https://doi.org/10.33472/AFJBS.6.5.2024. 2855-2867

AfricanJournalofBiological Sciences

Cystic duct stump stone or remnant gall bladder stone as a cause of post-cholecystectomy syndrome.

Sherwan Ahmed Aziz[1*], Azhy Muhammed Dewana[2], Baderkhan Saeed Ahmed[2], Sirwan Ahmed Aziz[1], Yousif Sartip Mohammed[3], Abdulla Sherwan Ahmed[3]

[1]Lecturer, Department of Surgery, College of Medicine, Hawler Medical University, Erbil, Kurdistan Region-Iraq

[2]Assistant Professor, Department of Surgery, College of Medicine, Hawler Medical University, Erbil, Kurdistan Region-Iraq.

[1]Lecturer, Department of Surgery, College of Medicine, Hawler Medical University, Erbil, Kurdistan Region-Iraq

[3]Erbil Directory of Health, Erbil, Kurdistan Region-Iraq.

***Corresponding author**: Sherwan Ahmed Aziz, Email: sherwan.garota@hmu.edu.krd

Article History
Volume 6, Issue 5, 2024
Received: 01 May 2024
Accepted: 09 May 2024
doi:*10.33472/AFJBS.6.5.2024. 2855-2867*

Abstract

Background: The cause of post-cholecystectomy syndrome can be classified as a biliary or non-biliary source from the stomach, esophagus, pancreas and blood vessels. Remnant gall bladder stone or cystic duct stone is an important cause of biliary PCS. This study deals with cystic duct stump stone, as a cause of PCS.

Materials &Methods: The study was conducted in Erbil teaching hospital in Erbil/Iraq, from second January 2012 to 15th February 2020. Twelve female patients who had cystic duct stones were included in the study. The cystic structure containing stones confirmed by ultrasound and MRCP examinations. Laparoscopic completion surgery done.

Results: Patients with PCS presented at variable interval ranging from two weeks to two years after cholecystectomy. The mean age of patients was 43.33±7.18, the youngest patient was 35 years old while the oldest was 56 years old. The presenting symptom was colicky right upper abdominal pain in 10 patients (83.3%), the other two patients presented with features similar to cholecystitis. All the twelve patients underwent re-exploration by Laparoscopy successfully without conversion to open surgery. The mean operative time was 79.33±20.27 minutes.

Conclusion: PCS in our study were probably from stone formation and impaction in the stump of the long remnant cystic duct, the obstruction caused by impacted stone made distal dilatation and cyst formation which was difficult to differentiate it from remnant gall bladder (after subtotal cholecystectomy). Laparoscopic completion surgery is preferable although need longer operation time.

Keywords: Laparoscopy; Post-cholecystic syndrome; cystic duct stump;Stone;MRCP; Magnetic resonance cholangiopancreatography

INTRODUCTION

Gallbladder diseases in many developed countries are common and include a wide range of disorders [1]. Gallstones are the most common disease of the gallbladder [2,3]. Today, cholecystectomy is a standard procedure It is symptomatic and an alternative for the treatment of gallstones It is suitable for open surgery. Reduction of pain after surgery, shorter recovery period, the possibility of starting oral feeding earlier, shorter hospitalization time, and so on Faster return to daily cholecystectomy activities Laparoscopic as the treatment of choice for most Gallbladder diseases have become [4,5].

About 85% of patients with symptomatic gall stones will be free from symptoms after cholecystectomy, while 15% still have same preoperative symptoms or new symptoms related to the biliary tree postoperatively, and is termed the post-cholecystectomy syndrome[6]. Post-cholecystectomy syndrome (PCS) describes a group of symptoms that persist or occur after surgical gallbladder removal. The causes can be classified as a biliary (retained stones, clamped or injured bile ducts) or non-biliary source from the stomach, esophagus, pancreas and blood vessels. The onset of biliary PCS can occur immediately or shortly in the postoperative period and is classified as early biliary PCS; this is caused by retained or missed duct stones, biliary injury or leaks. Late biliary PCS commences months or years after LC and is triggered by inflammation of gall bladder remnant, recurrent stones, system dysfunction or stricture[7–9].

