

# Laparoscopic completion cholecystectomy: experience in BIRDEM General Hospital

Ratan MEH<sup>a</sup>, Alam H<sup>b</sup>

## ABSTRACT

**Background:** After cholecystectomy, patients often present with post-cholecystectomy syndrome. Among a handful of causes, remnant gallbladder pathology is a rare entity. We are here presenting a series of remnant gallbladder pathology cases, who were managed laparoscopically.

**Methods:** A prospective study of post-cholecystectomy syndrome patients who showed remnant gall bladder stones in ultrasonogram. Data on diagnostic workup, management and the challenges encountered in handling such patients were collected.

**Results:** Eight patients presented with remnant gall bladder stones, between January 2011 to June 2019. Six of them were female. These patients presented a variable time period after initial surgery, earliest after 3 months, with persistent pain in right hypochondriac region. Difficult cholecystectomy was documented in operation notes of two cases. Seven of them were managed by laparoscopic completion cholecystectomy.

**Conclusion:** A symptomatic gallbladder remnant after cholecystectomy is rarely seen. However, the diagnosis should be considered in patients with recurrent biliary symptoms after a difficult cholecystectomy. Completion cholecystectomy is challenging both for patient as well as the surgeon but it is the definitive treatment for such cases. Laparoscopic completion cholecystectomy is our recommended technique.

**Key words:** remnant gallbladder, post-cholecystectomy syndrome, partial cholecystectomy, difficult cholecystectomy, completion cholecystectomy.

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## INTRODUCTION

Gallstone disease is a major health problem worldwide. Incidence is 11-36% in the adult population, half of whom are symptomatic.<sup>1</sup> The “gold standard” management for symptomatic gallbladder disease is laparoscopic cholecystectomy (LC).<sup>2</sup> In 2011, cholecystectomy was the 8th most common operation in USA.<sup>3</sup> But, unfortunately, between 5 and 47% of patients are not relieved of their symptoms even after cholecystectomy.<sup>4-7</sup>

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### Author information

- Md. Ezharul Haque Ratan, Professor, Department of surgery, BIRDEM General Hospital, Dhaka, Bangladesh.
- Hasina Alam, Assistant Professor, Department of surgery, BIRDEM General Hospital, Dhaka, Bangladesh.

**Address of correspondence:** Dr. Md. Ezharul Haque Ratan, Professor, Department of surgery, BIRDEM General Hospital, Dhaka, Bangladesh. [ezhar@gmail.com](mailto:ezhar@gmail.com)

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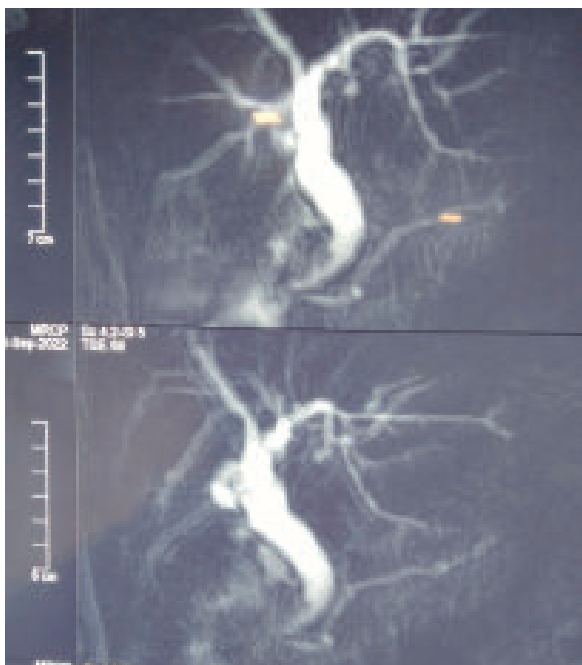
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The presence of symptoms after cholecystectomy is termed ‘post-cholecystectomy syndrome’ (PCS). With the number of cholecystectomies being performed increasing in the laparoscopic era, the number of patients presenting with PCS is also increasing. PCS is found in 10-30% of case.<sup>6,7</sup> Persistence or appearance of new symptoms after surgery is investigated only when they persist beyond 30 days of surgery. The most common cause of PCS is an overlooked extrabiliary disorder; reflux oesophagitis, peptic ulcer, irritable bowel syndrome or chronic pancreatitis. Next comes the biliary aetiologies, which includes bile leakage or biliary strictures, retained calculi / dropped calculi, chronic biloma or abscess, stenosis or dyskinesia of the sphincter of Oddi, choledocholithiasis, gallstone pancreatitis and/or cholangitis, long cystic duct remnant and inflammation or gall stone in remnant gall bladder.<sup>8,9</sup> Recurrent gallbladder disease secondary to a remnant gallbladder pathology presenting as acute cholecystitis,

symptomatic cholelithiasis is extremely rare, <sup>8-12</sup> approximately 0.18% of laparoscopic cholecystectomies. <sup>10</sup> We are reporting, a series of PCS patients, who presented with an abdominal ultrasonogram revealing gall stone and were managed by laparoscopic completion cholecystectomy (LCC).

