Original Article

DOI: 10.7860/JCDR/2016/20154.8342

The Laparoscopic Re-Exploration in the Management of the Gallbladder Remnant and the Cystic Duct Stump Calculi

Surgery Section

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ABSTRACT

Introduction: The gallbladder remnant and the cystic duct stump calculi are uncommon causes of post-cholecystectomy syndrome. Re-exploration is usually needed in the cases where symptom persists. Very few case series and reports are available regarding laparoscopic re-exploration.

Aim: To assess the safety and feasibility of Laparoscopic re-exploration in the cases of gallbladder remnant and cystic duct stump calculi leading to post cholecystectomy syndromes.

Materials and Methods: In this study, laparoscopic re-explorations was done in 22 patients in which 17 patients had gallbladder remnant calculi and 5 had cystic duct stump calculi. The study considered parameters like the operative time, conversion rate, post-operative complications, post-operative hospital stay and mortality in these patients. The duration of study was 15 years and the data was retrospectively reviewed.

Results: The median operating time was 83 minutes (range 51 to 134 minutes). Only one patient had conversion to open surgery. In postoperative period two patients had bile leak. They were managed conservatively and leak subsided in 8 and 11 days respectively. One patient had postoperative bleeding not requiring blood transfusion. There was no major complication requiring further intervention and no mortality. Patients were discharged on median day 4 (range 2-11) after the surgery. Patients were followed up every 3 months for one year. However, out of these three patients did not turn up for follow-up.

Conclusion: In expert hands laparoscopic re-exploration of the gallbladder remnant/cystic duct stump calculi can be performed within a reasonable operating time. The conversion to conventional re–exploration rate was very low with minimal post-operative complications and shorter hospital stay.

Keywords: Gallstone disease, Laparoscopy, Post-cholecystectomy syndrome, Surgical intervention

INTRODUCTION

Cholecystectomy relieves symptoms of gall stone disease in 85% of cases [1]. The remaining 15% continue to have symptoms after the surgery and this is called post-cholecystectomy syndrome [2]. In post-cholecystectomy syndrome, there may be continuation of previous symptoms or the development of new symptoms that might be attributed to gall stone disease or altered physiology caused by removal of gall bladder such as gastritis and diarrhoea. The time interval between cholecystectomy and symptom recurrence can be few months to as many as 40 years [3]. The causes of post-cholecystectomy syndrome are more often non-biliary than biliary. The non-biliary causes are peptic ulcer, gastro oesophageal reflux, pancreatic disorders, liver diseases, irritable bowel syndrome and coronary artery disease [4]. The biliary causes are choledocholithiasis, traumatic biliary stricture, sphincter of Oddi dysfunction, gallbladder remnant calculi and cystic duct stump calculi [5,6]. The gallbladder remnant and cystic duct stump calculi are uncommon causes of post-cholecystectomy syndrome. However, there is limited literature available till date.

The gallbladder remnant left after subtotal cholecystectomy forms calculi in some cases, results in reappearance of previous symptoms. The calculi in cystic duct, which was missed during cholecystectomy, can also cause recurrent symptoms due to repeated attacks inflammation. Surgical intervention is needed in both these group of cases and this can be done by successfully by laparoscopy. Few case series and reports are available about laparoscopic re-exploration for the gallbladder remnant/cystic duct stump calculi. Two large series are by Chowbey et al., and Palanivelu et al., including 26 and 15 cases respectively [7,8]. They concluded that the Laparoscopic re-intervention for treating residual gallstone disease is feasible and can be safely performed in centers of expertise.

This 15 years retrospective study was conducted with the aim to assess the safety and feasibility of laparoscopic re-exploration in the cases of gallbladder remnant and cystic duct stump calculi leading to post-cholecystectomy syndrome by assessing operative time, conversion rate, post-operative complication, post-operative hospital stay and mortality.

MATERIALS AND METHODS

This retrospective study was conducted from 1997 to 2011, on total 22 patients of post-cholecystectomy syndrome (M/F: 06/16) admitted to our institute. Age ranged from 27 to 65 years. Nineteen patients were referred from other centre. Seventeen patients had gallbladder remnant calculi and 5 had cystic duct stump calculi. Most patients had previous operative note to guide us in the further management [Table/Fig-1]. The period between their previous surgery and recurrence of symptom ranged from 4 months to 15 years. The patients with only choledocholithiasis as the cause of recurrent symptom were excluded from the study.

