

## MANAGEMENT OF FORGOTTEN CBD STENT WITH STENTOLITH (STENT-STONE COMPLEX) - A RARE CASE SERIES

### General Surgery

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### ABSTRACT

Stentolith also known as stent-stone complex of the common bile duct (CBD), is an extremely rare long term complication of a forgotten or retained stent in the CBD, with only a handful of cases reported. A high index of suspicion is required to diagnose stentolith especially in patients presenting with cholangitis, with a history of ERCP done long before. We report a total of 3 patients, who presented with either non specific pain abdomen or features of biliary obstruction, admitted in the Department of General Surgery at KIMS, PBMH. They were diagnosed with choledocholithiasis on imaging (USG abdomen / MRCP). Intra operatively all the patients were found to have retained stents with de novo stone formation.

### KEYWORDS

Choledocholithiasis, stent-stone complex, stentolith, biodegradable biliary stent

### INTRODUCTION

Choledocholithiasis is evident in around 10-15% of all cases of gall stones. Currently the standard practice of management of such cases includes ERCP guided sphincterotomy (EST) and stone extraction with a success rate of 85% to 95% (1). Failed stone clearance at ERCP happens commonly due to large and impacted stones and/or coexistent narrowing of the distal bile duct. Biliary placement of endoprosthesis is reserved for all such cases as well as for frail and high surgical risk patients (2). These stents are meant to be removed within 4-6 weeks of the procedure when the intended purpose is fulfilled or replaced every 3 to 6 months when their permanent presence is required as a biliary conduit (3). If not timely removed, they lead to various early and late complications (4). In some rare cases, the stent itself becomes the nidus for further stone formation, giving rise to a stent-stone complex or stentolith. Stentolith refers to a large concretion of precipitation of crystals and cellular debris looking like a stone formed around a long standing biliary stent, especially a forgotten stent.

### CASE STUDY

A total of three cases with features of cholangitis or non specific pain abdomen were admitted in the Dept. of General Surgery, KIMS, PBMH. They were all found to have forgotten stent with de novo stone formation. All 3 cases were dealt successfully by both laparoscopic as well as open surgical techniques.

Our first case was that of a 65 year old hypertensive lady with a previous history of having undergone laparoscopic cholecystectomy 10 years ago. She presented with pain abdomen and recurrent vomiting for 5 days. Her USG abdomen revealed dilated intrahepatic biliary radicals with multiple CBD stones and features suggestive of subacute intestinal obstruction. These findings were further corroborated with MRCP as well. After being alerted by our anesthesiologist, of possible cardiopulmonary risk for laparoscopic intervention, we proceeded for an exploratory laparotomy with excision of band causing intestinal obstruction and a choledocholithotomy. To our surprise we found an adhesion band to the abdominal wall, containing a lost gall stone as the culprit for intestinal obstruction. As we further explored the CBD we found a one sided dumb bell shaped specimen (Fig 1.), impacted within the lumen. This stentolith was then delivered carefully by the use of Desjardin forceps. The patient had an uneventful recovery and got discharged on 5th postoperative day (POD). She is doing well till 2 years of follow up.

Our 2nd case was that of a 45 year female who presented with a history of vague pain abdomen and dyspepsia on and off for 8 months. She had undergone an endoscopic procedure 2 years back. No documents were available for the same. Her USG findings revealed dilated IHBR and evidence of both CBD and gall stones. She underwent laparoscopic CBD exploration and found to contain a giant stentolith all around the stent (5cm in length) which was retrieved with careful and tedious manipulation. Choledochoduodenostomy and cholecystectomy was done to cure the condition. She tolerated the procedure well was discharged on 7th POD.

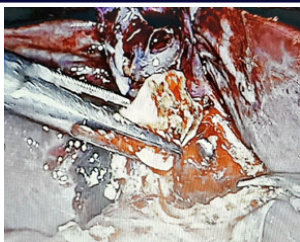
Our third case was that of a 23 year male, who presented with features of obstructive jaundice and cholangitis. He had similar USG findings of cholelithiasis with choledocholithiasis and dilated CBD and bilateral IHBR. He underwent a laparoscopic CBD exploration. Multiple large stones ranging in size from 1cm to 3cm present alongside the CBD stent clogging both the CBD and left hepatic duct were removed and a bilioenteric anastomosis in the form of choledochoduodenostomy and cholecystectomy was done (Fig 3). The patient had an uneventful recovery. She tolerated oral diet on 4th POD and discharged on 8th POD.