## METHODS

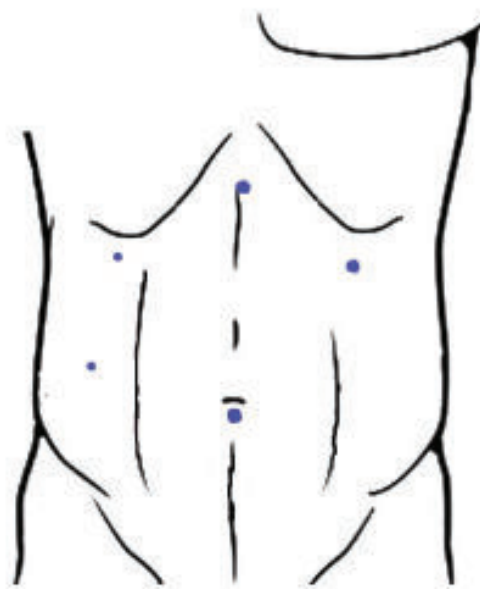
All patients attending BIRDEM General Hospital, Surgery Outpatient, between January 2011 and June 2022 with PCS and abdominal ultrasonogram revealed gall stone were counseled for LCC and were included in this study. Preoperative evaluation was done by history, clinical assessment and appropriate investigations. Sex, diabetes status, history of past surgery, current symptoms, ultrasonogram findings, detail operation procedure, peri-operative events were noted. All cases had an abdominal ultrasonogram during admission, which revealed gall stone. Magnetic resonance cholangiopancreatography (MRCP) (Figure 1) and Endoscopic retrograde cholangiopancreatography (ERCP) were done in two patients. Other routine investigations were also done for anaesthetic fitness.



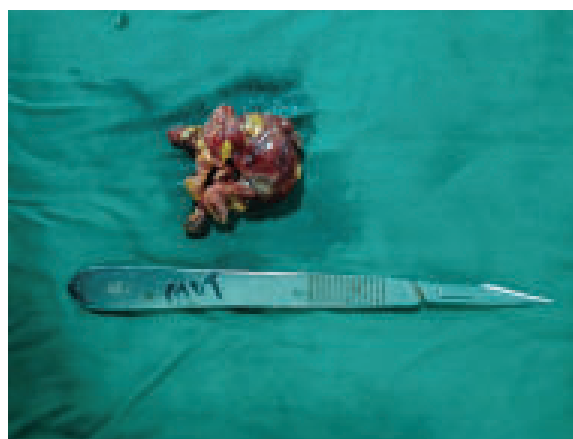
**Figure 1.** MRCP negative shadows in remnant gallbladder and lower CBD (case 3)

Pneumoperitoneum was established by placement of a Veress needle into the umbilicus. LCC was performed using standard four ports. However, 1 patient required an additional port (10 mm) in left hypochondriac region

(Figure 2). In addition to the usual 0 degree telescope, 30 degree telescope was also used. Adhesiolysis was the most difficult part of the operation. Adhesions were cut at avascular line using scissors and cauterization very carefully. Two cases needed a bag for extraction of specimen (Figure 3) through the umbilical port. Post-operative follow up period was 6 weeks.



**Figure 2.** position of ports Two 10 mm ports and two 5 mm ports and an additional 10 mm port in one case (case 7)



**Figure 3.** Resected remnant gall bladder (case 6)

## RESULTS

Among the 8 patients presented, majority were female (75%), between 28 and 59 years of age (Table 1). LC was the initial operation in 7 cases (87.5%). One patient

**Table I.** Presentations of the patients

	Age (years)	Sex	Diabetic status	Previous surgery	Duration from previous surgery	Documentation from previous surgery	Presenting complaints
1	32	F	DM	LC	9 months	No mention of DC or Subtotal cholecystectomy	Persistent RHR pain
2	34	F	DM	LC	7 months	No mention of DC or Subtotal cholecystectomy	Persistent RHR pain
3	28	F	DM	LC	2 years	No mention of DC or Subtotal cholecystectomy	Persistent RHR pain+ jaundice
4	40	M	DM	LC	3 months	DC recorded in OT note	Persistent RHR pain
5	29	F	ND	LC	8.5 months	No mention of DC or Subtotal cholecystectomy	Persistent RHR pain
6	42	M	DM	LC	8 months	No mention of DC or Subtotal cholecystectomy	Persistent RHR pain
7	59	F	DM	LC to OC	3 months	DC and Subtotal cholecystectomy recorded in OT note	Persistent RHR pain
8	43	F	DM	LC	7 months	No mention of DC or Subtotal cholecystectomy	Persistent RHR pain+ jaundice

