

Management of Obstructive Jaundice Due to Common Bile Duct Stone in Baghdad Teaching Hospital.

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Summary:

Background: the most common cause of obstructive jaundice is CBD stones, and these can produce significant morbidity and mortality. The management of the obstructive jaundice due to CBD stones is in evolution; several methods of investigations and treatment have been introduced, and each one has its own advantages and disadvantages.

Objective: to study and evaluate the management of obstructive jaundice due to CBD stones in Baghdad teaching hospital.

Patients and methods: a prospective study of 111 patients with clinical, laboratory, and imaging features suggestive of obstructive jaundice due to CBD stones who were managed in Baghdad teaching hospital over the period from January 2011 to November 2011; other 14 patients with obstructive jaundice due to other causes were excluded. All patients were symptomatic and had abnormal liver function tests. Transabdominal US was done for all of them, MRCP for 26 patients, and EUS for 9 patients. Four patients had primary stones, 95 patients had secondary stones, 9 patients had retained stones and 3 patients had Mirizzi syndrome. Those patients were subjected to ERCP both to prove the diagnosis and extract the CBD stones. Only three patients sent directly for surgical treatment because they were diagnosed as Mirizzi syndrome. Surgical treatment also was offered for those patients in whom endoscopic management failed.

Results: from the 125 patients presented with obstructive jaundice included in this study 14 patients were found to have a periampullary lesions, and they were excluded from the study, so the total number of the patients was 111; 46 males and 65 females Endoscopic management was done for 108 patients with success rate of 90%. Surgical treatment was required in 13 patients, 10 of them following failure of ERCP and the other 3 patients were those with Mirizzi syndrome. The most common complication of ERCP was acute pancreatitis and the most common cause of failure to extract the stones was the size of stone (more than 15mm).

Conclusions: Endoscopic sphincterotomy and stone extraction followed by laparoscopic cholecystectomy is still considered the orthodox treatment of CBD stones. Large and multiple CBD stones are the most common causes of failure of endoscopic extraction and indication for surgical treatment. There was higher incidence of retained CBD stones in our study than what was reported in western countries, because there is no intraoperative screening to avoid missing CBD stones in our hospital.

Key words: CBD stones, endoscopic management, surgical intervention.

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Introduction:

The incidence of CBD stones in patients with symptomatic gallstones varies, but it is probably around 10%. CBD stones may be primary, secondary or (retained, and recurrent). Secondary CBD stones are the most common type ^(1,2). Initial investigations should include trans-abdominal ultrasound (50% to 80% sensitivity) ⁽³⁾, Conventional CT scan (non helical) 65%-88% sensitivity and 73-97% specificity), and CT cholangiography, although its performance characteristics for choledocholithiasis detection are similar to those of MRCP, which has 85% to 95% sensitivity and 93-97% specificity for choledocholithiasis, ⁽⁴⁾ Intraoperative cholangiography (IOC) can be successfully completed in 88% to 100% of patients with a Sensitivity of 59-100%, and specificity of 93-100%

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Laparoscopic ultrasound (LUS) of the extra hepatic bile ducts can be successfully completed in 88-100% of patients with greater sensitivity and equal specificity compared with IOC for detecting CBD stones, ⁽³⁾ while Endoscopic ultrasound (EUS) has sensitivity for choledocholithiasis of 84-100% and specificity of 96-100%, ⁽⁵⁾ ERCP is one of the gold standards for detection and treatment of choledocholithiasis. ⁽⁶⁾ The sensitivity of ERCP is 90% and its specificity is 98%. Endoscopic sphincterotomy followed by stone extraction using a basket or balloon catheter is the standard endoscopic therapy for CBD stones with reported success rates of over 90% ^(4,5) Open CBD exploration remains an important technique for management of bile duct stones that are unsuitable for endoscopic treatment or that unable to be removed at ERCP. The aim of this study is to evaluate the management of CBD stones at Baghdad teaching hospital.

