

Radiological Findings in a Case of Stentolith- Leaving no Stones Unturned

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Abstract: *Cholelithiasis is a cause of significant morbidity which might be secondary due to passed off gall bladder calculi or primary when there is de-novo stone formation. Endoscopic retrograde cholangiopancreatography (ERCP) has revolutionized the management of choledocholithiasis since it is minimally invasive and is effective for clearance of the common bile duct (CBD) stones. CBD stenting is often done to prevent recurrence, however may be accompanied by its own set of complications such as perforation, hemorrhage, cholangitis, stent migration, stent occlusion, stent fracture and the formation of stentoliths. We report a case of an 82 year old man who had a history of CBD stent placement 10 years back for choledocholithiasis, following which he was asymptomatic. The patient was lost to follow up and presented to the hospital at present with features of obstructive jaundice. Radiological investigations revealed the formation of a stentolith over the retained stent. The stent acts as a nidus for stone formation. The management includes endoscopic stent-stone complex retrieval, laparoscopic management or open CBD exploration.*

Keywords: stentolith, CBD stent, cholestasis, MRCP

1. Introduction

Choledocholithiasis is a cause of significant morbidity which might be secondary due to passed off gall bladder calculi or primary when there is de-novo stone formation. Endoscopic retrograde cholangiopancreatography (ERCP) is the current modality of choice for the management of choledocholithiasis with or without common bile duct (CBD) stent placement.

CBD stents prevent the recurrence of stones, but require removal or exchange after few weeks. Various complications of CBD stenting include perforation, hemorrhage, cholangitis, stent migration, stent occlusion, stent fracture and the formation of stentoliths. We report a case of stentolith formation over forgotten CBD stent which was inserted for choledocholithiasis 10 years back.

2. Case presentation

An 82 year old man presented with the complaints of abdominal pain and vomiting since 10 days. He also had history of intermittent jaundice since three weeks. He had a history of cholelithiasis with choledocholithiasis 10 years back, for which the patient underwent cholecystectomy with CBD stenting. The patient was lost to follow up after that. At present, the patient had icterus with yellowish discoloration of the skin. Abdominal examination was normal. The total bilirubin was 4.4, of which the direct bilirubin was 3.75. The serum alkaline phosphatase was 530. Ultrasound of the abdomen showed dilated CBD up to 9mm with moderate central and peripheral intrahepatic biliary radicle dilatation (IHBRD). There was a calculus in the mid and distal CBD with severe upstream biliary dilatation (Figure 1).

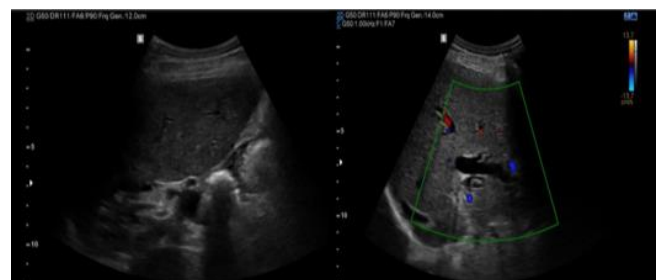


Figure 1: Ultrasound of the abdomen in axial sections shows a large echogenic calculus with posterior acoustic shadowing in the common bile duct with severe dilatation of the proximal common bile duct and the intrahepatic biliary radicles.

On CT (computed tomography), there was a CBD stent in situ with a hyperdense content surrounding the stent - a stentolith (Figure 2).

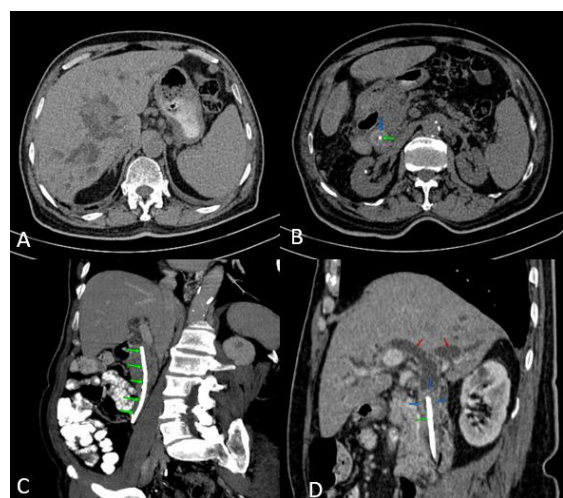


Figure 2: Axial non contrast image of the computed tomography of the abdomen (A, B) shows severe dilatation of the intrahepatic biliary radicles and a lamellated

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hyperdense calculus (blue arrow) with hyperdense stent in centre (green arrow). Curved Multiplanar reformation (MPR) image (C, D) shows hyperdense calculus (green arrow) in its entire extent surrounded by a hyperdense calculus (blue arrow) with proximal biliary dilatation (red arrow).