Gall stones may form in the remnant of gall bladder after partial cholecystectomy when encountering severe inflammation or fibrosis of the gall bladder, hence the surgeon intentionally leave a portion of the gall bladder to avoid injury to the CBD or nearby structures, the diseased remnant gall bladder may form stones later[10]. Stones may also form in the cystic duct stump especially when more than one centimeter length of the cystic duct left behind[11]. The obstructed cystic duct stump will dilate and form a sacular structure from increased intraluminal pressure;In the studies of M Baghaei et al. (2020) [12] and S Gvidiani[13], concluded that bile duct obstruction increases intraluminal pressure and eventually duct dilatation.

The gall bladder and extrahepatic biliary ducts are lined by tall columnar epithelium, the gall bladder has mucosal folds which disappear on distention, so histological differentiation between inflamed gall bladder and inflamed distended cystic duct may be difficult[14].

Although the diagnosis of gallstones is usually very clear, the diagnosis of stones in the common bile duct is very challenging. During laparoscopy cholecystectomy, it is difficult to explore the common bile duct[15].

The aim of our study is to show that the long cystic duct stump may be an important cause of post-cholecystectomy syndrome and the distended cystic duct may mimic remnant gall bladder.

MATERIALS AND METHODS

The descriptive study was conducted in Erbil teaching hospital in Erbil, the capital of Kurdistan Region of Iraq, from second January 2012 to 15th February 2020. Approval for conducting the study was obtained from ethical committee of Hawler Medical University. The total number of patients Eighteen patients with post-cholecystic syndrome proved to have recurrence of biliary stone formation who presented to the surgical consultation unit in Erbil teaching hospital The study inclusion criteria included patients had history of laparoscopic cholecystectomy in Erbil, they developed biliary colic or symptoms similar to cholecystitis few weeks to few years after the operation of cholecystectomy. Exclusion criteria included having a common bile duct stone, findings other than stones during surgery (malignancy, polyp), history of laparotomy surgeries previously, conversion to open surgery and lack of access to patients It was the direction of follow-up and mortality. According to the inclusion and exclusion criteria, 6 patients who had common bile duct stones were excluded from the study, and finally 12 female patients with cystic structure in the gallbladder bed were included in the study. The residual gallstone was defined as a radiologically visible cystic structure at gallbladder bed containing a stone in its lumen. These patients investigated by ultrasound which showed cystic structure at the gall bladder bed, the diagnosis confirmed by MRCP (Figure 1 and 2).

Figure 1

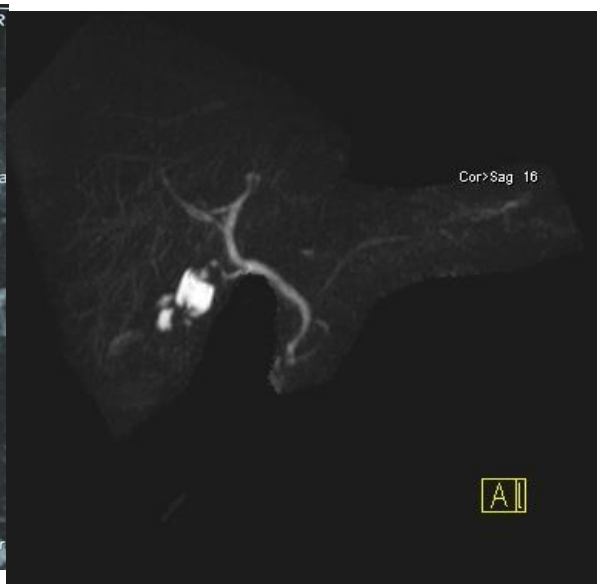

Figure 2

Figures 1 and 2: MRCP show a cystic structure with the biliary tree.

Preoperative blood tests including full blood count, renal and liver function tests performed for all, Chest x-ray, ECG and Echo done for patients older than 40 years.