Patients were taken for laparoscopic surgery. Single surgeon in a dedicated laparoscopic unit performed all the re- explorations. No

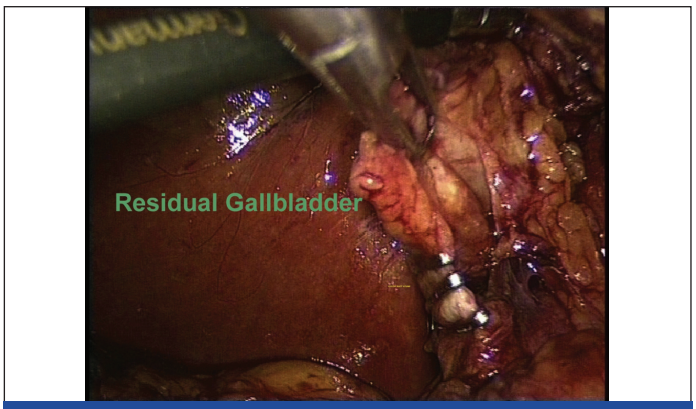
Previous Surgery	No. of Patients (22)	Gallbladder Remnant Calculi (17)	Cystic Duct Stump Calculi (5)
Open (Complete) Cholecystectomy	2	0	2
Open Subtotal Cholecystectomy	12	11	1
Laparoscopic (Complete) Cholecystectomy	2	0	2
Laparoscopic Subtotal Cholecystectomy	6	6	0

[Table/Fig-1]: Table showing the primary surgery and diagnosis.

bowel preparation was given. Abdominal insufflations were done through veress needle away from the previous scar. Four ports were placed as in standard laparoscopic cholecystectomy. An extra port was placed on the left side of abdomen for adhesiolysis as-and-when necessary. Zero and 30-degree telescope were used. Harmonic scalpel was preferred.

Adhesiolysis was started from the right flank, mobilising colon, first dividing its adhesions from the liver. Gradually adhesiolysis progressed towards the midline. No attempt was made initially to divide the adhesions directly over duodenal region since this may cause duodenal injury.

During the process of adhesiolysis, gallbladder remnant or cystic duct stump were dissected out and clear anatomy was identified. This was grasped with fine tooth forceps and pulled up [Table/Fig-2]. Attempt was made to clear the calot's triangle. CBD was always identified. Most of the time cystic artery and duct could be identified clearly and were clipped and divided. Otherwise they were clipped en masse and divided. Specimen was removed through the epigastric port, putting it in a specimen retrieval bag [Table/Fig-3], which later on histologically proven to be chronic cholecystitis in Gall bladder remanant and Duct stump calculi was consistent with chronic inflammation. Operative cholangiogram was not attempted. A suction drain was always placed in the sub-hepatic area, preferably Jackson Pratt drain.



[Table/Fig-2]: Residual Gallbladder.

[Table/Fig-3]: Specimen of Residual Gallbladder.

In one of the patients, there was complete gallbladder with cholecysto-duodenostomy. The anastomosis was dismantled, which had already been completely obliterated and no duodenal repair was required. The patients were allowed liquid diet six hours postoperatively and normal diet the next morning. Almost all the patients except for three patients had their drain removed 2nd postoperative day and they were discharged the following day. They were followed up every 3 months for 1 year.

RESULTS

The median operating time was 83 minutes (range 51 to 134 minutes). Only one patient had conversion to open surgery. It was because of dense adhesions between the CBD and the inflamed cystic duct stump risking CBD injury. It was successively completed by open method and required two units of blood transfusion, intraoperatively.

Nineteen patients presented with upper abdominal pain and 3 with jaundice. Liver function tests, ultrasonography and MRCP were done in all the patients. In two patients, ERCP was required for diagnosis as MRCP was inconclusive. Serum bilirubin, transaminase and alkaline phosphatase were elevated in patients with jaundice. Of the three patients with jaundice 2 had associated CBD stone along with remanant gallbladder calculi. Clearance of CBD stone by ERCP was done in these patients before taking for surgery. One patient with jaundice had compression of common hepatic duct by inflamed cystic duct. One patient had recurrence of pain after 15 years along with elevated serum alkaline phosphatase. Previous operative details were not present. MRCP in these patients showed the presence of complete gallbladder with cholecystoduodenostomy.

In postoperative period, two patients had bile leak. One patient had residual gallbladder calculi and one cystic duct stump calculi. They were managed conservatively and leak subsided in 8 and 11 days, respectively. One patient had postoperative bleeding not requiring blood transfusion. There was no major complication requiring further intervention and no mortality. Patients were discharged on median day 4 (range 2-11) after the surgery. All patients were followed up every 3 months for one year. Three patients were lost in the follow-up.

DISCUSSION

The normal cystic duct measures 4-6 cm in length [9]. Cystic duct remnant is defined as any length of cystic duct more than 1 cm after the surgery [10]. The various complications, that occur because of cystic duct remnant are calculi, bile leakage, stricture, fistula formation, dilatation of remnant cystic duct, amputation neuroma and suture granuloma [9]. Florken, first described the cystic duct stump calculi as one of the cause of post-cholecystectomy, in 1912 [11]. In the era of laparoscopic surgery, the incidence of cystic duct stump calculi has increased [6]. In open cholecystectomy, only minimal cystic duct stump was left as the cystic duct was ligated close to the CBD, while in laparoscopic surgery there is a tendency to leave a longer cystic duct stump as cystic duct is divided close to the gall bladder. The risk of CBD injury tempts the surgeon to remain close to the gallbladder not exposing most of the cystic duct and leaving behind calculi in it if present.

