INTRODUCTION

Up to 20% of the general population are affected by biliary stones worldwide\(^{1,2}\), 11 to 21% of patients are associated with common bile duct stones\(^{3-5}\). Cost effectively diagnosis of common bile duct stones (CBDS) and timing of management remain a topic of argument for the proper management of such condition\(^{6-8}\). CBD clearance can be done by surgery (open or laparoscopic), endoscopy and lithotripsy. Moreover, the gallbladder which is mostly the source of the stones is indicated for cholecystectomy. Several ways can accomplish this mission, as a one-step or two-step procedure, variously associating the above reported techniques\(^{9,10}\).

The present retrospective study is aimed to evaluate the difficulty of LC done after more than 2 weeks period for patients underwent ERC to manage CBDS.

PATIENTS AND METHODS

Between May 2012 and November 2014, clinical records of 99 patients presented to the National Hepatology and Tropical Medicine Research Institute (NHTMRI) - at surgery department - who suffered from CBDS, were revised. CBD stones diagnosis was...
approached by clinical symptoms (colicky pain, jaundice, cholangitis, and pancreatitis), serology (liver/pancreas enzymes) and ultrasound (CBD stones, CBD diameter > 6mm). All patients were referred to endoscopy department for ERC to confirm the diagnosis and deal with the CBD stones by papillosphincterotomy and stone extraction with or without stenting. All patients returned back to surgery department and had LC after more than 2 weeks period. LC was performed and/or supervised by senior staff surgeons of the unit.

Operations were carried out under general anesthesia, and standard laparoscopic procedure with the “critical view” dissection at the Calot’s triangle was applied in all patients. Difficulty of safe dissection and degree of adhesions with or without presence of Mirizzi syndrome necessitating conversion to open surgery was judged by a senior surgeon according to the following staging classification shown in table 1.

RESULTS

The study included 99 patients with a median age of 59 years (range=38 to 75 years). They were 69 males and 30 females. Thirty three patients (33.3%) presented with obstructive jaundice. Calculus type (CBDS) was confirmed by abdominal ultrasound and/or CT scan. The remaining 66 patients (66.7%) presented with calculus cholecystitis without jaundice, however CBDS were suspected and diagnosed as previously mentioned in methods. All patients were subjected to ERC and PST, where CBDS were successfully removed using dormia basket or balloon extraction, and stents were placed in the CBD in 24 patients (24.2%). All patients were scheduled for LC; however the timing of operation was delayed more than 2 weeks. Causes of surgery delay were; unfitness for surgery and demand of medical preoperative preparation (24 cases 24.2%), patient reluctance due to social commitments (27 cases 27.3%), and long waiting list (48 cases 48.5%) (Table 2).

During surgery: Operative time ranged between 45 and 70 minutes with a mean of 60 minutes. Grades of adhesions encountered at Calot’s triangle according to the previous classification were as follows; grade I (27 cases 27.3%), grade II (42 cases 42.4%), grade III (18 cases 18.2%), and grade IV (12 case 12.1%). Conversion to open surgery was necessary in 33 cases (33.3%); 12 with grade II, 9 with grade III, and all cases (12) with grade IV (Figure 1). Indications for conversion to open surgery were, (1) unsuccessful dissection to identify anatomical features at Calot’s triangle after more than 30 minutes (18 cases), (2) occurrence of complications bleeding (6 cases), CBD injury (9 cases), and both (6 cases).

Postoperative follow up: Mortality was encountered in 3 cases (3.03%), where CBD injury and bleeding occurred, and at open surgery bleeding was controlled and CBD was repaired on a T-tube. However, the cause of death-6 weeks later- was due to hepatic failure due to hepatic ischemia caused by massive hemorrhage occurred during surgery. Morbidity was encountered in 30 cases (30.3%) and ranged between: Biliary leak in 15 cases, 3 after conversion to open surgery, and 12 after LC. 9 cases resolved spontaneously, and the other 6 needed ERC and stent placement followed by resolving of leak, Subphrenic collection (abscess and/or hematoma) in 9 cases which were treated by sonar guided aspiration and pig tail drainage, and Wound infection occurred in 6 cases of the conversion group (Table 3).

DISCUSSION

CBD clearance can be done by surgery, endoscopy and lithotripsy. Moreover, the gallbladder which is mostly the source of the stones is indicated for cholecystectomy. Several ways can accomplish this mission, as a one-step or two-step procedure, variously associating the above reported techniques\[9,10\].
ERC is followed by LC followed by ERC. "Rendez-vous" technique (synchronous ERC & LC).