**Fig 1. Dumbbell shaped stentolith (stone clustered at one end of stent) being removed from CBD.**



**Fig 2. Laparoscopic view of stone free stent being taken out from CBD.**



**Fig 3. Laparoscopic view of large impacted stone being removed from CBD, post stent retrieval.**

## DISCUSSION

The altered sphincter of Oddi function following sphincterotomy or transpapillary placement of a biliary stent, enhances the chances of ascending infection by the duodenal contents and the resultant cholangitis and pancreatitis. The bile flow is maintained alongside the irretrievable stone and stent even though the stent lumen is completely blocked over time. In addition, these stents act as foreign body and a nidus in promoting bacterial adhesion and biofilm production. Biliary stents can be made of plastic or metal intended to maintain patency of bile duct due to stones, benign strictures or malignant obstruction. Early complications following CBD stenting are bleeding, cholecystitis, cholangitis, pancreatitis with features of obstructive jaundice. The late complications may include stent migration, stent occlusion, ascariasis of the biliary tree, duodenal perforation, colcutaneous fistula or stone formation around the stent called stentolith. These late cases also may clinically present with features of bleeding, cholangitis, pancreatitis, biliary stricture or stentolith with features of obstructive jaundice or rarely a liver abscess.

The incidence of stentolith is around 18% in all cases with forgotten stent spanning over 2 years. The De novo radiolucent stones are formed in the proximal or distal parts of the stent. The stones are generally 2cm to 3cm in diameter. The stent-stone complex often takes a peculiar dumb bell shape. Stentolith can be formed because of infection, retained suture material, surgical clips or secondary to traumatic strictures (5). Foreign bodies form a nidus for CBD stone formation. Plastic stent blockage presents at a median patent interval of 62-165 days, which may be changed prophylactically at scheduled intervals, or when stent dysfunction develops. These stents if kept for a prolonged period promote bacterial proliferation, formation of a biofilm of bacteria lining the inner surface of the stent and a gel like glycolyx which is impervious to antibiotics, not influenced by the shearing effect of the bile flow and host immune system. The release of beta glucuronidase by E.coli, in addition causes deconjugation of bilirubin glucuronide which precipitates calcium bilirubinate and this in combination with glycoprotein result in stone formation and stent occlusion (6). The plastic stent in situ behaves as a nidus by forming a biofilm, that promotes trapping of these crystals admixed with refluxed duodenal content and cellular debris results in stent occlusion. Though the duration of mean patency of plastic stents is about 6 months to 12 months for benign diseases, earlier stent occlusions are reported with malignant biliary obstruction. Hence replacement or removal of biliary stents are recommended at 3 months to 6 months interval (2).

CBD stentolith may present with pain, fever, jaundice or recurrent cholangitis. Measures helpful in preventing or at least delaying occlusion of stent or stentolith formation could be use of prophylactic antibiotics, use of antibiotic impregnated stent, bile thinning compounds like ursodeoxycholic acid, placement of CBD stents sans sphincterotomy when possible, use of a larger diameter stent (7). Use of biodegradable biliary stents made of PLLA (Poly L- Lactic acid) are available as polymer strands in a tubular mesh form with the incorporation of Tantalum strands rendering radio opacity for detection in situ can be an option in preventing stentolith. These PLLA biliary stents can vary as to the rapidity of absorption as fast (in weeks), medium (in months) or slow absorbing in about 6 months time by hydrolysis (8). They can be removed endoscopically requiring straightening of the biliary axis and replacement of an additional temporary stent. Hence endoscopy has higher rates of documented failure. Thus in cases with large stentolith causing impaction and gross fibrosis, surgical intervention via laparoscopic CBD exploration provides best outcome. However the size of the specimen and associated scarring and fibrosis make it an inevitable surgical challenge, requiring great skill, technique and experience on part of the

surgeon, to achieve the best result.

## CONCLUSION

Endoscopic CBD clearance and stenting is one of the most common procedures being performed by an endoscopist on a daily basis. Hence it is essential to remember the complications of prolonged in situ placement or a long forgotten CBD stent. These can vary from stent migration to visceral perforation and formation of stentolith as our study cases. It therefore becomes mandatory to counsel the patient about the need for its planned removal or replacement. The low understanding, noncompliance to follow up and rural background of our patients makes it more difficult to maintain timely follow up of our patients. Hence the treating doctor must also stress on the need for timely follow up including maintenance of a stent registry system (9). Moreover if a patient presents with features of recurrent cholangitis with a history of any prior endoscopic procedure with or without relevant documents, we must have a high index of suspicion for the diagnosis of stentolith. Laparoscopic CBD Exploration and clearance remains the best choice for intervention of a case of CBD stentolith (10). Stent related complications can also be prevented or lessened by use of biodegradable PLLA biliary stent in addition to maintaining a stringent registry system for follow ups, removal or timely replacement of biliary stents.

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