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Original Research Article

Remnant gall bladder and cystic duct stump stone after cholecystectomy: tertiary multicenter experience

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ABSTRACT

Background: There is no doubt that cholecystectomy relieves pre-surgical symptoms of gallbladder (GB) disease. The persistence of symptoms mainly biliary pain was recorded in 10 - 20% of cases, with variety of causes. Residual GB/cystic duct stump stone is one of the most important un-expected cause. The present study was conducted to study and evaluate those patients, with their surgical treatment.
Methods: This retrospective study was conducted on 27 cases with residual GB/cystic duct stump stone. The diagnosis was guided by ultrasound and magnetic resonance cholangio-pancreatography. All cases were managed by using completion cholecystectomy - either open or laparoscopic. All preoperative, operative, and postoperative data were collected.
Results: Preoperative endoscopic retrograde cholangio-pancreatography and papillotomy were required in 13 patients whom were presented with obstructive jaundice. Open completion cholecystectomy techniques were done in the majority of cases (21 patients) while laparoscopic approach was feasible in only 6 cases with one conversion (1/6). The mean operative time was (89.57 ± 12.05 and 118.16 ± 12.6 min), and the mean blood loss was (195.5 ± 19.22 and 187.5 ± 23.61 ml) respectively. Intra-operative minor biliary injury occurred in two cases and repaired instantaneously. The mean hospital stay was (4.76 ± 2.81 and 2.33 ± 1.32 days) respectively. All patients were reported to be symptom-free at the follow-up after surgical treatment.
Conclusions: Residual GB/cystic duct stump stone is a preventable and correctable cause of post-cholecystectomy complaint. Completion cholecystectomy is a proven treatment of choice to relieve symptoms and avoid complications; furthermore, it can be carried out laparoscopically with experienced team and facilities in spite of difficulties.

Keywords: Management, Postcholecystectomy, Stump stone

INTRODUCTION

The standard treatment of symptomatic cholelithiasis is laparoscopic cholecystectomy (LC); however, in some patients the symptoms may persist after surgery, what's called post-cholecystectomy syndrome (PCS).[1,2] The cause of PCS is often non-biliary, in spite a few of these patients may actually harbor gallstones in a residual gall bladder or cystic duct stump.[3,4] The reported incidence of this challenging consequence is < 2.5%.[5] In comparison to conventional cholecystectomy; the incidence of incomplete gallbladder removal following LC is high, constituting up to 13.3%, and this may be due to poor visualization of gallbladder fossa, adhesions, recurrent

inflammation, bleeding, frozen Callot's triangle, or confounding gallbladder morphology.[6-14] Diagnosis and management of retained calculi can be challenging; as most of those patients requires surgical intervention.[15] The present study was conducted to evaluate those patients, with tertiary multicenter experience in diagnosis and treatment of cystic duct or gall bladder remnant after cholecystectomy.

METHODS

In a period between January 2015 to January 2018, data was retrospectively searched for post cholecystectomy cases of residual gallbladder or cystic duct stones at Assuit, Sohag, and Qena University Hospitals which underwent either conventional open or laparoscopic completion cholecystectomy. We founded 27 cases with residual gallbladder/cystic duct stump stone (15 cases of residual gallbladder and 12 cases of cystic duct stump stone) following previous cholecystectomy operation either open or laparoscopic varying from 9 months to 14 years back. All of our studied patients were operated for initial cholecystectomy at other centers, and details of previous surgery notes could not be retrieved.

All patients were symptomatic for more than 6 months prior diagnosis and treatment, mainly presented by recurrent upper abdominal pain, dyspepsia, and jaundice. All patients were subjected to thorough history taking, physical examination, and laboratory work up as complete blood count, liver function tests, kidney function tests, blood sugar, and coagulation profile. Imaging studies were done for patients including abdominal ultrasonography, and magnetic resonance cholangio-pancreatography (MRCP), however endoscopic retrograde cholangio-pancreatography (ERCP) was done for patients presented with jaundice (13 cases) for relieve of common bile duct (CBD) obstructive element, but stones in the cystic duct stump or remnant gall bladder was not negotiated by ERCP for trial of extraction.

