MANAGEMENT OF COMMON BILE DUCT STONE

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Summary

Symptomatic cholelithiasis is one of the most common surgical problems in clinical medicine. Common duct stones complicate the management of between 10% and 15% of these patients. With the advent of laparoscopic cholecystectomy and other minimally invasive therapeutic options, the management of these patients has become more complex. This study focuses on the pathogenesis and clinical presentation ofcholedocholithuaus as well as the impact of new technology on the management of this problem.

Pathogenesis and classification

C.B.D (Common bile duct) stones are either of primary or secondary origin. Primary stones develop within the biliary ductal system in patients with benign strictures, sclerosing cholangrtis or cystic dilation of the bile ducts[4]. Secondary stones develop within the gall bladder[1]. Gender, parity, obesity, weight loss, and perhaps genetic are important risk factors in developing of secondary stones[3]. Almost all

primary C.B.D. stones are of the pigment type and few are of cholesterol type. The pigment stones are of two types the brown type which is of primary in origin, contain bacteria in it and bile culture is positive 100%. The second type is the black type which is of secondary in origin, no contain bacteria and the bile culture is positive in 13% only[3,4].

Clinical presentation

Most patients with stones in the gall bladder are asymptomatic. Asymptomatic patients have 1% to 3% of developing symptoms and complications each year. Surprisingly, patients with choledocholitiasis may also remain asymptomatic for a considerable time[2,5]. These stones may pass through the sphincter of oddi and be evacuated without causing symptoms[5]. Patients with C.B.D. stones may presented with complains of abdominal pain and Jaundices Choelangiitis occurs. If obstruction of bile flow occurs in the presence of infected bile. The typical features of cholangiitis include fever, Jaundice, and abdominal pain and were first described by Charcot in

(1877)[5,6]. Patients may also present with pancreatitis when gall stones cause temporary or sustained obstruction of the ampulla of vater[6]; therefore early intervention in the form of surgical or endoscopic therapy is indicated for these patients[6,7].

Laboratory Investigation: Accurate identification of patients with C.B.D. stones is essential to avoid unnecessary C.B.D. instrumentation and to reduce the incidence of retained stones after cholecystectomy. The diagnosis may be apparent when the patient presents with cholangiitis or pancreatitis. However, in many patients undergoing cholecystectomy, the presence of common duct stones may not be apparent from signs and symptoms[8,9,10]. Liver function tests and pancreatic enzymes may be entirely normal in patients with C.B.D. stones[8]. Lacaine and colleagues found C.B.D. stones in 40% of patients if bilirubin (>1.3 mg/100ml) and alkaline phosphatase were both elevated, as compared to less than 5% of patients if both of these values were normal[10]. A number of radiological techniques are available as options for diagnosis of C.B.D. stones. Some

of these techniques also offer the opportunity for treatment of choledocholithiasis allowing management to be tailored to individual patient[9,10].

GGTP serum gamma glutamyl transpeptidase is the most sustained laboratory indicator of biliary obstruction and may be elevated even when the total bilirubin is in the normal range[19,20].

Ultrasound: Ultrasound is an inexpensive, non-invasive and readily available method for investigating the biliary tree. Ultrasound is approximately 97% accurate in diagnosing gall stones, 90% in diagnosing dilatation of C.B.D. and 15-20% in diagnosing stone in C.B.D.[8]. Several factors militate against detection of stones in C.B.D. such as gas in the duodenum, and the curved wall of C.B.D. that lead to refraction of the sound beam[11,12].

The sensitivity of ultrasound in detecting C.B.D. stones can be increased to between 80% and 100% when the ultrasonic tranducer is introduced endoscopically into the duodenum[13]. The distal bile duct is visualized by positioning the tranducer at the level of the ampulla, and the proximal C.B.D. and hepatic

duct are visualised transmurally in the 1st part of duodenum[13].

Ultrasound may be used intraoperatively during cholecytectomy in detection of C.B.D. stones[14,15]. Intra-operative ultrasound in expert hands, has a positive predictive value between 72% and 79%. Intra-operative ultrasound may a particularly useful adjunct to laparoscopic surgery. A high frequency ultrasonic probe in a 6F sheath is introduced into the abdomen through an operating port and passed into the bile duct through the cysticduct, preliminary data suggest that this technique is as sensitive as cholangiography[16]. Disadvantages of intra-operative ultrasond as a diagnostic test for C.B.D. stones are that (1) the technique is highly operator-dependent, (2) bile duct anatomy is not adequately demonstrated and (3) the probe is no smaller than the newest choledochoscopes.

Computed tomography scanning (CT): CT is more sensitive than ultrasound in the detection of C.B.D. stones (65%-90%). CT remains an important tool in the evaluation of jaundiced patients in identifying (1) the level

of obstruction and (2) the presence or absence of a pancreatic mass[17,18].

