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Original Article

A Prospective Study of Value of Routine Milking of Cystic Duct during Laparoscopic Cholecystectomy

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Abstract

Background: Although cystic duct stones (CDSs) are occasionally encountered during laparoscopic cholecystectomy (LC) and are not detected easily by preoperative investigations, it is noteworthy to detect them intraoperatively as they decrease the incidence of postcholecystectomy pain and alarm us to the more serious common bile duct (CBD) stones. Hence, we aimed to evaluate the role of cystic duct milking in detection of CDSs and its significance.

Methods: This study was performed on 150 cases with calcular cholecystitis at Sri Venkateswara Institute of Medical Sciences, Tirupati, Andhra Pradesh, in the period from August 2015 to May 2017. All patients had undergone LC, cystic duct milking. On-table cholangiogram (OTC) was done for cases who showed CDS.

Results: CDSs were detected in 28 cases, and preoperative investigations failed to detect any of them; however, retrospectively 19 (67.8%) of them revealed to have mild transient liver function derangement associated with acute right hypochondrial pain. Wide cystic duct (more than 4 mm) was recorded in 3 (10.7%) of 28 cases who showed CDS. The incidence of association of CDS and CBD stones was found in 10 (35.7%) cases.

Conclusions: CDSs are occasionally encountered during LC. They can be removed easily by just milking of cystic duct before clipping. The benefit is to decrease the incidence of postcholecystectomy pain as well as it alerts us toward the more serious CBD stones. Hence, OTC at that time becomes mandatory to avoid missed stone.

Key words: Common bile duct stones, Laparoscopic cholecystectomy, Milking of cystic duct

INTRODUCTION

Cystic duct stones (CDSs) are usually found during laparoscopic cholecystectomy (LC). In most cases, they are noticed during dissection of the pedicle and at the time of dividing the cystic duct. Based on the epidemiological evidence, the most common bile duct (CBD) stones originate in the gallbladder.[1,2] Nearly 10%–15% of the patients with cholecystectomy experience postcholecystectomy syndrome.[3] CDSs are involved in postcholecystectomy pain, failure of insertion of on-table cholangiogram (OTC) catheter, and the subsequent development of CBD stones.[4-6] In most cases, the normal-caliber cystic duct cannot be seen on ultrasound, axial computed tomography (CT), or direct preoperative cholangiography, and it can only be detected by percutaneous transhepatic catheterization or endoscopic retrograde cholangiopancreatography (ERCP).[7] Performing MRC from different angles makes cystic duct course visualization possible as well as approximate imaging generation of the apparent filling defect.[8] This is not always available and needs high index of suspicion preoperatively. From the previous studies, the presence of CDS should be considered during LC and should not be taken lightly even if it had not been detected preoperatively by the available investigations. Our study was done to demonstrate the value of routine milking of cystic duct to detect and remove CDS.

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METHODS

This was a prospective study performed on 150 patients presented to the Outpatient Clinic, Sri Venkateswara Institute of Medical Sciences, Tirupati, with chronic calcular cholecystitis. The study was conducted from August 2015 to May 2017. Laboratory investigations (complete blood count, prothrombin time, liver and kidney functions tests, total and direct bilirubin, alkaline phosphatase, and serum amylase) and imaging (abdominal ultrasound) were done to all patients. The exclusion criteria were acute calcular cholecystitis, history of jaundice or ERCP, CBD dilatation, and biliary pancreatitis. Written informed consent was obtained from all patients.

LC and routine cystic duct milking were routinely performed to all patients and the OTC was done for cases in whom CDS were detected.