The study protocol was approved by the local ethical committee of our hospitals. Also, a written informed consent was obtained from all patients' prior recruitment to study.

Operative techniques: All surgeries were done by the same experienced surgeons, under general anesthesia with standardized techniques. 21 patients were dealt with using conventional open completion surgery, while 6 cases were treated by laparoscopic completion cholecystectomy.

Conventional surgery was done through right Kocher's subcostal incision, while access to peritoneal cavity during laparoscopic procedure was done through Palmer's point, open Hasson's technique, or by optical port, followed by standard 4 port laparoscopy procedures; all were applied strictly under vision. Identification of the liver was an important anatomic landmark for initial dissection and adhesolysis commenced till exposure of the gall bladder fossa. The duodenum was another independent anatomic landmark for identification of CBD and adjacent vessels, and also the lateral fissure of the liver was of great help for identification of the porta hepatis.

The gall bladder remnant or cystic duct stump was dissected free from surrounding colon and omentum using energy machine (harmonic share or ligasure device) helped by its stone content as another landmark, and lastly resected with ligation of the cystic duct. An abdominal hemostatic drain was placed in all patients and removed prior discharge.

Statistical analysis: Descriptive data were expressed as mean and standard error of the mean, or as median and ranges for continuous variables and proportions for categorical variables. Statistical analysis will be performed using the Fisher's and chi-square tests. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 27 cases with residual gall bladder/cystic duct stump stone (15 cases of residual gall bladder stones 55.6%; versus 12 cases of cystic duct stump stones 44.4%) following cholecystectomy operation either open technique in 24 cases (88.9%), or laparoscopic technique in 3 cases (11.1%). However; the operative details of the previous surgeries could not be retrieved as all studied patients were operated outside our center of excellence (Table 1).

Table 1: Patients demographics.

Variable	Number (%)
Age	
>50	9 (33.3%)
<50	18 (66.7%)
Gender	
Male	7 (25.9%)
Female	20 (74.1%)
Initial cholecystectomy operation	
Open cholecystectomy	24 (88.9%)
Laparoscopic cholecystectomy	3 (11.1%)
Duration after Cholecystectomy	
Early (<2 years)	25 (92.6%)
Late (>2 years)	2 (7.4%)
Site of residual stone	
Remnant GB	15 (55.6%)
Cystic duct stump	12 (44.4%)
Complaint	
Abdominal Pain	27 (100%)
Jaundice	13 (77.8%)
Dyspepsia	21 (48.1%)
Others	6 (22.2%)

There are 20 females (74.1%), and 7 males (25.9%), with the mean age of 38.92 ± 16.2. The main presenting symptoms were abdominal pain in nearly all cases (100%), dyspepsia in 21 cases (77.8%), and jaundice in 13 cases (48.1%). In contradistinction to other rare presentations as cholangitis that was encountered in 3 cases (11%) necessitating urgent ERCP interference, vomiting in 2 cases (7.4%); and mild pancreatitis in one patient (3.7%) whom was treated conservatively (Table 1).

Table 2: Patients outcomes.

Parameter	Number (%)
Operative treatment technique	
Open completion cholecystectomy	21(77.8%)
laparoscopic completion cholecystectomy	6 (22.2%)
Operative time; mean ± SD (min)	
Open Laparoscopic	89.57 ± 12.05 118.16 ± 12.6
Blood loss; mean ± SD (ml)	
Open Laparoscopic	195.5 ± 19.22 187.5 ± 23.61
Packed RBCs transfusion (unit)	0 (0%)
Plasma transfusion (unit)	
Open Laparoscopic	3 (11.1%) 0 (0%)
Length of hospital stay; mean ± SD (days)	
Open Laparoscopic	4.76 ± 2.81 2.33 ± 1.32
Length of ICU admission; (days)	0
Biliary injury; no (%)	
Open Laparoscopic	2 (7.4%) 0 (0%)
Mortality rate; no (%)	0 (0%)

The main time interval between the initial cholecystectomy approach and diagnosis of retained stone in residual gall bladder/cystic duct stump in our series was 4.5 years (9 months – 14 years).

