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Case series

Remnant Cystic Duct Stones with Choledocholithiasis – A Case Series

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Abstract

Cholecystectomy is one of the most performed surgeries and the laparoscopic approach is the minimally invasive choice. Remnant cystic duct calculi are one of the rare causes of post-cholecystectomy syndrome which may lead to life-threatening complications if being neglected. We present in this article a case series of three interesting cases presenting with features of obstructive jaundice and biliary colic months to years after undergoing cholecystectomy. All patients underwent basic clinical assessment and routine relevant laboratory investigations. The initial imaging modality was an ultrasound abdomen, followed by the highly sensitive magnetic resonance cholangiopancreatography (MRCP). Endoscopic retrograde cholangiopancreatography was performed for all three patients by a medical gastroenterologist for diagnostic and therapeutic purposes. Then, all patients underwent diagnostic laparoscopy with cystic duct exploration in which indocyanine green dye was used to delineate the hepatobiliary anatomy, post which the patient recovered well and remained asymptomatic in the entire follow-up period. In conclusion, remnant cystic duct stone must be diagnosed at the earliest presentation, with MRCP being the investigation of choice, and can be treated using the laparoscopic approach in the experienced hands without morbidity.

Key words: Choledocholithiasis, Indocyanine green in laparoscopy, Laparoscopic cystic duct exploration, Post-cholecystectomy syndrome, Remnant cystic duct stones

INTRODUCTION

Cholecystectomy is the most performed hepatobiliary surgery over decades. The minimally invasive surgery, notably the laparoscopic approach, now represents the standard procedure for gallbladder disease. The adoption of laparoscopic cholecystectomy by general surgeons has widened the criteria deemed to warrant the procedure and has resulted in a rise in the number of cholecystectomies carried out.[1-3] For some patients, symptoms persist even after surgery, including abdominal discomfort, pain in the right upper abdomen, indigestion, and jaundice. This scenario defines post-cholecystectomy syndrome (PCS), which can arise from biliary and non-biliary causes and affects 10–40% of patients within a period ranging from 2 days to 25 years.[4-6] Common biliary causes include residual gallbladder or cystic duct stump, common bile duct stones (CBDS), and sphincter of Oddi dysfunction. Typical non-biliary causes are linked to liver or pancreatic disease, gastroesophageal reflux, and peptic ulcers.[7,8]

Biliary causes are rare, and diagnosing issues with the gallbladder or cystic duct stump can be complex and challenging. Remnant cystic duct calculi are being neglected or misdiagnosed, which may lead to serious life-threatening complications. Florcken first reported the concept of "cystic duct remnant" in 1912.[9] Since then, many papers have been published regarding the same and various management protocols have been followed. The laparoscopic approach has been proven to be successful

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in treating the remnant cystic duct calculi. The use of indocyanine green (ICG) helps the operating surgeon in delineating the anatomy and reducing the risk of bile duct injuries. We present our experience with remnant cystic duct calculi and its management in our institution.

MATERIALS AND METHODS

We managed three patients with remnant cystic duct calculi in our institution from 2021 to 2023.

Case 1

A 37-year-old female came to the outpatient department (OPD) 6 months after emergency laparoscopic cholecystectomy for acute cholecystitis with complaints of upper abdomen pain, nausea, generalized itching, and yellowish discoloration of urine for 1 month. Clinically, she was hemodynamically stable, icteric, and had tenderness in the epigastric and right hypochondrium region.

Laboratory investigations revealed signs of inflammation (White Blood Cells: 14090 cubic mm). Liver function test (LFT) parameters were deranged – SGOT: 134 U/L, SGPT: 236 U/L, alkaline phosphatase: 190 U/L, total bilirubin: 5.70 mg/dL, and conjugated bilirubin: 3.94 mg/dL. Renal parameters, serum amylase, and lipase were normal.