Laparoscopic subtotal cholecystectomy is a useful procedure when dissection in the calots triangle is hazardous [12,13] the indications of laparoscopic subtotal cholecystectomy are patients of gallstone disease having portal hypertension, Mirizzi's syndrome and severe inflammation at the calots triangle [14]. It has also been suggested to decrease the rate of conversion [15]. However, the incidence of gallbladder remnant calculi is more after subtotal cholecystectomies as leaving behind a part of dysfunctional gallbladder leads to calculi formation in some of the patients. Their incidence in cases of laparoscopic subtotal cholecystectomy was 4.19% while it was only 0.02% in patients who underwent conventional laparoscopic cholecystectomy [8]. Larger the remnant of gallbladder left during subtotal cholecystectomy, more the chance of formation of calculi in it [16].

The patients of gall bladder remnant/cystic duct stump calculi may develop symptoms soon after the primary surgery or after many years. Pain is the most common symptom and is due to recurrent inflammation [17]. Some of these patients may develop jaundice due to compression of CBD by the inflamed cystic duct or by passage of calculi in the CBD [18,19].

Ultrasonography and liver function tests are the initial investigations. Magnetic Resonance Cholangiopancreatography (MRCP) is the investigation of choice for gall bladder remnant/cystic

duct stump calculi. MRCP has a sensitivity of 95%–100% and a specificity of 88%-89% in detecting calculi in the cystic duct remnant and CBD [20]. Except 2 cases, we could diagnose all the cases by MRCP. ERCP is useful when the diagnosis is in doubt or for the associated CBD calculi.

Previously laparoscopic surgery was contraindicated in patients with previous abdominal surgeries but now with the advances in laparoscopic skills and instruments, complex procedures can be performed in patients with or without previous surgeries [21,22]. Major concerns while operating on patients with gall bladder remnant/cystic duct stump calculi are risk of organ injury during initial port placement and in extensive adhesiolysis. Li-Bo Li et al., has reported from their experience that blind veress needle, insertion and initial trocar placement more than 3 cm from the scar of previous biliary surgery is safe [23]. In re-exploration after previous laparoscopic surgery, there are less adhesions in relation to abdominal wall compared to previous open surgery.

In these re-explorations there are extensive adhesions in the gallbladder fossa. The right colon, duodenum and omentum are all adhered to the gallbladder fossa. The gallbladder remnant/cystic duct stump remains deeply embedded in this dense scar tissue. As in any re-exploration for extra-hepatic billiary tree, the rule of adhesiolysis is to begin on the right side along lateral inferior border of the liver. However, adhesiolysis beginning medially and proceeding laterally has also found to give a good plain of dissection as reported by Chowbey et al., [7,24]. Dissection with the harmonic scalpel decreases operative time and blood loss.

In the management of these patients laparoscopic surgery has certain advantages over open technique. The operating view is superior which allows easier identification and isolation of structures in the Calot`s triangle. There is less post-operative pain, better pulmonary function, oxygenation and ventilation, early return of bowel habits, early return to full activity, better cosmesis and better patient satisfaction. As for any re-exploration this procedure need high degree of expertise.

Good results with reasonable mean operative time 62 min and 103.5 min, low conversion rate 0/26 and 0/15, no major postoperative complications and short hospital stay 2.6 days and 4-12 days has also been obtained by Chowbey et al., and Palanivelu et al., respectively [7,8,24]. As for any other laparoscopic re-exploration it needs high degree of expertise.

The recommendations have been made to prevent the incidence of gallbladder remnant/cystic duct stump calculi. The cystic duct should be fully dissected and skeletonised till 1 cm from the CBD [25]. Stones in the cystic duct can be seen as well as palpated with the dissector [7]. Milking these stone back in the gallbladder neck before clipping may be useful to ensure clearance of duct calculi [8]. Routine use of intraoperative cholangiography is debated but when used it can be useful in detecting calculi in the cystic duct [5,26]. While performing subtotal cholecystectomy there should not be much of leftover gallbladder (No fundectomy) [16].

CONCLUSION

In expert hands, laparoscopic re-exploration of the gallbladder remnant/cystic duct stump calculi can be performed within a reasonable operating time. There is low conversion rate with minimal post-operative complications and shorter hospital stay.

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FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Mar 14, 2016**
Date of Peer Review: **Apr 23, 2016**
Date of Acceptance: **Jul 07, 2016**
Date of Publishing: **Aug 01, 2016**