (63%) and liver abscesses (75%), with only fever in liver ab The right hepatic lobe contained 83-100% of the lesions, mainly in the form of solitary cysts (87.5-100%) which agrees with the findings of Ali and Alaswad and Shetty [11,12]. Diagnostic workup involved the use of ultrasonography and CT images in all cases, and ELISA in case of hydatid disease. In their study, Soares et al. pointed out that radiological characteristics that characterise simple cysts are the thin walls, unilocularity and lack of tissue response [13]. The MRI was also useful in the diagnosis of biliary communication, which is important in the treatment of hydatid, according to Li et al. [14,15]. Hydatid cysts were unroofed with omentoplasty (94%) or partial pericystectomy (6%) with the inclusion of scolicidal irrigation using hypertonic saline. Similar methods are proposed by Alkhyatt et al. and Osemek et al. though more advanced equipment like the Palanivelu Hydatid System was not available in our place, so simple cysts took only 55 minutes of operation [16,4]. The complexity of the procedure was reflected in the duration of operation: 95 minutes in case of hydatid cysts, and 55 minutes in case of simple cysts. Our 3.33% conversion rate is much better than 425% that is reported by Rihani et al and the one conversion was due to haemorrhage during surgery on the hydatids. There was also little postoperative morbidity as port site infection (6.67%), bile leakage (3.33%), and mild peritonitis (3.33%) were treated conservatively. The lack of anaphylaxis goes against the issues that were raised in history, which prove that correct precautions are a guarantee of safety as stated by Baskaran and Patnaik [17,18]. Zero mortality is equivalent to Palanivelu et al. and Ekwunife et al. [19,7]. Perioperative praziquantel administration of hydatid cases probably avoided consequences, but due to its limited follow-up (13/30 patients), it does not provide a comprehensive evaluation of the long term. This experience proves laparoscopic management as the gold standard of benign hepatic cystic lesions, which offers less morbidity.

LIMITATIONS

The weaknesses of the study are that the sample size is small, the duration is limited to six months, the study is limited to one centre and therefore could not be generalized, no long-term follow-up to determine the recurrence and no comparison with open surgical outcomes.

CONCLUSION

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RECOMMENDATION

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CONFLICT OF INTEREST

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