Patients and methods:

This is a prospective study of One hundred twenty five patients with obstructive jaundice attending Baghdad teaching hospital, from January 2011, to November 2011. Fourteen patients have been excluded because their condition was due to periampullary lesions in 10 patients and merrizi syndrome in three patients. All patients included in this study have been admitted to the hospital. For those patients who presented with severe symptoms like cholangitis, or acute pancreatitis resuscitation was done with intravenous fluids, antibiotic, and vitamin k. The work up for each patient included, detailed history, physical examination, then laboratory investigations including liver function tests, hematological tests, bleeding profile, renal function tests, and radiological study including; trans abdominal Ultrasound examination which was done for all patients, while CT scan, MRI, MRCP and/or EUS were done when the diagnosis of CBD stone is not proved with Ultrasound examination. The next step was to arrange for ERCP to prove the diagnosis of CBD stones and for therapeutic trial with endoscopic sphincterotomy and balloon extraction of the stone. All these procedures have been done by the same physician. laparoscopic cholecystectomy was performed for all patients two to six weeks following endoscopic extraction of stone. The results of ERCP examination regarding CBD stones were recorded regarding their number, size, and the complications of this procedure were recorded for each patient. After the procedure patients were observed for 1-3 days, to detect late complication Those patients with failure of endoscopic CBD stone extraction were scheduled for open surgical treatment. Only 2 of the three patients with Mirizzi syndrome underwent primary surgical treatment (without ERCP).

Results:

Out of 125 patients included in this study, 14 patients were found to have distal pathology in the periampullary region and were excluded from the study, so the total number of the patients was 111, 46 male and 65 female of with age ranging between 15-91 years(mean 49.3 yr.) .The most common presentation was biliary colic and intermittent jaundice(48.6%), progressive jaundice and stone impaction (29%), cholangitis (18%) , and the least common presentation was gall stone pancreatitis 4.5%.All patients had abnormal liver function tests, with increasing level of serum alkaline phosphatase and conjugated hyperbilirubinaemia . ALT and AST were elevated in most of the patient. Renal impairment was found in some of those patients with severe cholangitis and pancreatitis with associated dehydration (13%). Leukocytosis (>10,000) was found in those patients with cholangitis, cholecystitis and pancreatitis. Imaging study: Ultra Sound examination was done for all patients, 75 patients (67.5%) had initial diagnosis of CBD stones and all were sent for ERCP as therapeutic modality. Due to lack of facilities it was possible to obtain MRI-MRCP examination for 26 patient and EUS for 9 patients to confirm the diagnosis. Ninety five patients had secondary CBD stones, 9 patients had retained CBD stones, 4 patients

had primary CBD stones, and 3 patients with Mirizzi syndrome ERCP was done for all patients except in three patients who had Mirizzi syndrome ERCP was done for both conformation of the diagnosis and extraction of the stones. It was possible to extract the stones of CBD for 98 patients(88.2%)_by Endoscopic sphincterotomy and balloon extraction, (only these two are available in the hospital) (table 3).

Table1: number, size and type of CBD stones that were extracted with ERCP.

| Size of stone | Primary stone | | Retained stones | | secondary stones | |
|---------------|---------------|----------|-----------------|----------|------------------|----------|
| | Single | multiple | Single | multiple | Single | multiple |
| <5mm | - | - | - | - | 8 | 7 |
| 5-15mm | 1 | 2 | 2 | 3 | 19 | 36 |
| >15mm | - | - | 2 | 1 | 7 | 10 |

All the stones which were less than 5mm were secondary CBD stones (single or multiple). The most common type of CBD stones was multiple secondary. (in one third of the patients CBD stones were multiple secondary stones)

The recorded complications following ERCP included cholangitis, pancreatitis, and bleeding (table 4).