Ultrasound abdomen showed post-cholecystectomy changes with mild intrahepatic biliary radical dilatation. Magnetic resonance cholangiopancreatography (MRCP) showed a ballooned-out cystic duct with a void dark intensity signal measuring 10 mm with a meniscus sign noted at the junction of the remnant cystic duct and common hepatic duct possibly impacted calculous causing extraneous compression and biliary obstruction with intrahepatic biliary radical (IHBR) dilatation [Figures 1 and 2]. These findings are suggestive of Mirizzi syndrome type 1.

She underwent endoscopic retrograde cholangiopancreatography (ERCP) by a medical gastroenterologist. Complete blood count (CBD) stenting was done with 10Fr biliary stent to relieve obstruction [Figure 3]. Cholangiogram done showed free flow of bile and no cholecystobiliary fistula suggesting Mirizzi syndrome type 1. Post-ERCP, there was a decrease in bilirubin values.

After ERCP, we proceeded with diagnostic laparoscopy. Using ICG, hepatobiliary anatomy was delineated. Cystic duct was explored and stone was retrieved. Remnant cystic duct was ligated using Ligaclip near CHD and excised [Figure 4]. 28Fr abdominal drain was placed in the GB fossa.

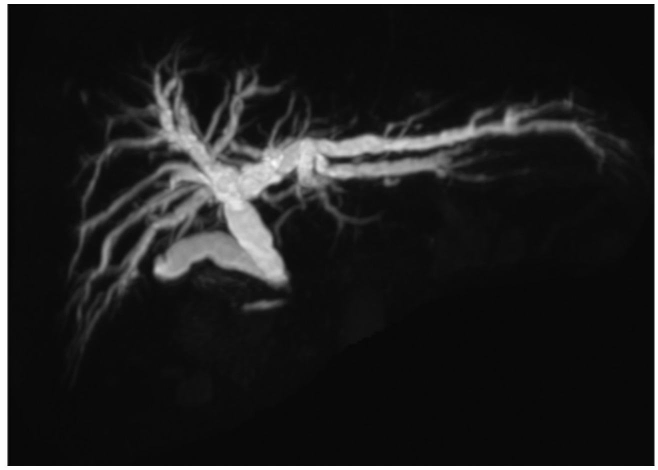

Figure 1: Magnetic resonance cholangiopancreatography image showing dilated cystic duct, common hepatic duct, and intrahepatic biliary radical

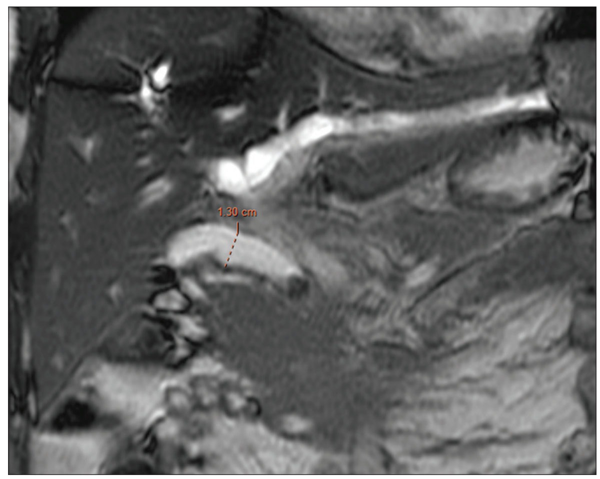

Figure 2: Magnetic resonance cholangiopancreatography showing dilated cystic duct

Figure 3: Endoscopic retrograde cholangiopancreatography – image showing CBD stent with no obstruction

She was started on a liquid diet on POD 0 and the soft solids on POD 1, and the patient tolerated well. Drain was removed on POD 1. On POD 2, there was a further decrease in bilirubin level and she was discharged in a stable condition.

Case 2

A 54-year-old female came to OPD with complaints of abdomen pain for 1 year, intermittent in nature, aggravated during the past 1 week, associated with bilious vomiting and fever. She underwent open cholecystectomy for cholelithiasis 3 years back. The patient was hemodynamically stable with only right hypochondrium tenderness, otherwise unremarkable.

