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Original Research Article

Analysis of the management of choledocholithiasis and it's outcome with the role of preoperative endoscopic retrograde cholangiopancreatography and magnetic resonance cholangiopancreatography

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ABSTRACT

Background: Choledocholithiasis implies stones in the common bile duct (CBD). Most of the common bile duct stones are those that have passed into the bile duct from the gall bladder. About 20 to 25% of patients above the age of 60 with symptomatic gall stones are likely to have stones in the CBD. To analyse the role of ERCP and MRCP in the management of choledocholithiasis.
Methods: About 60 patients who are attending the General Surgery OPD of Rajiv Gandhi Government General Hospital, Madras Medical College, Chennai, Tamil Nadu, India from the October 2017-March 2018 were included in the study with confirmed common bile duct stones with or without gall stones were chosen. patients were categorized into group A- who has undergone a successful ERCP followed by laparoscopic cholecystectomy and group B- who underwent open cholecystectomy with CBD exploration.
Results: Ultrasonography was done in 57 patients, of which 41 patients showed CBD stones (71.93%), 12 patients showed dilated CBD in the presence of cholelithiasis (21.05%) and in the remaining 4 patients (7.01%) this investigation showed only cholelithiasis. Since clinical condition warranted, authors proceeded with further hepatobiliary imaging, which revealed choledocholithiasis.
Conclusions: Magnetic resonance cholangio pancreatography can also be used for follow up of the patients with choledocholithiasis after therapy, to look for the presence of retained stones, since it can detect stones even in the size as small as 2 mm. Selective use of intraoperative choledochoscopy in suspected cases helps in reducing the incidence of retained stones.

Keywords: Choledocholithiasis, Dilated common bile duct, Laparoscopic, Cholecystectomy, Successful removal of the stone by ERCP

INTRODUCTION

Gall stones are among the most common gastrointestinal illness requiring hospitalization in otherwise healthy people with a prevalence of 11% to 36%. More than 95% of biliary tract disorders are related to gall stones.[1]

Choledocholithiasis implies stones in the common bile duct (CBD). Most of the common bile duct stones are those that have passed into the bile duct from the gall bladder. Choledocholithiasis is found in 6 to 12% of patients with cholelithiasis. The incidence increases with age. About 20 to 25% of patients above the age of 60

with symptomatic gall stones, are likely to have stones in the CBD. 2 Stones are non-crumbling concretions larger than 2 mm in diameter and biliary microlithiasis are particles 2 mm or less in diameter although there is no universally accepted definition.[3] Sludge is a suspension of cholesterol monohydrate crystals, calcium bilirubinate granules and/or other calcium salts with or without microlithiasis of gall bladder mucus.[4] Sludge is a form of gall stone disease and may predispose to macroscopic gall stones or directly cause pancreatitis and another morbidity.[5] Despite good surgical techniques, 8 to 16% of patients have retained stone in common bile duct after conventional choledocholithotomy common bile duct stones are defined as 'Retained' if they are detected within two years of cholecystectomy and 'Recurrent' if they are detected beyond two years of cholecystectomy.[6,7] This study is an analysis of the management of choledocholithiasis in modern surgical practice and an evaluation of the role of endoscopic retrograde cholangio pancreatography (ERCP) and magnetic resonance cholangio pancreatography (MRCP). This study compares the morbidity associated with preoperative ERCP+laparoscopic cholecystectomy with conventional choledocholithotomy.[8]

METHODS

Total 60 patients who are attending the General Surgery OPD of Rajiv Gandhi Government General Hospital Madras Medical College, Chennai, Tamil Nadu, India from October 2017-March 2018 were included in the study with confirmed common bile duct stones with or without gall stones were chosen. patients were categorized into group A- who has undergone a successful ERCP followed by laparoscopic cholecystectomy and group B- who underwent open cholecystectomy with CBD exploration because of few reasons (failed ERCP/ERCP not possible/uncooperative patient).