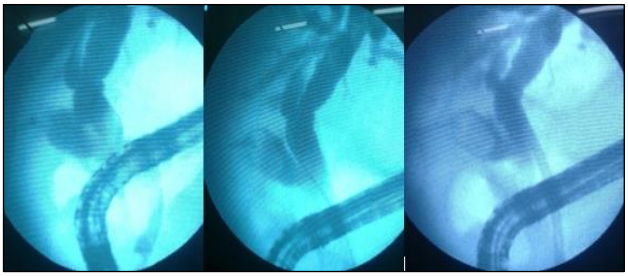

Figure 1: ERCP for remnant GB with a big obstructing stone inside, treated by stenting.

The primary diagnosis in our series was established by expert abdominal ultrasonography in 88.8% of cases (24 patients), however ERCP was the primary diagnostic modality in 13 patients (48.1%) presented with obstructive jaundice as seen in fig. (1), but the gold standard of diagnosis was MRCP that was needed in nearly all cases (Table 1).

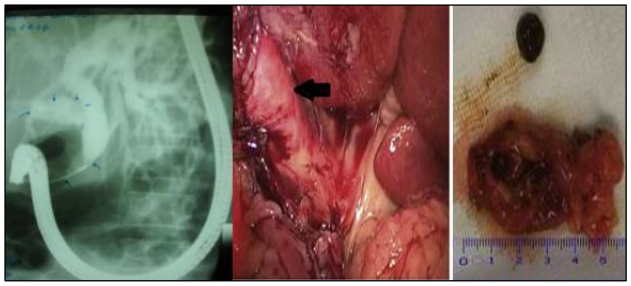

Figure 2: Remnant G.B. as evident by ERCP; treated by open completion cholecystectomy, and the gross appearance of the resected pouch with a stone inside its lumen.

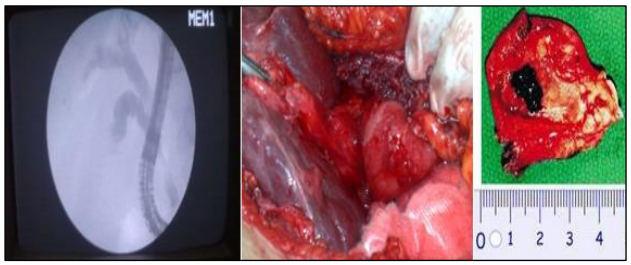

Figure 3: Remnant G.B. as evident by ERCP; treated by open completion cholecystectomy, and the gross appearance of the resected pouch with a stone inside its lumen.

The abdominal ultrasonography report diagnose and clearly mentioned stone in the residual gall bladder in 12 out of 15 cases (80%) diagnosed in our series (the remaining 3 cases was somewhat vague and mentioned an echogenic focus in the gall bladder fossa); moreover the expert report clearly identified and mentioned stone in cystic duct stump in 8 out of 12 cases (66.6%) diagnosed in our series, the remaining were clearly diagnosed by the gold standard MRCP or ERCP.

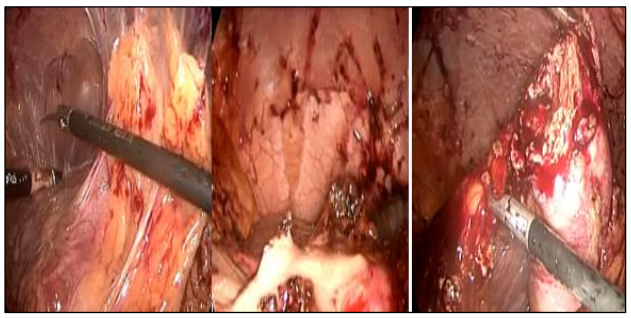

Figure 4: Laparoscopic completion cholecystectomy for remnant GB, massive adhesions and abscess at the suture site of previous partial cholecystectomy was encountered.

The nature of intervention in our series was surgery either open completion cholecystectomy in 21 cases (77.8%) as seen in figs. (2) and (3), or laparoscopic approach which was feasible only in 6 cases (22.2%) with one conversion as seen in figs. (4), (5) and (6). The mean operative time was (89.57 ± 12.05 and 118.16 ± 12.6 min), and the mean blood loss was (195.5 ± 19.22 and 187.5 ± 23.61 ml) respectively (Table 2).