Cholangiography: Cholangiography remains the gold standard in the diagnosis of choledocholithiasis. The availability of percutanous transhepatic cholangiography and endoscopic retrograde cholangio pancreatography as accurate means of detecting C.B.D. stones have rendered I.V cholangiography obsolete[19]. Prophylactic antibiotics should be administrated both in PTC and ERCP, particularly to patients with recent cholangiitis. Expert endoscopists can successfully cannulate the C.B.D. in approximately 90% to 95% of patients[20]. However, previous Billroth II gastroentrostomy may make the procedure technically impossible, particularly in patients with an antecolic anastomosis or along afferent limb in which PTC may be used. In order to prevent missed C.B.D. stones during cholecystectomy operative cholangiography should always be performed during open or laparoscopic cholecystectomy. Even if stones have been proved to be present preoperatively, operative cholangiography demonstrates

ductal and shows the distribution of the stones in the biliary tree at the time of surgery[21,22]. Now the MRI cholangiogram is available in detecting C.B.D. stones but it is expensive and should not be used as an initial diagnostic test[22].34.35

Techniques of stones management

I-Endoscopic sphincterotomy

A diagnostic ERCP is performed initially to confirm the presence of stones. If one or two small stones only are found, it may be possible to retrieve a small stone with a basket through an intact papilla. However, sphincterotomy will be required in the majority of patients. Following sphincterotomy most stones smaller than 1cm in diameter will pass spontaneously within few days. After natively a balloon catheter or a Dormia basket may be used to extract the stones. Stones larger than 2 cm may require additional measures such as hydraulic lithotripsy or the use of dissolution agents instilled through a nasobiliary cannula. If clearance is incomplete, a nasobiliary drian should be placed in the bile duct to maintain

biliary drainage. Stones can be removed successfully in 85% to 90% of patients[23,24].33

II-Precutaneous stones extraction

C.B.D. stones may be removed using a percutaneous approach[25,26,27]. Catheters are placed in the biliary tree precutanously at the time of precutanous cholangiographyand the tract is progressively dilated over a number of weeks until it will accommodate a 10 F to 16 F catheter. If the tract is large enough, stones may be retrieved using either a Dormia basket under fluoroscopic guidance or choledochoscpe under direct vision electrohydraulic or laser lithotripsy probes, stones dissolution agents, and repeated procedures may be required to achieve complete clearance of ductal system[25,27].

III-Extra corporeal shock wave lithotripsy (ESWL):

ESWL has been used as a less invasive means. ESWL was successful in fragmenting C.B.D. stones in 95% of patients, additional procedures including endoscopic fragment extraction or biliary lavage may be required to clear C.B.D. The principle biliary

complications of ESWL were biliary pain, hemobilia and biliary sepsis. ESWL may be play a useful adjunctive role in the management of C.B.D. stones in the elderly or other patients of high risk[29].

IV-Laparoscopic common duct exploration

When C.B.D. stones are identified on cholangiography during laparoscopic cholecystectomy, several procedures have been described for removing stones without resorting to open choledochotomy. A fogarty catheter may be introduced through the 14-gauge intravenous cannula sleeve used for cholangiography[21] and passed into the common duct through the cystic duct. The catheter may push stones in front of it as it is advanced into the duodenum. Alternatively, stones may be retrieved via the cystic duct by withdrawing the catheter with the balllooninflated[30].

A flexible choledochoscope may also be introduced through the mid clavicular port and passed into the C.B.D through the cystic duct[31]. Stones may be captured using a Dormia basket passed through the operating channel. If the cystic duct can not be dilated to

accommodate a choledochoscope, the scope may be introduced through a standard choledochotomy. However, a T tube is indicated following choledochotomy and suturing laparascopically remains a slow, tedious procedure. The presence of large numbers of stones in the C.B.D. are a relative contraindication to laparoscopic duct exploration. The availability of small-diameter electrohydraulic and laser lithotripy probes allow lithotriptic clearance of large numbers of C.B.D stones laparoscopically in a reasonable time period[31]. However, these patients are likely to have retained or recurrent stones and may be better served by a drainage procedure[21]. The complication of laparoscopic C.B.D exploration are cholangiitis, bile leaks, common duct injury and entrapment of the basket in the duodenum requiring open removal[32].36,37,38

Conclusions

The approach to C.B.D. stones has changed considerably as expertise in non-operative and minimally invasive techniques has increased.

Important factors to be considered in choosing the most appropriate option include local expertise, the severity of disease, and the presence of the gall bladder. Younger patients with intact gall bladder who present with symptoms due to C.B.D stones should have a cholecystectomy and stone clearance from their ducts. However, endoscopic sphincterotomy alone may be a reasonable alternative in elderly patients and those unfit for surgery. Patients who present acutely with sever cholangiitis or pancreatitis may require emergency duct decompression, and recent studies indicate that endoscopic drainage is preferable to open procedures in these groups. However, the majority of patients with cholangitis or pancreatitis will settle on conservative therapy. The management of patients must be individualized on the basis of local laparoscopic interventional radiologic, and endoscopic expertise.

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