The procedure was performed using a standard four-port technique. The cystic duct was dissected intraoperatively and the critical view of safety was observed before the placement of an endoclip at the junction of the gallbladder–cystic duct. An anterolateral incision was made in the cystic duct using scissors, and a partially closed Maryland was then used to milk the cystic duct beginning at its junction with CBD toward the gallbladder. At this stage, either CDS or debris is noticed [Figure 1]. Sometimes, we needed to extend the incision toward the CBD to deliver large stones. For all cases who showed CDS and after clearance of that stones, an OTC was done. A 6-F Ureteric catheter was passed through the cystic duct, and the cholangiogram was obtained [Figure 2]. If CBD stones were identified, they were dealt with at the same session and after removal of the gallbladder by endoscopic sphinctrotomy and stone extraction through ERCP. The balloon entered the CBD till the confluence and was inflated and multiple attempts of trawling were done till stones, mud and free bile came out of papilla [Figure 3]. In some cases, the dormia basket was used for stone extraction which failed to be extracted using the balloon.

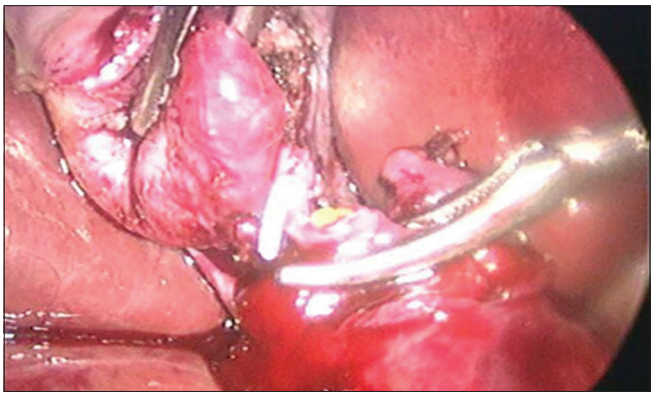

Figure 1: Cystic duct stones after milking of cystic duct

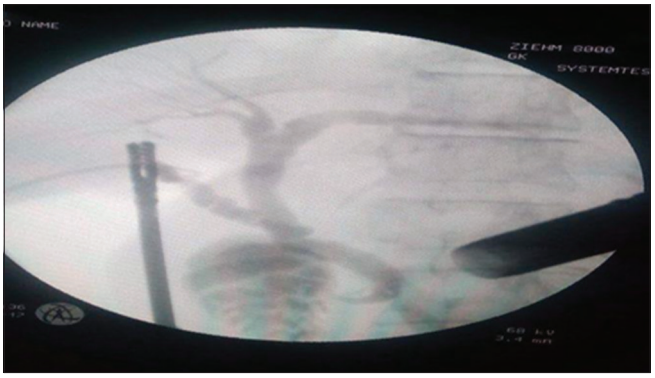

Figure 2: Intraoperative cholangiogram

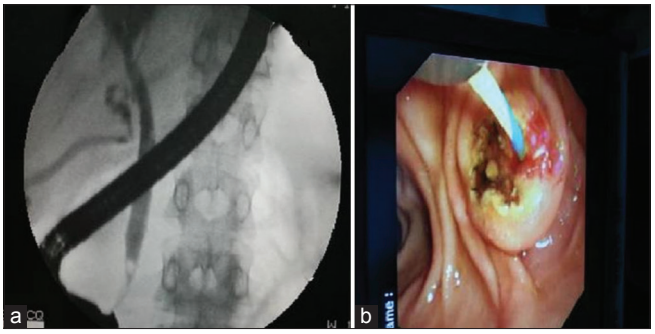

Figure 3: (a) ERCP with a stone in distal common bile duct (CBD) and, (b) sphincterotomy and removal of stone. LC – laparoscopic cholecystectomy, CBD – common bile duct

RESULTS

This study was conducted on 150 cases with chronic calcular cholecystitis at Sri Venkateswara Institute of Medical Sciences, Tirupati, Andhra Pradesh, from August 2015 to May 2017. All patients had undergone LC and cystic duct milking.

The study comprised 40 (26.7%) males and 110 (73.3%) females. The range of the age was 18–72 years with mean ± SD of 38.51 ± 12.41. A number of 28 (18.7%) cases of CDS were documented. In about 67.8% (19 cases) of those patients, there was mild recent derangement of liver function tests associated with acute right hypochondrial pain. A single stone was found in 20 (71.4%) cases and multiple stones were found in 8 (28.6%) cases. The cystic duct was reported to be wide more than 4 mm in diameter in 3 (10.7%) cases. OTC was done for all cases who showed CDS (28 cases). We recorded 10 (35.7%) cases with CBD stones [Figure 4].