Inclusion criteria

All patients diagnosed to have choledocholithiasis by any investigation.

Exclusion criteria

Those who have already undergone cholecystectomy, those who are unfit for surgery, those with gall stone pancreatitis. All patients diagnosed to have choledocholithiasis by any investigation were made to undergo preoperative MRCP, if not done prior.

After confirming the diagnosis of choledocholithiasis and ruling out other biliary pathologies, all these patients were subjected to ERCP. In patients with successful ERCP and CBD stenting, laparoscopic cholecystectomy was done in the same admission- for 37 patients with neck first method, and for 6 patients with fundus first method. Those patients in whom, ERCP failed to clear the CBD or those patients for whom, ERCP was precluded for other reasons, open cholecystectomy with CBD exploration with selective use of intraoperative flexible video choledochoscopy, in cases where there is suspicion of persistent stone intraoperatively (≈ 4 cases).

All patients who had successful ERCP had stenting of the CBD which was removed 6-8 weeks after cholecystectomy. ERCP was done with side viewing scope and most of the cases needed sphincterotomy for cannulation of the CBD. T tube cholangiogram was done on patients who had T tube in situ on 8^{th}-10^{th} postoperative day, following which T tube was removed on 12^{th}-14^{th} postoperative day. All patients underwent MRCP after 12 weeks to rule out retained stones and then followed up periodically.

Statistical analysis

Data were entered using Microsoft Excel and analyzed using STATA software. A continuous variable was analyzed using the student 't' test which was used to determine the significant difference.

RESULTS

Table 1 shows the commonest age group in the study was between 51-60 years. The age group ranges from 24 years to 60 years. The male vs female incidence in age wise distribution.

Table 1: Age group.

Age in yrs	Male	Female
21-30	0	5
31-40	3	6
41-50	8	12
51-60	8	18

Table 2 shows the commonest symptom was pain (80%) which is followed by jaundice (66.66%). The other symptoms include vomiting (50%), fever (30%), pruritus (30%), clay colored stools (28.33%), past history of jaundice (26.66%), dyspepsia (23.33%) and flatulence (6.66%).

Table 2: Symptomatology.

Symptoms	No. of patients	%
Pain	48	80
Jaundice	40	66.66
Vomiting	30	50
Fever	18	30
Pruritus	18	30
Clay colored stools	17	28.33
History of jaundice	16	26.66
Dyspepsia	14	23.33
Flatulence	4	6.66

In Table 3 preoperative investigations were done, complete blood count, liver function tests, urine for bile salts and bile pigments, coagulation profile, ultrasonography of the abdomen, computed tomography, magnetic resonance cholangio pancreatography.

Table 3: Investigations.

Investigations	No. of patients with abnormal value	%
Hemogram	-	0
Serum bilirubin (>2 mg%)	40	66.66
SGOT, SGPT (>40 IU/dL)	32	53.33
Serum alkaline phosphatase (170 mU/ml)	31	51.66
Urine bile salt and bile pigment positive	40	66.6

Figure 1 shows ultrasonography was done in 57 patients, of which 41 patients showed CBD stones (71.93%), 12 patients showed dilated CBD in the presence of cholelithiasis (21.05%) and in the remaining 4 patients (7.01%) this investigation showed only cholelithiasis. Since clinical condition warranted, authors proceeded with further hepatobiliary imaging, which revealed choledocholithiasis. MRCP was done in all the patients, which was 100% sensitive and specific in our study, which is almost consistent with older studies, which showed the sensitivity ranging from 82 to 100% and the specificity ranging from 91 to 100%.