Table 2: complications of ERCP.

| Complications | No. of patients |
|-------------------------|-----------------|
| Mild acute pancreatitis | 3 (2.7%) |
| Cholangitis | 2 (1.8%) |
| Bleeding | 1 (0.9%) |
| Total | 6 (5.4%) |

All complications mentioned above responded to conservative treatment. Several causes were associated with failure of endoscopic management of CBD stones.

The most important one is the size of stone (more than 15mm) other factor is number of stones, papillary stenosis, and duodenal diverticulum (Table 5).

Table 3: causes of ERCP failure

| Cause of failure | No. of patients |
|---|-----------------|
| Size of stones | 8 (7.2%) |
| Lower CBD stricture or papillary stenosis | 1 (0.9%) |
| Duodenal diverticulum | 1 (0.9%) |

Surgery was performed after failure of endoscopic extraction of CBD stones, in ten patients. In 3 patients, with Mirizzi syndrome, primary surgical treatment was the option, without performance of endoscopic management in 2 of them, while the other one underwent diagnostic ERCP without trial of stone extraction. Several types of operations were

performed after failure of ERCP, open cholecystectomy was done, with choledochotomy and extraction of stones then closure over T-tube, for 7 patients. The second operation was choledochoduodenostomy which was performed for 2 patients, while Roux-en-Y choledochojejunostomy which was done for one patient. Surgical treatment performed for the three patients with Mirizzi syndrome, in two patients, partial cholecystectomy was performed, extraction of stones through gall bladder stump then closer of gall bladder remnant. One patient with Mirizzi syndrome was treated with Roux-en-Y hepatojejunostomy. Postoperatively, one patient, developed external biliary fistula, which healed spontaneously. Another patient who was managed with choledochotomy developed severe wound infection and burst abdomen, and another patient developed wound infection. Thrombophlebitis occurred in two patients and atelectasis in another patient.

Discussions:

Common bile duct stones are not uncommon in clinical practice and increasing awareness of their presence with the advances in diagnostic tools has raised the ability to diagnose their presence. ERCP has revolutionized the management of CBD stones and decreased the morbidity and mortality of the management of these stones by surgical procedures laparoscopic or open. ERCP is used for confirming the diagnosis of CBD stones and for sphincterotomy and stones retrieval. The ability of ERCP varied widely according to the available facilities and the experience of the endoscopist, but there is a consensus that it is difficult to deal with stones larger than (1 cm) in diameter and when there are more than (3) stones in the CBD, in addition to other conditions obscuring the ampulla of Vater or anatomical variations like duodenal diverticula. In Iraq, ERCP was introduced more than thirty years ago but there was limited facilities and experienced endoscopists to deal properly and efficiently with this problem and the number of patients who had the chance to be managed by ERCP were much less than those managed by traditional surgery. Nowadays, with the increasing experience of endoscopists and increasing facilities in major Iraqi cities, most CBD stones are managed successfully by ERCP and the requirement for open surgery is decreasing and confined to conditions when ERCP failed to extract stones or when there is contraindication to ERCP. The most common presenting symptom for patient with CBD stone is biliary colic followed by jaundice and other less common presenting symptoms. In this study, all the patients were symptomatic with the most common presentation was biliary colic (48.6%), although it was less than what was reported by F. Prat et al of 73.2% in 1993⁽⁹⁾ and Saharia 70% 1997. (2) The incidence of CBD stones in patients undergoing laparoscopic cholecystectomy approximates 6 to 12%. (7) Although some stones can pass uneventfully, others can cause complications in 25 to 50%. In this study, the diagnosis of CBD stones was established in majority of patients (67.5%) by US examination showing either CBD stones and/or CBD dilatation, this result is greater