The operations performed under general anesthesia in supine position, the first port put in left subcostal area in mid clavicular line (Palmer`s point access) to avoid injury from adhesions of previous supra-umbilical port, then abdominal insufflation with CO2 done and the pressure kept at 12-14 mmHg. The classical four port for trocar placement (a 5 mm port for camera above umbilicus, a 10 mm port for dissection and extraction of the specimen at subxiphoid, and two ports of 5 mm at right hypochondrium traction on the cyst) done under vision.

The head of bed elevated and tilted slightly to the right. Dissection under the edge of liver done at the midclavicular line to find the cystic structure, it cleared from the surrounding adhesions (figures 3-5), and retracted over liver.

Careful dissection of the cystic structure done and critical view of safety applied to avoid injury to the bile duct and hepatic artery.

After delivery of the specimen from the epigastric port, the field re-inspected for safety insurance and a 18F tube drain put for 24-48 hours. The ports sutured with 3/0 polypropylene suture. The specimens sent for histopathological study. All patients kept in hospital for 48 hours, then after discharged without problem.

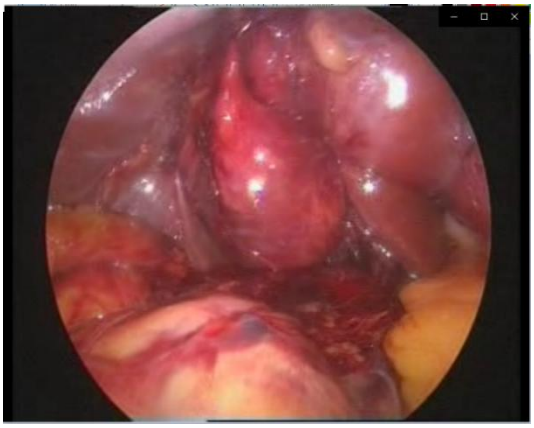

Figure 3: cystic structure at gall bladder bed

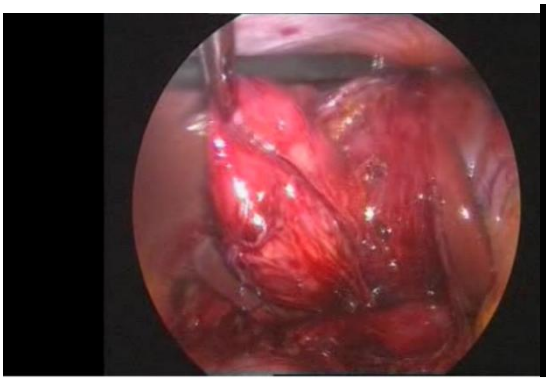

Figure 4

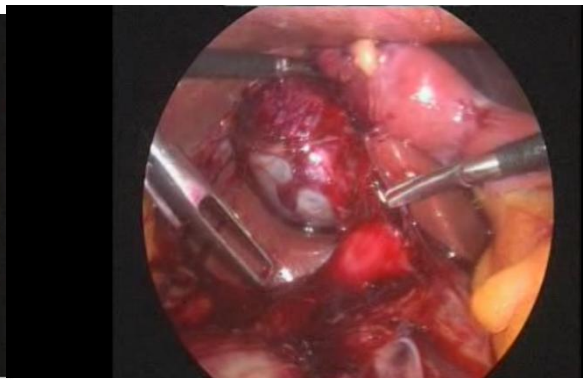

Figure 5

Figures 4 and 5: dissecting the cystic structure and clearing it from the surrounding

Demographic information and clinical information before and after the operation were extracted from the patients' files. For quantitative variables, mean and standard deviation were reported, and for qualitative variables, frequency (percentage) was reported. Data was analyzed by using SPSS Statistics for Windows, Version 26.0 (IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp).

RESULTS

The study involved 12 female patients who underwent laparoscopic re-operation for post-cholecystectomy syndrome due to recurrent cystic duct stones. One of the patients had history of common bile duct(CBD) injury during laparoscopic cholecystectomy for which underwent ERCP and CBD stenting. The earliest postcholecystectomy pain occurred two weeks after an uncomplicated laparoscopic cholecystectomy. The presenting symptom was colicky right upper abdominal pain in 10 patients (83.3%), the other two patients presented with features similar to cholecystitis.