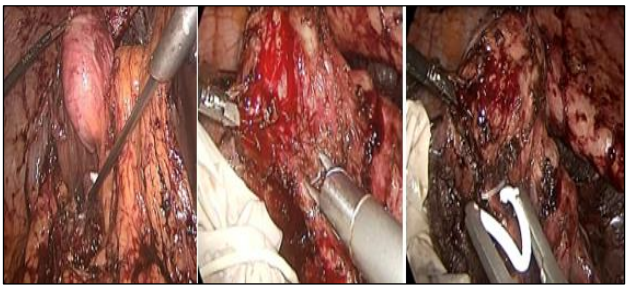

Figure 5: Laparoscopic Completion cholecystectomy: dissection of the remnant GB, identification and clipping of cystic artery and cystic duct prior excision.

Fortunately, no mortality detected in our series, and no major morbidity, apart from minor complications included intra-operative minor biliary injury that was encountered in 2 cases, discovered intraoperatively and treated by instantaneous repair, and wound sepsis in 3 cases which responded to repeated dressing and antibiotic (Table 2).

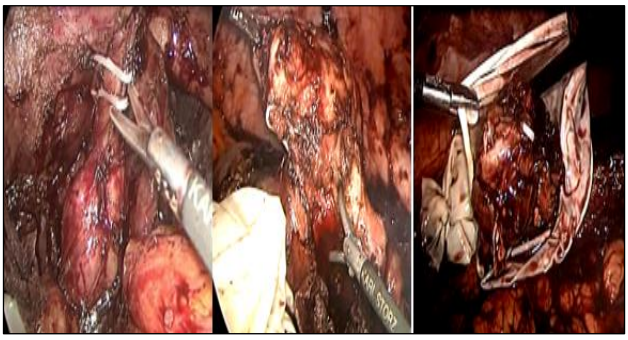

Figure 6: Laparoscopic Completion cholecystectomy: cutting of cystic duct, shaving the remnant bladder from the liver, and specimen retrieval in a glove bag.

Hemostatic tubal drain was done in all patients, and lasted for 1-3 days, and the mean hospital stay was (4.76 ± 2.81 and 2.33 ± 1.32 days) respectively. All patients were followed up after surgery, with the mean follow up time of 1.8 years (4 months - 2.8 years), and all patients were reported to be symptom free after surgical interventions.

DISCUSSION

There is no doubt that cholecystectomy relieves the symptoms of gall bladder stone disease in up to 85% of patients. Symptoms may persist even after surgery in up to 15% of patients.[16] Various causes for such symptoms had been identified in the literature and are grouped together as post-cholecystectomy syndromes.[3,4] The actual cause in most of patients are non-biliary; like peptic ulcer, gastroesophageal reflux, pancreatic disorders, liver diseases, irritable bowel and coronary artery diseases. In spite a few patients may be diagnosed as residual gall bladder/cystic duct stump stone.[17] The reported incidence of this challenging consequence is <2.5%. 5 Other biliary causes include biliary stricture, papillary stenosis, or dyskinesia of sphincter of Oddi.[3,13]

Patients with symptoms suggestive of gall bladder disease following cholecystectomy such as biliary colic, jaundice, and dyspepsia should be evaluated to rule out any retained stone.[15] There may be gender specific risk factor for developing post-cholecystectomy syndrome, in present study; the incidence was 74.1% in females compared to 25.9% in males and this higher incidence in females was also reported by Shirah et al, whom stated that the male to female ratio was 1:1.45.[18]

In present study, all patients were symptomatic for more than 6 months prior diagnosis and treatment, recurrent abdominal pain was the main symptom that encountered in all cases (100%), dyspepsia in 77.8%, jaundice in 48.1%, and other symptoms as cholangitis, vomiting, and mild pancreatitis in 22.2% of the cases. Tanita et al, in their series reported that all patients were symptomatic for more than 3 months prior intervention, and Shirah et al, revealed that abdominal pain was the main presenting symptom in their study.[18,19] Parmar et al, reported that abdominal pain and persistent dyspepsia as the commonest presentation, while Walsh et al, reported that patients was referred to their institution without persistent symptoms after cholecystectomy.[20,13]