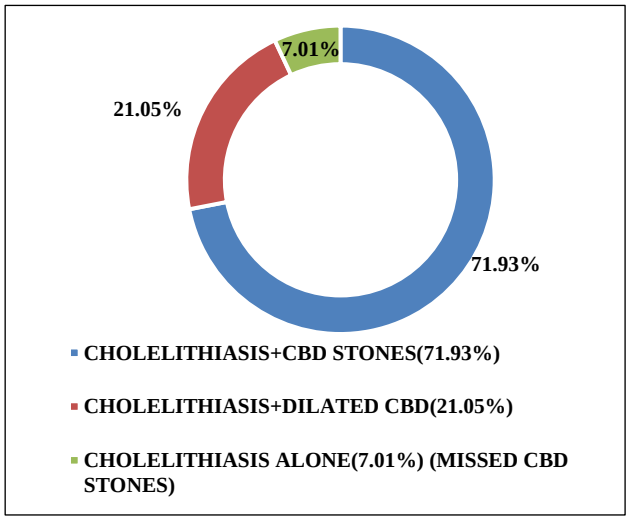

Figure 1: USG abdomen findings.

Figure 2 shows out of 60 patients in the study, ERCP could not be done in 2 patients because of previous Billroth II gastric bypass. ERCP could not proceed in 6 patients (one due to severe Ampullary stenosis and the remaining 5 due to lack of patient co-operation). 52 patients underwent ERCP (diagnostic accuracy 100%), out of which 46 patients had successful removal of had stones in CBD on follow up preoperative ultrasonogram (Probably missed stones/stones slipped from gall bladder post ERCP (ERCP-surgery interval)). The remaining 6 patients (11.54%) had failed ERCP due to impaction/multiplicity of CBD stones. The ERCP had a stone extraction rate of 88.5% and the diagnostic accuracy of 100% in this study and was comparable to the International statistics.

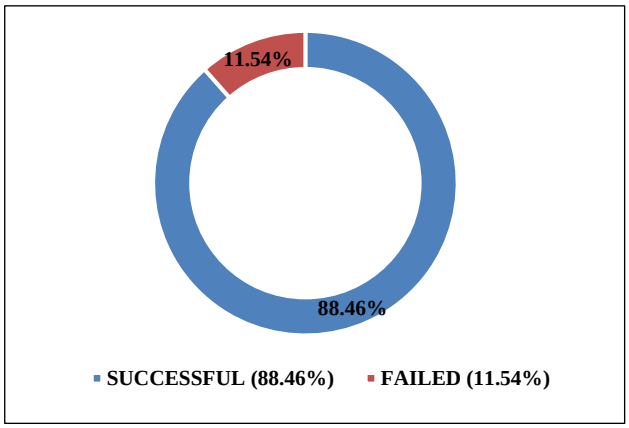

Figure 2: ERCP-endoscopic retrograde cholangio pancreatography.

Figure 3 shows the common complications encountered were wound infection, bile leak, and retained stones. Complications in both groups. Wound infection, bile leak, retained stones were common in Group-B.

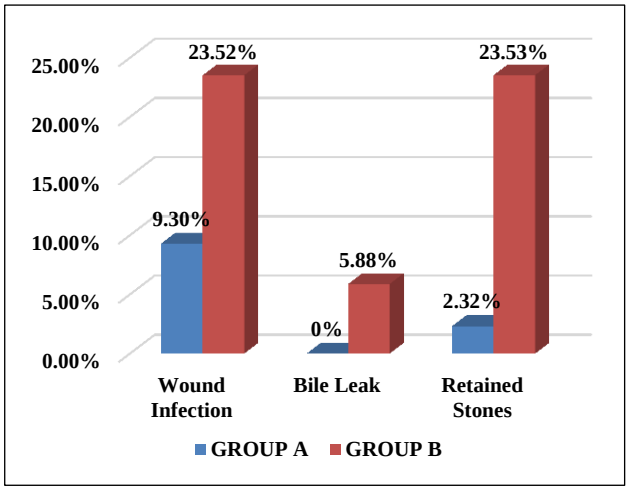

Figure 3: Complications.