The mean age of patients was 43.33±7.18, the youngest patient was 35 years old while the oldest was 56 years old. Preoperative diagnosis for the patients included acute cholecystitis 9 (75%), chronic cholecystitis 2 (16.6%) and biliary colic 1 (8.4%). The imaging method for all patients was ultrasound and the diagnosis was confirmed using Magnetic resonance cholangiopancreatography The mean operative time was 79.33±20.27 minutes.The mean duration of cholecystectomy was 384.875 ± 284.916 (345-14) minutes. The shape of gallstones was Round in 2 (16.6%), Sandy in 5 (41.7%) and faceted in 5 (41.7%). The number of gallstones

in 8 (66.6%) was >3 and 4 (33.4%) was ≤3. Gallstone size (mm) was in 7 (58.33%) >5 and in 5 (41.67%) ≤5. (Table 1).

Table 1: Demographics and clinical features of the patients

Variable	Value
Sex	12 (100%)
Age	43.33±7.177 (35 – 56) y
Preoperative diagnosis at LC	
Acute calculous cholecystitis	9 (75%)
Chronic calculous cholecystitis	2 (16.6%)
Biliary colic	1 (8.4%)
Preoperative imaging modality	
USG	12 (100%)
CT Scan	0
Confirmed diagnosis	
MRCP	12 (100%)
Operative time minutes	79.33±20.272 (40 – 114)
Duration of cholecystectomy	284.916±384.875 (14 -345)
Gallstone shape	
Round	2 (16.6)
Sandy	5 (41.7%)
Faceted	5 (41.7%)
Gallstone number	
3 >	8 (66.6%)
3 ≤	4 (33.4%)
Gallstone size (mm)	
5 >	7 (58.33%)
5 ≤	5 (41.67%)
presenting symptom	
colicky right upper abdominal pain	10 (83.3%)
cholecystitis	2 (6.7%)

Values are presented as number (%) or mean±(SD) (range).

USG, ultrasonography, MRCP, Magnetic resonance cholangiopancreatography

All the re-operations performed successfully through laparoscopy without major complications.

All patients had tube drain in sub-hepatic area, in Seven patients the drain removed after 24 hours and in five patients the drain removed after 48 hours. All the 12 patients discharged from the hospital after 48 hours.

The histopathological examination of the removed cystic structure confirmed as biliary structure.

Postoperative follow up of the patients for at least two years were uneventful. (Table 2)

Table 2: Clinical finding in patients

Variable	Value
Operative method	
laparoscopy	12 (100%)
Major injury	0
tube drain	
sub-hepatic area	12 (100%)
Drain removal time	
24 hours after the operation	5 (41.66%)
48 hours after the operation	7 (58.34%)
Hospital stays	2 days
Finding histopathology	
biliary structure	12 (100%)
Follow-up period	2 years

Values are presented as number (%)

DISCUSSION

Laparoscopic cholecystectomy is a common procedure performed at governmental hospitals in Erbil city, because of lack of computerized data record of the details of the operative procedure and difficulties or complications encountered during operations, so when facing post-cholecystectomy syndrome related to remnant stone, it will be difficult to get precise information about the procedure. In our study when recalling information from the different surgeons who did laparoscopy of the studied 12 patients, all performed total cholecystectomy, but recalling about the length of the stump of cystic duct could not be confirmed.

If the residual cystic duct is more than 1 cm, it is defined as a residual duct, and if there is a stone, it may cause post-cholecystectomy syndrome [16]. For the first time, Rogy et al (1991) [17] proposed the role of cystic duct stump in the syndrome in patients who underwent bile duct surgery for the second time after cholecystectomy, and 35 patients (10.8%) with long cystic duct stump (more than 1.5 cm) found in this study, it was concluded that cystic duct stump can be the cause of recurrent symptoms and removal of cystic duct does not eliminate symptoms after cholecystectomy.

The mean operation time 79 minutes was longer than a traditional 4 port laparoscopic cholecystectomy; studies done by Singal et althe operation time was 47.60 ± 6.633[18], and in Subirana et al was53.89 min ± 28.05[19]. The longer operation time was due to adhesions and disturbed anatomy of the gall bladder bed from previously performed laparoscopic cholecystectomy compared with a procedure performed on a virgin anatomy.