DISCUSSION

CDSs encountered during LC are not given the importance that they worth. Residual CDSs represent

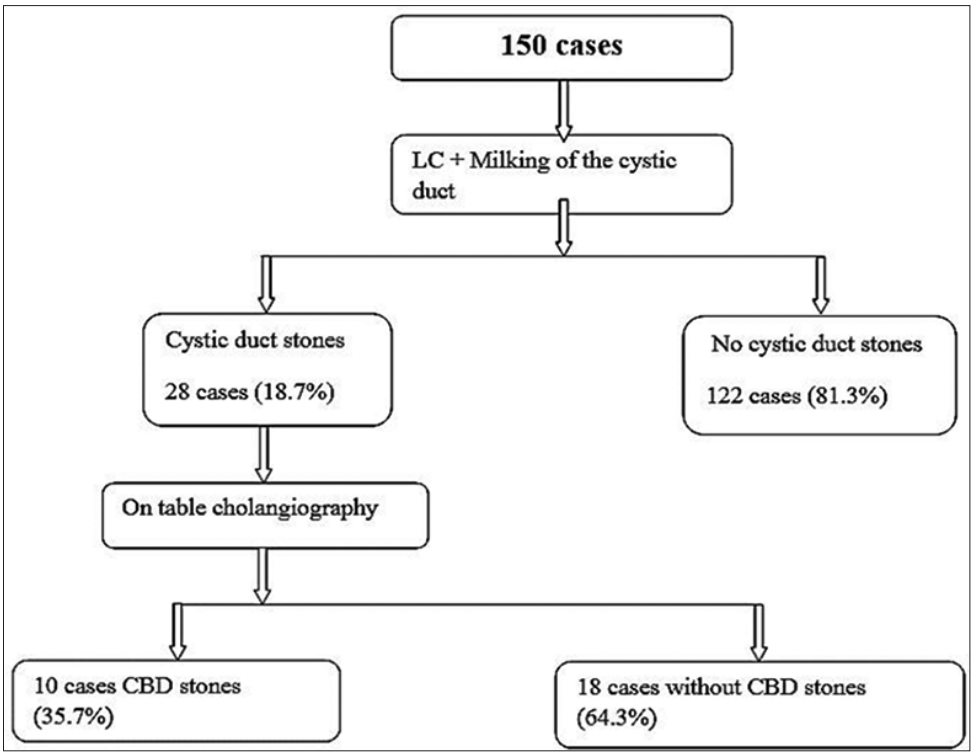

Figure 4: Number and distribution of studied cases (LC=Laparoscopic cholecystectomy, CBD=Common bile duct)

up to 25% of cases of postcholecystectomy pain that represents a great challenge to surgeons to resolve.[9] This group of patients is theoretically preventable by the simple maneuver of routine milking of cystic duct during LC. In our study, although CDSs were not detected in any case using abdominal ultrasonography, there was incidence of about 18.7% of patients having CDS (28 cases). This matches with results published by Mahmud *et al.* in 2001 of a documented incidence of CDS of about 12.3%.[6] In another study, Kambal *et al.* in 2014 stated that the incidence of CDS was about 19%.[10] Furthermore, a prospective study from St James University Hospital (Leeds, UK) presented in 2012 at the international conference of the Association of Surgeon of Great Britain and Ireland found sludge or CDS shown on OTC during LC at an incidence of 20%.[11] Pain during the month preceding surgery should alert the surgeon toward CDS.[10] In our study, there was recent onset of mild transient liver function test (LFT) derangement associated with the right hypochondrial pain in about 67.8% of patients who revealed to have CDS, and this was significantly higher in comparison to those who do not have CDS. This is consistent with the findings of Sezeur and Akel, where LFTs were deranged more commonly in association with CDS (47.6% vs. 24.5%; $P < 0.05$).[12] In Mahmud *et al.*'s study, there was incidence of about 34.3% LFT derangement among those with CDS; however, they documented an incidence of 70.3% of severe attack of pain preoperatively.[6] In our study, there was wide cystic duct in only 3 (10.7%) cases of CDS. Castelain *et al.* showed a positive correlation between a wider diameter cystic duct and the passage of stones.[13] On the other hand, some stated that aberrant anatomy has been shown to be associated with the development of CDS and not the length of cystic duct.[14] CBD stones which may be a cause of morbidity among patients with calcular gallbladder were found in our study in association with CDS in 35.7%. This explains the importance that should be given to the presence of CDS. In Mahmud *et al.*' study, they reported incidence of association up to 35%.[6] Furthermore, in the study by Kambal *et al.*, they documented that the incidence was more common when CDS was present (50% vs. 29%).[10] From the previous studies, we can conclude that CDSs are not rare and careful milking of the cystic duct before applying clips is a safe and effective way for detecting and extracting these stones even if they were not detected preoperatively. This simple maneuver may reduce the rate of postcholecystectomy pain in addition of giving us a notice of more serious condition of CBD stones and raise our need to do intraoperative cholangiography.