DISCUSSION

Transabdominal ultrasound has been the traditional method of evaluating patients with biliary disease.[9] Reports the sensitivity and specificity of 48 to 100% and 64 to 100% respectively. However the ability of transabdominal ultrasound to establish the diagnosis of choledocholithiasis is only about 50% varying from 30 to

90% as per KO et al, according to Lipsett et al, study in 2003, when compared with altered liver function tests and/or increased amylase levels, ultrasound evidence of common bile duct dilatation (>7 mm) has been described to be the best predictor of choledocholithiasis.[10,11] In another study, multivariate logistic regression analysis revealed that dilated CBD in ultrasound with features of cholangitis and elevated bilirubin and hepatic transaminases is having likelihood chances of 99% for the diagnosis of choledocholithiasis.[12] But ultrasound sensitivity is in part operator dependent and altered by bowel gas, making the findings inconsistent.[13] In this study, ultrasound helped in the diagnosis in 93% of cases, which is more than that of the above-mentioned studies. ERCP was compared with findings on common bile duct exploration or cystic duct cholangiography in 72 patients and was found to have a sensitivity of 90% and specificity of 98% with 96% accuracy.[14] Interestingly, the interval between the performance of the procedure and operation was particularly important in patients with multiple small stones. Since small stones pass readily from the Gall's bladder into the common bile duct and from the CBD into the duodenum, the longer the interval between the ERCP and the surgery, the greater the chance of discordant findings. With the improvements in the technique and better radiologic equipment, ERCP certainly has improved over time.[15] Along with the ability to diagnose the bile duct stones, ERCP has the advantage of offering therapeutic intervention options in the same sitting of the diagnosis, in the form of endoscopic sphincterotomy and stone retrieval. ERCP stone extraction is successful in 80 to 90% of the cases with sphincterotomy and balloon catheter or Dormia basket stone retrieval.[16] Schiff L et al, study states that the addition of mechanical, electrohydraulic, laser or extracorporeal shockwave lithotripsy to ERCP for larger stones increases the success rate to over 95%.[17] Schwartz's et al, depicted the role of ERCP in the postoperative patients after laparoscopic cholecystectomy with symptoms suggestive of choledocholithiasis.[18] Stones were detected in 100% of cases and 73.3% underwent successful extraction of stones by ERCP. Although ERCP is a safe endoscopic diagnostic and therapeutic tool, it has a mortality of about 0.2% after diagnostic testing and 0.5% after therapeutic approach. Cardiopulmonary complications (arrhythmia, hypoventilation, and aspiration) are the leading cause of death. Other significant complications include perforations, bleeding related primarily to sphincterotomy, pancreatitis, cholecystitis and cholangitis. The prophylactic antibiotic has only a doubtful role in preventing complications.[18] In this study, ERCP was diagnostic in 100% with a stone extraction rate of 88.46%, which is concordant with the International statistics. Since, its introduction over a decade ago, MRCP has tremendously changed the way in which the common bile duct stones are detected and excluded. It is done without instrumentation, contrast material, and ionizing radiation, in single breath hold for 20 seconds. Bile is seen with high intensity with stones as low-intensity filling defects.[19] Stones, as small as 2 mm can be detected, even in the absence of biliary dilatation.

Although earlier studies noted MRCP sensitivities ranging from 81 to 90% specificities from 91 to 100% for choledocholithiasis, recent studies with 'state of the art' techniques have found the sensitivities of 90 to 100% and the specificities of 92 to 100.[20]

CONCLUSION

Pre-operative ERCP followed by laparoscopic cholecystectomy can be considered as standard therapy for the management of choledocholithiasis. Since, it has a lesser incidence of retained stones on follow up when compared to conventional CBD exploration. It has less postoperative morbidity in terms of length of hospital stay and complications. MRCP can also be used for follow up of the patients with choledocholithiasis after therapy, to look for the presence of retained stones, since it can detect stones even in the size as small as 2 mm. Selective use of intraoperative choledochoscopy in suspected cases helps in reducing the incidence of retained stones.

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