The mean operation time in our study was close to the operation time of a study done by Kumar et al which was 75 minutes[20], but shorter operation time compared with a study done by Palanivelu et al which was 103.5 min[21], Popescu et al which was 97.5 min[11], and Conours et al was 118 min[22], while our operation time was longer than a study done by Tantia et al which was 62 min[23].

We were successful in completing the operation by laparoscopy without conversion to open, in a study done by Kumar et al who operated on 19 patients with remnant biliary stone; two from 18 (11%) laparoscopic completion cholecystectomy converted to open and one of the 19 patients started with open procedure[20], in a study conducted by Popescu et al on 14 patients with PCS due to remnant stone; six patient underwent open exploration and eight laparoscopic, four of the cases the cause were remnant gall bladder and ten of them were cystic duct stone[11].

The histopathological examinations of the removed cystic structures in all the 12 patients confirmed a tall columnar epithelium. The mucosal lining of the gall bladder and extrahepatic biliary duct is tall columnar epithelium, but the gall bladder has folds which disappear on distention[24]. It may be difficult to differentiate between gall bladder and distended cystic duct after obstruction by stone, on recalling of previous cholecystectomy, there were no evidence that gall bladder remnant left behind, although the length of cystic duct stump was unknown, that is why we think that the sacular structure containing stones is long cystic duct stump became distended from obstruction by the stone formed from stasis of bile[25].

In a study done by Palanivelu et al who performed laparoscopic re-exploration of 15 patients with remnant gall bladder who had documented subtotal cholecystectomy[21].

Tantia et al[23] performed laparoscopic completion cholecystectomy on Seven patients with post-cholecystectomy syndrome; Two of them had dilated cystic duct stump and five with remnant gall bladder.

The 12 patient who underwent operation in our study stayed for 2 days, which was concordance with a study in a tertiary care teaching hospital in India in which the postoperative stay was 1-5 days (mean was two days)[10].

Considering the increase of laparoscopic surgeries, it is necessary and necessary to consider cystic duct stones as the cause of post-cholecystectomy syndrome. And Hampenin used MRCP as a safe and optimal method due to its non-invasiveness [26].

In connection with the importance of laparoscopy, it is important to mention that incomplete cholecystectomy, the stump of the cystic duct is placed in the inflamed scar tissue, and according to today's advances, it is safe and possible to remove the gallbladder or remnants of the gallbladder in patients by laparoscopy. And finally, the disease can be managed well with laparoscopy [27].

CONCLUSION

Post-cholecystectomy syndrome in our study were probably from stone formation and impaction in the stump of the long remnant cystic duct, the obstruction caused by impacted stone made distal dilatation and cyst formation which was difficult to differentiate it from remnant gall bladder (after subtotal cholecystectomy). Laparoscopic completion surgery is preferable although need longer operation time.

Acknowledgment

Funding

None.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

References

1. Portincasa P, Di Ciaula A, Bonfrate L, Stella A, Garruti G, Lamont JT. Metabolic dysfunction-associated gallstone disease: expecting more from critical care manifestations. Intern Emerg Med. :1–22.

2. Lord AC, Hicks G, Pearce B, Tanno L, Pucher PH. Safety and outcomes of laparoscopic cholecystectomy in the extremely elderly: a systematic review and meta-analysis. Acta Chir Belg. 119(6):349–56.

3. Grigor'eva IN, Romanova TI. Gallstone disease and microbiome. Microorganisms. 8(6):835.

4. Ullah S, Yang BH, Liu D, Lu XY, Liu ZZ, Zhao LX, et al. Are laparoscopic cholecystectomy and natural orifice transluminal endoscopic surgery gallbladder preserving cholecystolithotomy truly comparable? A propensity matched study. World J Gastrointest Surg. 14(5):470–81.

5. Hao Y, Yang Z, Yang H, Hong J. Gallbladder-preserving cholecystolithotomy. Expert Rev Gastroenterol Hepatol. 16(3):265–72.

6. Shirah BH, Shirah HA, Zafar SH, Albeladi KB. Clinical patterns of postcholecystectomy syndrome. Ann Hepato-Biliary-Pancreatic Surg. 22(1):52.