Blood investigations – CBD, LFT, renal function test, serum amylase, and lipase – were normal. Ultrasound abdomen suggested the possibility of cystic duct calculi. CECT abdomen showed cystic duct stump calculous with CBD, IHBR, and EHBR dilatation-likely distal CBD stricture. MRCP showed choledocholithiasis and distal CBD stricture with the residual cystic duct of 9 mm containing 5 mm calculous.

Then proceeded with ERCP+CBD stenting. 7.8-mm black pigmented stone extracted along with biliary sludge and pus. Check cholangiogram showed free flow of bile with no filling defect.

She underwent diagnostic laparoscopy with cystic duct exploration. The intraoperatively cystic duct was identified as adherent to CBD and was separated using blunt dissection and excised. Postoperatively, she was started on oral diet on POD 1 and was discharged on POD 2 in a stable condition.

Case 3

A 40-year-old female came to OPD with complaints of upper abdomen pain for 3 months and three episodes of non-bilious vomiting for 1 day. The patient underwent open cholecystectomy 15 years back. The patient was hemodynamically stable with only right hypochondrium tenderness present.

All laboratory investigations were normal. Ultrasound abdomen showed cystic duct calculi. MRCP showed cystic duct calculi and choledocholithiasis.

The patient underwent ERCP with CBD stenting and two calculi with sludge extracted. Post-procedure patient developed biliary pancreatitis. Repeat MRCP showed features of acute pancreatitis. After 1 week of conservative management, patient amylase and lipase were normal. Then, we proceeded with laparoscopic cystic duct stump excision, and stone was extracted from the cystic duct intraoperatively. Post-procedure patient was started oral diet on POD-1, tolerated well, and discharged on POD 4 in stable condition.

Surgical Procedure

In all the cases mentioned above, the procedure was carried out under general anesthesia with the patient in the supine position. Four ports used for conventional laparoscopic cholecystectomy were used for redo surgery again. The camera port was made using open Hasson's technique and pneumoperitoneum was created. The remaining ports were made under vision. The harmonic scalpel was used to release dense adhesions between the omentum, liver, and remnant cystic duct. Traction is applied to the remnant cystic duct or liver. With the use of ICG, hepatobiliary anatomy was delineated, and then, adhesions were released using blunt dissection [Figure 5]. The cystic duct was opened and a stone was retrieved [Figures 6 and 7]. The cystic duct was ligated close to CBD using Ligaclips and excised. Then, specimen was retrieved through endobag. The abdominal drain was placed before concluding the surgery.

RESULTS

We managed three female patients with remnant cystic duct calculi. Two patients underwent open