presented to operating surgeon with her persistent complain but the rest of the 7 patients (87.5%) presented to physicians for their symptom after a variable period of time (3 months – 2 years). All complained of persistent right hypochondriac region (RHR) pain. In addition, two patients also complained of jaundice. None of the patient or their relatives knew that subtotal cholecystectomy was done as the initial procedure. However, review of the previous documents showed that a difficult cholecystectomy (DC) was documented in two cases. Two patients had stone in remnant gall bladder as well as common bile duct (CBD) (75%). ERCP was attempted; in one case CBD could be cleared but failed in another case. So, we went for open completion cholecystectomy and choledocholithotomy in the later. The rest of the

seven (7) patients (87.4%) underwent LCC (Table II). One patient needed an extra port in left subcostal region as visibility was hampered due to dense adhesion in umbilical port region. Dealing with the post operative adhesions were the main challenge encountered during operation. Operation time (60-120 minutes) was mainly dependent on adhesiolysis. Ligature machine was used for safe dissection where necessary. Once the cystic duct can be safely isolated, the procedure could be treated much like a routine cholecystectomy. No extravagant bleeding was encountered during the procedure and perioperative blood transfusion was not required. None of the cases required conversion to open, neither were there any intra-operative complications. Six patients were done as day case. There was no mortality in this series.

**Table II.** Workup and operative information

	Diagnostic inv.	Ports	Operative difficulty	Operation time	Definitive management	Post-operative complication
1	USG	4	Adhesiolysis	1 hour	LCC	-
2	USG	4	Adhesiolysis	1 hour	LCC	-
3	USG, MRCP	4	Adhesiolysis	1.5 hours	ERCP & extraction of CBD stone followed by LCC	-
4	USG	4	Adhesiolysis	1 hour	LCC	-
5	USG	4	Adhesiolysis	45 minutes	LCC	-
6	USG	4	Adhesiolysis	50 minutes	LCC	-
7	USG	5	Liver retraction, adhesiolysis	2 hours	LCC	-
8	USG, MRCP	-	Adhesiolysis	1.5 hours	Open completion cholecystectomy & choledocholithotomy	-

## DISCUSSION

Open cholecystectomy (OC) was the standard treatment for symptomatic gallstones for more than 100 years. Inception of LC was in 1987.<sup>13</sup> In the history of surgery, very few operations have changed the thinking and operating habits of surgeons as rapidly and broadly as LC. Management of gallstone disease, thus evolved from being a major procedure to a relatively safe and tolerable day care procedure today.

However, LC can be difficult at times. Various problems faced are difficulty in creating pneumoperitoneum, accessing peritoneal cavity, releasing adhesions, identifying anatomy, anatomical variation and extracting the gall bladder. LC with these problems along with time taken more than normal are considered as difficult. DC may lead to serious iatrogenic injuries and a high conversion rate. Subtotal cholecystectomy, antegrade and fundus first techniques and per-operative cholangiogram are some of the techniques adopted to lower complications and conversion rate in DC.<sup>13,14</sup>

A remnant gallbladder, first reported by Beye in 1936, was described as the “wider part of the free end of the remnant cystic duct, giving the impression of a diminutive gallbladder.”<sup>10,14</sup> It results from incomplete resection during cholecystectomy. Prior studies indicate its occurrence following both open and laparoscopic cholecystectomies without a difference in frequency between the two approaches.<sup>15,16</sup> Approximately 5% of all elective laparoscopic cholecystectomies are converted to open, typically due to inflammation and adhesions impairing safe dissection.<sup>17</sup> This inflammatory environment predisposes the patient to having, intentionally or unintentionally, a gallbladder remnant left behind.<sup>17-19</sup> Thus, a history of “complicated” or “difficult” cholecystectomy, particularly a laparoscopic converted to open cholecystectomy, should increase the suspicion of a remnant gallbladder.