One step

Two steps

Management of synchronous gall bladder and CBD stones

Endoscopy

Lithotripsy

Surgery

Endoscopic mechanical Extraction of stones wave Laser

ERC

CBD clearance by endoscopic PST and/or Oddi sphincter dilatation

Laparoscopy

CBD clearance by transcystic/trans-CBD access

Open surgery

CBD clearance by PST through duodenotomy bile-digestive anastomosis

Table 1 grade of adhesions at Calot’s triangle:

| Grade I: contracted gallbladder but still well defined Calot’s triangle | Grade II: contracted gallbladder with adhesions obscuring Calot’s triangle |
| Grade III: adhesions between the gallbladder and common hepatic duct (CHD) but still dissectible from each other (Mirizzi type I, II) | Grade IV: contracted gallbladder non separable from CHD (Mirizzi type III, IV) |

Conversion to open Cholecystectomy

Mortality

Morbidity

33 (33.3%)

3 (3.03%)

30 (30.3%)

Biliary leak

Subphrenic collection

Wound infection

15 (15.15%) 9 (9.9%) 6 (6.06%)


In spite of the encouragement for laparoscopic CBD clearance by the British Society of Gastroenterology guidelines for the management of biliary stones [12], the common practice shows that only 20% of American surgeons regularly perform laparoscopic CBD exploration [13,14], and the vast majority prefer pre-operative ERC [15]. The reasons for the previous limitation are the necessary learning curve for such infrequent procedure, and the non reproducibility of results in elective patients by referral centres [16].

The rendez-vous technique [16,17,18,19,20,21] involves CBD diagnosis and the synchronous management of both gallstones and CBDs during the same procedure (“one step”), although it needs the systematic availability of dedicated instrumentation and a second team to perform intra-operative ERC whenever IOC/laparoscopic US shows CBDS.

Figure 2 algorithm for management options for common bile duct stones [11]. CBD: Common bile duct; ERC: Endoscopic retrograde cholangiography; LC: Laparoscopic cholecystectomy; PST: Papillosphincterotomy.

In this study we reviewed the medical records of 99 patients who presented to our institute with CBDS. All patients were managed according to the algorithm [22], where suspicion of diagnosis by laboratory investigations and abdominal sonar was followed by referral to the endoscopy unit to perform ERC. The role of ERC was dual, first to confirm the presence of CBDS and second to deal with it by stone extraction (using dormia basket or balloon extraction) and PST with or without stent placement.

All patients returned back to surgery department to have LC. Timing of operation was noticeably delayed for more than 2 weeks in this series of patients. Cause of the delay was multi-factorial either related to the patient due to improper medical fitness for surgery necessitating long preparation or long waiting list in the surgery department.

At operation, operative details were analyzed where the difficulty of delayed LC after ERC (dual, first to confirm the presence of CBDS and second to deal with it by stone extraction (using dormia basket or balloon extraction) and PST with or without stent placement). In this study we reviewed the medical records of 99 patients who presented to our institute with CBDS. All patients were managed according to the algorithm [22], where suspicion of diagnosis by laboratory investigations and abdominal sonar was followed by referral to the endoscopy unit to perform ERC. The role of ERC was dual, first to confirm the presence of CBDS and second to deal with it by stone extraction (using dormia basket or balloon extraction) and PST with or without stent placement.

All patients returned back to surgery department to have LC. Timing of operation was noticeably delayed for more than 2 weeks in this series of patients. Cause of the delay was multi-factorial either related to the patient due to improper medical fitness for surgery necessitating long preparation or long waiting list in the surgery department.

At operation, operative details were analyzed where the difficulty of the procedure (LC) was judged according to degree of adhesions encountered during Calot’s triangle dissection to ensure a safe critical view technique. Adhesions were classified into 4 grades as mentioned in Table 1. Operative time was noticed to be longer. Also, the rate of conversion to open surgery in this group of patients was 33.3% which is relatively higher than the regular rate in ordinary circumstances.

Post operative follow up revealed higher rates of morbidity especially concerning biliary leakage and subphrenic collection. Mortality was also encountered in 3 cases due to acute hepatic failure secondary to intra-operative hepatic ischemia- which is relatively a rare complication after LC.

CONCLUSION

Delayed LC after ERC management of CBDS is associated with a higher rate of complications due to development of adhesions around
the CBD. Concomitant or early LC (within 1 week) after ERC for CBDS is strongly recommended, otherwise, a high surgical expertise is advised to perform the procedure in case of delay.

REFERENCES


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