The proximal tip of the stent was in the proximal CBD. There was upstream dilatation of the CBD with severe central and peripheral IHBRD. An MRCP (magnetic resonance cholangiopancreatography) confirmed the findings on CT. There was a filling defect in the mid and distal CBD with upstream biliary dilatation. On T1 weighted sequences, there was a hyperintense calculus within the CBD with a central hypointensity suggesting stone formation around the CBD stent (Figure 3).

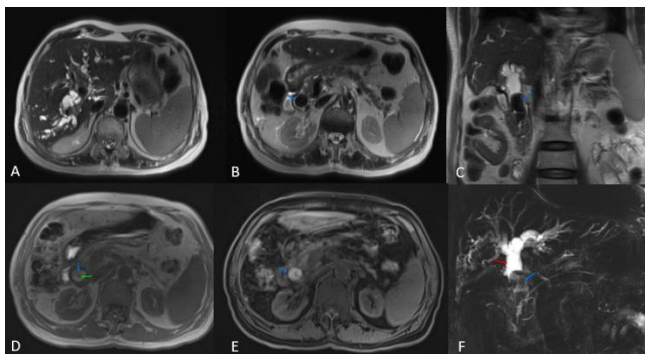


Figure 3: Axial (A, B) and Coronal (C) T2 weighted image of the MRI (magnetic resonance imaging) of the abdomen shows severe dilatation of the intrahepatic biliary radicles, hepatic ducts and the proximal common bile duct with oblong hypointense calculus (blue arrow) in the mid and distal common bile duct. Axial non-fat saturated (D) and fat saturated (E) T1 weighted sequences show hyperintense calculus (blue arrow) with a central hypointense stent (green arrow). MIP (maximum intensity projection) image (F) shows filling defect in the mid and distal common bile duct.

The patient underwent ERCP with sphincterotomy. The stone was fragmented and extracted along with the retained plastic stent. On examination of the stent, the lumen was not patent. The patient tolerated the procedure well and no complications were encountered. The patient was discharged after few days and was counselled for regular follow up on OPD (out-patient department) basis.

3. Discussion

Endoscopic retrograde cholangiopancreatography (ERCP) has revolutionized the management of choledocholithiasis since it is minimally invasive and is effective for clearance of the CBD stones. CBD stenting may be done to prevent recurrence [1]. The stent placement prevents migration of the gall stones into the CBD, relieves the biliary pressure and ensures drainage of the bile [2]. CBD stenting can be therapeutic or palliative in cases of malignant obstruction which are inoperable. Although CBD stenting has become the therapy of choice in choledocholithiasis, it also has its own share of complications. Early complications encountered include perforation, hemorrhage, cholangitis and sometimes pancreatitis. Delayed complications include

stent migration, bowel perforation secondary to the migrated stent, stent occlusion, stent fracture and stentolith formation [3]. The stent may be made up of plastic or metallic material. Metallic stents are usually deployed in cases of malignant obstruction [4]. Plastic stents are used commonly post CBD clearance in benign cholestasis and requires stent exchange usually after four to six weeks [5].

A stentolith is an entity where there is de novo stone formation over a nidus, usually a foreign body [6]. Commonly it is seen with retained endoprosthesis such as a biliary stent or a ureteric stent. It usually follows a long course and are seen in cases of forgotten stents. Possible factors for stentoliths include lack of proper counselling, lack of education or awareness among patients. Many patients fail to show up for stent removal or exchange which might be accounted to ignorance, additional cost for the visit, loss of daily wage and a temporary relief of symptoms.

The retained stent acts as a nidus for stone formation. There is bacterial proliferation with release of beta-glucuronidase which promotes the formation of a biofilm. This further leads to the deposition of calcium bilirubinate over the stent leading to the formation of a stentolith [7]-[8]. Patients with stentoliths present after a latent period with recurrent obstructive symptoms such as abdominal pain in the right upper quadrant, jaundice and pruritis. The patient might have fever in the setting of cholangitis. The stent may be embedded within the stone and adhered to the CBD wall which poses difficulty during its removal.

Radiological investigations play a significant role in the diagnosis of stentoliths. An ultrasound might reveal a dilated CBD with intrahepatic biliary radicle dilatation. Often a CT scan or an MRI is done which demonstrates the stent embedded within the stone.

The complications of a stentolith include biliary obstruction with a risk of cholangitis. There might be biliary strictures or secondary biliary cirrhosis [8]. Complications might also be encountered during the management as these stentoliths are usually adhered to the CBD wall making the retrieval difficult.

The management can be endoscopic retrieval of the stentolith, by lithotripsy and fragmentation of the stones [9]. Patients might require laparoscopic extraction in cases where endoscopic retrieval is not feasible [6]. In complicated cases, open CBD exploration is warranted with Roux en-Y choledochojejunostomy [8].

The best management for stentoliths is to prevent their formation. The patients should be counselled properly regarding the presence of a stent within their CBD and the importance of regular follow up. Stent registries must be maintained to reduce the non-compliance [6]. Certain measures such as the use of prophylactic antibiotics, antibiotic coated stents, biodegradable stents, larger diameter stents, bile thinning agents (ursodeoxycholic acid) might reduce the incidence of stentolith formation [10].

4. References

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