CONCLUSION

CDSs are not rare. Their preoperative detection may be difficult, but they can be detected easily intraoperatively and removed simply by just milking of cystic duct. Its

detection and removal help in decreasing the incidence of postcholecystectomy pain. Furthermore, their presence is an alarm to the more serious CBD stones and in this case intraoperative cholangiography becomes mandatory to avoid missed stone.

REFERENCES

1. Saharia PC, Zuidema GD, Cameron JL. Primary common bile duct stones. Ann Surg 1977;185:598-604.
2. Way LW, Admirand WH, Dunphy JE. Management of choledocholithiasis. Ann Surg 1972;176:347-59.
3. Perera E, Bhatt S, Dogra VS. Cystic duct remnant syndrome. J Clin Imaging Sci 2011;1:2.
4. 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.
5. Demetriades H, Pramateftakis MG, Kanellos I, Angelopoulos S, Mantzoros I, Betsis D. Retained gallbladder remnant after laparoscopic cholecystectomy. J Laparoendosc Adv Surg Tech 2008;18:276-9.
6. Mahmud S, Hamza Y, Nassar AH. The significance of cystic duct stones encountered during laparoscopic cholecystectomy. Surg Endosc 2001;15:460-2.
7. Gulliver DJ, Cotton PB, Baillie J. Anatomic variants and artifacts in ERCP interpretation. AJR Am J Roentgenol 1991;156:975-80.
8. Irie H, Honda H, Kuroiwa T, Yoshimitsu K, Aibe H, Shinozaki K, *et al.* Pitfalls in MR cholangiopancreatography interpretation. Radiographics 2001;21:23-37.
9. Köckerling F, Schneider C, Reymond MA, Hohenberger W. Extraction of cystic duct occlusion calculus in laparoscopic cholecystectomy. Zentralbl Chir 1997;122:295-8.
10. Kambal A, Richards T, Jayamanne H, Sallami Z, Rasheed A, Lazim T. Instrumental detection of cystic duct stones during laparoscopic cholecystectomy. Hepatobiliary Pancreatol Dis Int 2014;13:215-8.
11. Dave R, Yeomans N, Cockbain A, Toogood G. The incidence and management of cystic duct stones, the intra-operative cholangiogram is more than just a diagnostic tool. In: ASGBI., Liverpool, UK: International Surgical Congress; 2012.
12. Sezeur A, Akel K. Cystic duct remnant calculi after cholecystectomy. J Visc Surg 2011;148:287-90.
13. Castelain M, Grimaldi C, Harris AG, Caroli-Bosc FX, Hastier P, Dumas R, *et al.* Relationship between cystic duct diameter and the presence of cholelithiasis. Dig Dis Sci 1993;38:2220-4.
14. Jung CW, Min BW, Song TJ, Son GS, Lee HS, Kim SJ, *et al.* Mirizzi syndrome in an anomalous cystic duct: A case report. World J Gastroenterol 2007;13:5527-9.

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