than what was recorded by CRB Welboun and coworkers in 1995(14) (8) who showed that US was able to diagnose less than half of the patients with CBD stones. In the remaining patients in our study patients (32.5%), it was not possible to diagnose CBD stones by US examination and further imaging studies were needed, so MRCP was performed with estimated sensitivity of 100%, that is higher than what was reported ASGE/guidelines roles of endoscopy "2010" 93-97%.(5) There is an agreement that Endoscopic cholangiography is the gold standard for diagnosing common bile duct stones. It has the distinct advantage of providing a therapeutic option at the time of diagnosis(6) Recently intraoperative laparoscopic ultrasound (LUS) has been found to be as sensitive as, and faster than IOC. It also avoids the hazards of radiation to staff and patients (4) but in our study it was not used due to lack of instruments and experts that are vital to be performed. There are many options to deal with CBD stones including endoscopic sphincterotomy(ES) before laparoscopic cholecystectomy(LC), laparoscopic CBD exploration at the same time of performing LC, open CBD exploration, LC with postoperative ERCP, and the emerging technique of peroperative ES who claims very good results whether done in one step or two steps. Our study preferred preoperative ES and extraction of CBD stones followed by elective LC with good results and this will prevent the development of complications which can occur in 20% of those patients(4) Laparoscopy has got its progressing role in the management of CBD stones. Laparoscopic exploration of CBD (LECBD) was first performed in the early 1990s then laparoscopy has changed the management of CBD stones from two-stage procedure (Endoscopic sphincterotomy and stones extraction, then the second stage by laparoscopic cholecystectomy), to be single stage (LECBD and laparoscopic cholecystectomy). (9) In a study conducted by Ian Lendsy (7) in Melbourne-Australia they dealt immediately with these stones by open or laparoscopic exploration of CBD, or selectively by ERCP and extraction of the CBD stones that were diagnosed with intraoperative cholangiography with a sensitivity of 93.3%. The incidence of residual CBD stones, that will be retained following cholecystectomy, is around 1% of all CBD stones (7) While in our study the incidence of retained stones was about 8%, and this difference can be explained by the lack of intraoperative diagnostic tools for CBD stones as we have no intraoperative cholangiogram and no intraoperative laparoscopic US. In this work 109 patients were subjected for ERCP management, all were performed by the same endoscopist who was able to extract the stone(s) in 98 patients with a success rate of 90%. This result was similar to that reported by Fink A.S et al (1993) (10), and E.J Williams guideline (2008) (4) and higher than that reported by C R B Welboun et al 79% (8) although the only endoscopic accessories available in our hospital at the time of this study were Fogarty balloon catheter and sphincterotome. The failure of ERCP management is mostly due to stone size and number. The most common cause of failure of CBD stone extraction in our study was the size of CBD stone, and this is

similar to what was reported by Shyam et al "2008" (11) The complication rate of ERCP reported in our study was 5.4% (mild pancreatitis, cholangitis and bleeding), and there was no mortality, as a direct complication to ERCP, and this is similar to what was reported by C.R.B Welbourne 1995 (8) Primary surgical treatment (without initial ERCP) was performed in 2 patients; both were with Mirizzi syndrome, the operation that was performed in those patients was similar for that reported in Sedat et al "2000". (12) The operations that were performed for the remaining patients in whom endoscopic management failed to retrieve stones from CBD were similar to those recommended in the standard operative books. (9)

Conclusions:

ERCP, Endoscopic sphincterotomy and extraction of CBD stones followed by laparoscopic cholecystectomy is still the corner stone for management of CBD stone in our hospital. Open surgical intervention is required, sometimes, to deal with large, multiple CBD stones, for treatment of Mirizzi syndrome, and for treatment of CBD stones associated with rare conditions that makes their extraction difficult. This study shows that; the incidence of retained CBD stones in our hospital is higher than what reported in western countries because of lack of intraoperative screening for retained stones.

Author contributions:

Adel H. Jabur: Student who performed the study project including selection of the sample, acquisition of data in addition to writing the thesis.

Tharwat I. Sulaiman: Supervisor who designed the protocol of the study and supported in writing the thesis. Drafting and manuscript

Hussain A Turkey: interpretation of data study design and data collection and analysis

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