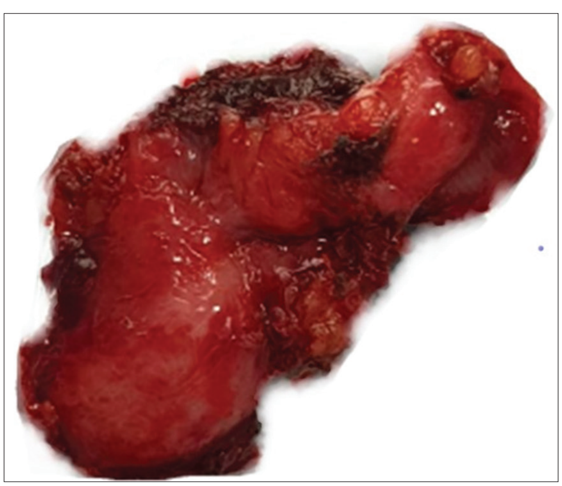

Figure 4: Cystic duct specimen

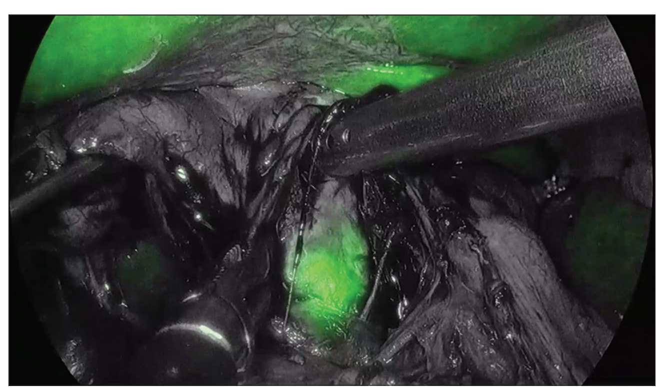

Figure 5: Indocyanine green uptake in liver and CBD

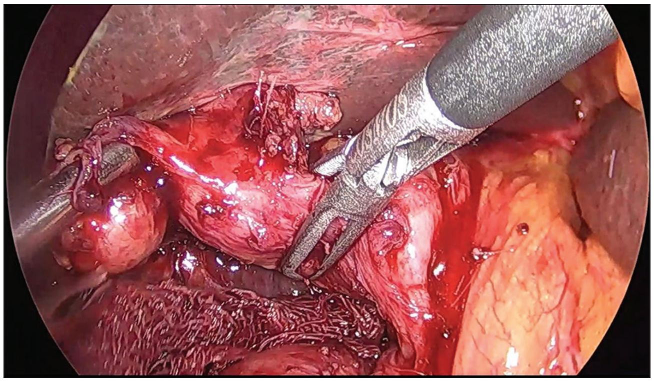

Figure 6: Remnant cystic duct stump

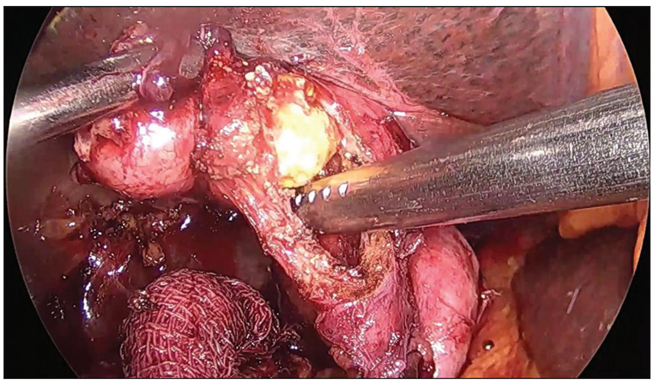

Figure 7: Stone retrieval in cystic duct

cholecystectomy and one patient underwent laparoscopic cholecystectomy previously. One patient presented with features of obstructive jaundice with cholangitis and two patients with features of biliary colic with a varied duration of presentation from 6 months to 15 years post-cholecystectomy. MRCP is the investigation of choice and it showed remnant cystic duct stones with CBD stone for all three patients and one patient had Mirizzi syndrome type 1 along with CBD stone. CBD stone was retrieved successfully with ERCP and CBD stenting was done. One patient developed post-ERCP biliary pancreatitis which was managed conservatively. Then, all patients underwent laparoscopic remnant cystic duct excision with stone retrieval successfully. Both intraoperative and post-operative periods were uneventful. Postoperatively, patients were discharged with a mean duration of 3 days. Six weeks after surgery, CBD stent was removed. Patients had been followed for 1 year and all patients remained free of symptoms in the follow-up period.

DISCUSSION

Cholelithiasis is more common in females, and hence, the incidence of PCS is also more common in females. Remnant cystic duct calculi are the one among the PCS which may lead to complications such as choledocholithiasis, cholangitis, pancreatitis, and Mirizzi syndrome. Symptoms can recur from months to years after cholecystectomy as Rieger and Wayand reported 3 weeks and Ng reported 40 years.[10,11] Ultrasound remains the initial investigation of choice; however, it has low sensitivity in detecting the cystic duct stone due to observer variations making MRCP the superior one with relatively higher sensitivity. In our study, MRCP had diagnosed remnant stone in all three patients but Walsh *et al*. mentioned that MRCP missed the diagnosis of remnant calculi in one patient and Palanivelu *et al*. reported that MRCP is 92% accurate in diagnosing the condition.[12,13] ERCP remains the best diagnostic and therapeutic procedure for managing these conditions. If ERCP fails to retrieve the CBD stones, extracorporeal shock-wave lithotripsy for biliary stone fragmentation can be used.[14]