Approximately one third (33%) of gall bladder remnant stone patients present with a history of laparoscopic converted to open cholecystectomy at the initial surgery.<sup>4, 10, 20</sup> But, in our series, 1 case (12.5%) was LC converted to OC and 2 (25%) were documented as DC. However, in a study, only 19% of the operative report explicitly stated that a subtotal cholecystectomy was performed due to the difficulty.<sup>8</sup> Inflammation or gall stone in remnant gall bladder as a cause of PCS was first

documented by Moody FG et al in 1987.<sup>21</sup> Different studies showed the mean age at diagnosis was 51±17 years, with 71% of the patients being female.<sup>8</sup> In our series, mean age was 38.4 years with 75% female. These patients presented over a highly variable and wide ranging amount of time after initial cholecystectomy (2 month – 40 years).<sup>4, 14, 19, 21</sup> In our series, duration of presentation after initial surgery was 3 months to 2 years. One study mentioned that the most common symptoms at presentation were right upper quadrant pain (50-77%), nausea (44-54%), vomiting (31-48%) and fever (15-19%).<sup>8</sup> In our series RHR pain was present in 100% cases and jaundice in 25% cases.

The definitive treatment of this condition is completion cholecystectomy.<sup>22</sup> The first laparoscopic completion cholecystectomy was reported by Gurel et al. in 1995.<sup>23</sup> Many investigations are suggested during workup of patients of PCS. Those patients with remnant gall bladder stones eventually showed elevated liver enzymes (35%), elevated alkaline phosphatase (32%), elevated total bilirubin (29%), elevated white blood cell count (19%) and elevated lipase (10%).<sup>4</sup> These figures are comparable to our results, 25% had altered liver function tests. However, the diagnosis of remnant gallbladder was based on abdominal ultrasonogram findings and confirmed during the operation and pathology reports, in patients who underwent surgery,<sup>4</sup> which was also the same in our series. Abdominal ultrasound is recommended as the initial imaging modality of choice as it is inexpensive, widely available and easily accessible. Ultrasound also has a sensitivity greater than 95% for gallstones<sup>24</sup> and a sensitivity of 81% for the diagnosis of remnant gallbladders. CT or MRCP was done if ultrasound was inconclusive. MRCP is highly diagnostic for remnant gallbladder and remnant cystic duct pathologies.<sup>22-25</sup> In our series, 25% cases needed MRCP followed by ERCP for diagnosis of concurrent CBD stone and its subsequent management. Additionally, MRCP provides information about the location of retained stones and the length and nature of the cystic duct. Once the diagnosis of symptomatic remnant gallbladder has been made, completion cholecystectomy is the definitive treatment. In 1966, Bodvall published a series of 26 cases of symptomatic remnant gallbladders that were effectively treated by cholecystectomy.<sup>12</sup> Subsequently, both open and laparoscopic resections have been described.<sup>19, 26-28</sup>

The decision to choose one versus the other should be based on the laparoscopic capabilities of the institution with a low threshold for conversion to open surgery. If presenting with choledocholithiasis, the patient should have therapeutic ERCP prior to surgery. The definitive treatment in every study was completion cholecystectomy, either open or laparoscopic.<sup>17,27</sup> In one study, 76.2% underwent completion cholecystectomy, which treated the symptoms in 100% of patients.<sup>8</sup> However, in majority of the studies, most patients underwent open completion cholecystectomy (74% patients) vs 26% patients underwent laparoscopic cholecystectomy.<sup>8,17</sup> In addition, some studies utilized extracorporeal shockwave therapy and endoscopic biliary laser lithotripsy for treatment,<sup>8</sup> non operative expectant treatment, ERCP and sphincterotomy, but with a high rate of recurrent symptoms.<sup>8,10,12</sup> Some centers with wide experience in laparoscopic techniques are however showing promising results in laparoscopic completion surgery,<sup>8, 27, 29-33</sup> similar to our study. The mean operative time was 97.5 min (75–180 min) in one study<sup>33</sup> which is comparable to our series. As our series, none of the studies reported the necessity for conversion to open or mortality.<sup>12, 14-17, 22, 27-33</sup>

Symptomatic patients with a remnant GB needs redo completion surgery. Completion cholecystectomy is the definitive treatment. It can be challenging for the surgeon, whether attempted open or laparoscopically, due to the complex re-operative field and delay between presentation and diagnosis. With advances in laparoscopic instruments, as well as the increasing experience of surgeons, even these cases can be operated laparoscopically safely. However, to prevent diagnostic delay, we have to recognize partial cholecystectomy as a valid procedure in difficult situations. Whenever done, it should be properly documented and the information relayed to the patient and party. We want to also emphasize that, whenever a pathology in remnant gall bladder is encountered by surgeon/physician/radiologist, the situation must be handled with utmost empathy as these patients are surrounded by mistrust on surgeons, financial load of a second surgery, fear of subsequent surgery and recurrence. Managing these patients is not only a procedural challenge but also a socio-economic challenge to regain the faith of the patient and offer a cost effective option for the patient.

**Authors' contribution:** MEHR and HA planned the study, drafted manuscript and approved final version of of submission.

**Conflicts of interest:** Nothing to declare.

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