As regard the mean time interval between cholecystectomy and diagnosis of stones in GB remnant or cystic duct stump, it was 4.5 years in present study (9 months - 14 years), while Palanivelu et al, reported mean time of 8.3 months (6 - 10.7 months) and Walsh et al, 13 reported 9.5 years as a mean time of presentation (14 months - 20 years).[21]

Nowadays; with advances in the radiological imaging the diagnostic accuracy in detecting the cause of post cholecystectomy syndrome is improved including ultrasound, CT scan, ERCP, and MRCP, all are effective in diagnosis of gall bladder/cystic duct remnant with or without stones where EUS is indicated in the presence of high index of suspicion with a negative abdominal ultrasound. [1,22-25]

The primary diagnosis in our series was established by expert abdominal ultrasonography detection in 74.1%, or ERCP modality in 48.1%, but the gold standard of diagnosis was MRCP that was done nearly in all cases. Diagnosis was established by abdominal US or MRCP in the study of Parmar et al, while Chowbey et al, reported

that the primary diagnosis was established by abdominal US, MRCP, ERCP, and EUS, while Palanivelu et al reported that abdominal US identified cystic duct remnant in 9 patients, and MRCP identified calculus in all patients.[20,15,21]

The treatment of residual GB/cystic duct stump stone is completion cholecystectomy which was carried out either laparoscopically or by open surgery to relieve symptoms and avoid complications, the use of ERCP is very difficult to negotiate such cystic duct stump stones as it depends on anatomical factors, the first factor is the diameter of cystic duct. Other factors include position of the stone in the duct, the degree of impaction of stones, the number of valves, the size of the stone, and the angle between the cystic duct and CBD, however pre-operative ERCP was used in present study for 13 cases (48.1%) to relieve jaundice by CBD stone extraction and sphincterotomy without negotiating cystic duct stump stone.[5,13,26,27]

Initially; open completion cholecystectomy was considered as a procedure of choice in our center for such challenging cases due to marked adhesion with avoidance of any visceral or biliary injuries but nowadays, laparoscopic completion cholecystectomy is widely accepted as practiced by many other authors as Tanital et al, who performed 7 cases in his series, while Chowbey et al, performed successfully all his cases using laparoscopic approach (26 cases), and the same was done by Palanivelu et al, in contradistinction to Walsh et al, whom reported use of open, laparoscopic, and endoscopic approaches for treatment of his cases.[19,15,21,13]

In our cases; open completion cholecystectomy was done in 21 cases (77.8%), while laparoscopic completion cholecystectomy was done in 6 cases (22.2%), with the mean operative time of 89.57±12.05 min, and 118.16±12.6 min for open and laparoscopic completion respectively.

The mean blood loss was 195.5±19.22 ml. for open versus 187.5±23.61 ml. for laparoscopic approach, and the length of hospital stay was 4.76±2.81 days for open versus 2.33±1.32 days for laparoscopic group.

Chewbey et al, reported that mean operative time was 62 min. and the mean blood loss was 50 ml., while Parmer et al, concluded that his mean operative time was 102.4 min, and the hospital stay was 2-4 days, in comparison to El-Nakeeb et al, reporting mean operative time of 127±31.32 min, and mean blood loss 165±74.5 ml, and mean hospital stay of 3.2±1.8 days.[15,20,28]

In present study, no mortality detected, and no morbidity apart from minor complications as intra-operative minor biliary injury that was discovered intra-operatively in 2 cases and repaired instantaneously, wound sepsis in 3 cases which responded to repeated daily dressing, in consistent with reported data of Parmer et al and Chowbey et al.[15,20]

CONCLUSION

Residual GB/cystic duct stump stone is a preventable and correctable cause of post-cholecystectomy complaint. Its symptoms and complications can be avoided by completion cholecystectomy; which can be performed laparoscopically by experienced surgeon and in presence of facilities despite difficulties.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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