Remnant cystic duct stone is common among patients who underwent subtotal cholecystectomy previously due to frozen or difficult calot's dissection. This complication can be reduced by milking the cystic duct toward the gallbladder, maintaining cystic duct stump length of <0.5 cm, and performing intraoperative cholangiography during cholecystectomy.[13,15] Now, with the invention of ICG in laparoscopy, it significantly aids in detecting and managing remnant cystic duct stones. Cystic duct exploration with stone retrieval and cystic duct excision can be managed through laparoscopy in the hands of an experienced surgeon without difficulty. A retrograde dissection was performed in our cases. We did not face any inflammation or firm adhesions, and all patients had CBD stent *in situ*, so cystic duct excision was done close to the CBD. ICG was used in delineating the anatomy and releasing the adhesions.

CONCLUSION

Remnant cystic duct stump calculi necessitate an expert and precise mind to diagnose. MRCP is the investigation of choice to diagnose and manage the disease. Patients can be managed laparoscopically with less morbidity in experienced hands.

REFERENCES

1. Legorreta AP, Silber JH, Costantino GN, Kobylinski RW, Zatz SL. Increased cholecystectomy rate after the introduction of laparoscopic cholecystectomy. JAMA 1993;270:1429-32.
2. Orlando R 3rd, Russell JC, Lynch J, Mattie A. Laparoscopic cholecystectomy. A statewide experience. The connecticut laparoscopic cholecystectomy registry. Arch Surg 1993;128:494-9; discussion 498-9.
3. Steiner CA, Bass EB, Talamini MA, Pitt HA, Steinberg EP. Surgical rates and operative mortality for open and laparoscopic cholecystectomy in Maryland. N Engl J Med 1994;330:403-8.
4. Schofer JM. Biliary causes of postcholecystectomy syndrome. J Emerg

Med 2010;39:406-10.
5. Tantia O, Jain M, Khanna S, Sen B. Post cholecystectomy syndrome: Role of cystic duct stump and re-intervention by laparoscopic surgery. J Minim Access Surg 2008;4:71-5.
6. Vyas FL, Nayak S, Perakath B, Pradhan NR. Gallbladder remnant and cystic duct stump calculus as a cause of postcholecystectomy syndrome. Trop Gastroenterol 2005;26:159-60.
7. Lum YW, House MG, Hayanga AJ, Schweitzer M. Postcholecystectomy syndrome in the laparoscopic era. J Laparoendosc Adv Surg Tech A 2006;16:482-5.
8. Kim JY, Kim KW, Ahn CS, Hwang S, Lee YJ, Shin YM, *et al*. Spectrum of biliary and nonbiliary complications after laparoscopic cholecystectomy: Radiologic findings. AJR Am J Roentgenol 2008;191:783-9.
9. Flörcken H. Gallenblasenregeneration mit steinrezidiv nach cholecystektomie. Dtsch Z Chir 1912;113:604-5.
10. Rieger R, Wayand W. Gallbladder remnant after laparoscopic cholecystectomy. Surg Endosc 1995;9:844.
11. Ng B. Case report of choledocholithiasis 40 years post cholecystectomy. Radiol Case Rep 2024;19:1589-91.
12. Walsh RM, Ponsky JL, Dumot J. Retained gallbladder/cystic duct remnant calculi as a cause of postcholecystectomy pain. Surg Endosc 2002;16:981-4.
13. Palanivelu C, Rangarajan M, Jategaonkar PA, Madankumar MV, Anand NV. Laparoscopic management of remnant cystic duct calculi: A retrospective study. Ann R Coll Surg Engl 2009;91:25-9.
14. Ponsky LE, Geisinger MA, Ponsky JL, Streem SB. Contemporary "urologic" intervention in the pancreaticobiliary tree. Urology 2001;57:21-5.
15. Freud M, Djaldetti M, De Vries A, Leffkowitz M. Postcholecystectomy syndrome: A survey of 114 patients after biliary tract surgery. Gastroenterologia 1960;93:288-93.

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