7. Angeline G, Lalisang TJM. High incidence of postcholecystectomy syndrome: Can we reduce it? J Int Dent Med Res. 11(2):723–7.

8. Saleem S, Weissman S, Gonzalez H, Rojas PG, Inayat F, Alshati A, et al. Post-cholecystectomy syndrome: A retrospective study analysing the associated demographics, aetiology, and healthcare utilization. Transl Gastroenterol Hepatol. 6.

9. Singh A, Kapoor A, Singh RK, Prakash A, Behari A, Kumar A, et al. Management of residual gall bladder: A 15-year experience from a north Indian tertiary care centre. Ann Hepato-Biliary-Pancreatic Surg. 22(1):36.

10. Popescu RC, Leopa N, Dumitru A, Dan C, Dosa A, Bosneagu R, et al. Residual gallbladder and cystic duct stump stone after cholecystectomy: Laparoscopic management. Chir. 116(4):484–91.

11. Lv Y, Liu N, Wu H, Li Z. Etiological classification and treatment strategies for secondary bile duct dilatation. Exp Biol Med. 246(3):281–5.

12. Baghaei M, Kavian M, Ghodsi S, Razavi SE. Numerical Investigation of Bile Secretion and Pressure Rise in Obstructed Human Common Bile Duct. J Appl Fluid Mech. 14(1):275–86.

13. Gvidiani S, Gulbani L, Svanadze L, Tsomaia K, Bebiashvili I, Kordzaia D. Ductular Reaction in Total and Partial Biliary Obstruction in Experimental Settings. Gene Expr. 000(000):000–000.

14. Rubin DC, Shaker A. Small intestine: anatomy and structural anomalies. Yamada's Textb Gastroenterol. :73–92.

15. Murphy MC, Gibney B, Gillespie C, Hynes J, Bolster F. Gallstones top to toe: what the radiologist needs to know. Insights Imaging. 11(1):1–14.

16. Yin Z, Zhu Y, Li Z, Jiang X, An W, Yin L, et al. Factors related to residual gallbladder calculi formation using computed tomography and magnetic resonance imaging combined with clinical data. J Int Med Res. 48(9):0300060520958968.

17. Rogy MA, Függer R, Herbst F, Schulz F. Reoperation after Cholecystectomy. The Role of the Cystic Duct Stump. HPB Surg. 4(2):129–35.

18. Singal R, Goyal P, Zaman M, Mishra RK. Comparison of three-port vs four-port laparoscopic cholecystectomy in a medical college in the periphery. World J Laparosc Surg. 10(1):12–6.

19. Subirana H, Rey F, Barri J, Robres J, Parra L, Martín M, et al. Single-incision versus four-port laparoscopic cholecystectomy in an ambulatory surgery setting: A prospective randomised double-blind controlled trial. J Minim Access Surg. 17(3):311–7.

20. 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. 91(1):25–9.

21. Concors SJ, Kirkland ML, Schuricht AL, Dempsey DT, Morris JB, Vollmer CM, et al. Resection of gallbladder remnants after subtotal cholecystectomy: presentation and management. Hpb. 20(11):1062–6.

22. Shaw C, O' Hanlon DM, Fenlon HM, Mc Entee GP. Cystic Duct Remnant and the "Post-cholecystectomy Syndrome." Hepatogastroenterology. 51(55):36–8.

23. 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. 4(3):71–5.

24. Miller MA, Zachary JF. Mechanisms and Morphology of Cellular Injury, Adaptation, and Death. Pathol Basis Vet Dis Expert Consult. :2-43.e19.

25. Chatra PS. Cystic duct remnant: a rare cause for post-cholecystectomy syndrome. BJR|case reports. 4(1):20170043.

26. Tonolini M, Ierardi AM, Patella F, Carrafiello G. Early cross-sectional imaging following open and laparoscopic cholecystectomy: a primer for radiologists. Insights Imaging. 9(6):925–41.

27. Majumder A, Altieri MS, Brunt LM. How do I do it: Laparoscopic cholecystectomy. Ann Laparosc Endosc Surg. 5(April).