Endoscopic Removal of Retained Bile Duct Calculi via T-Tube Tract

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Abstract

A simple and safe technique for removal of retained bile duct calculi using a flexible fiberoptic cholangioscope and rigid nephroscope via the T-tube tract has been described.

The technique allowed removal of large impacted calculi under direct vision without damage to the bile duct.

Key words: Cholangioscopy, nephroscopy, Amplatz sheath

Introduction

Retained common bile duct (CBD) stones remain an enigma despite the use of intraoperative cholangiography and other techniques to detect them during cholecdochohepatotomy. Though repeated attempts to remove the stones under radiological control with a steerable basket were unsuccessful, T-tube cholangiogram showed two calculi in the CBD, measuring 1.5 cm and 2 cm in diameter (case 1); two calculi, one impacted at the junction of the right and left hepatic ducts (2.0 cm diameter) and the other lying free at the lower end of the CBD (case 2); and a single calculus of 2.5 cm diameter in the CBD (case 3).

Technique

Patients were sedated with IV diazepam and pentazocine. Antibiotics were given in the perioperative period. The biliary tree was opacified with X-ray contrast through the T-tube and visualised under image intensifier. A guide wire was introduced through the T-tube tract across the bile duct into the duodenum and the T-tube was removed. The skin at the mouth of the T-tube tract, as also the tract itself, was infiltrated with 2% lignocaine. The skin at the entry site was then incised to allow passage of a 32F dilator. To dilate the T-tube tract upto its junction with the bile duct, an Amplatz dilater set was passed over the guide wire (Fig 1). Subsequently, dilators of increasing sizes were passed successively until the tract could be dilated upto 32F size. The entire procedure was done under fluoroscopy with constant opacification of the biliary system to prevent extraductal passage of the dilators. The last dilator was passed along with the Amplatz sheath, which was left in situ projecting into the lumen of the CBD (Fig 2). The dilator was then removed.

Case 1: A repeat cholangiogram was performed to confirm the site of calculi. A flexible fiberoptic cholangioscope (outer diameter 5 mm) was passed through the sheath into the bile duct. For the upper stone the
sheath was tilted upwards. After visualising the stone, a Dormia basket was passed through the channel of the cholangioscope and the stone engaged in it under vision. The cholangioscope along with the calculus held in the Dormia basket was removed, leaving the sheath in place. The cholangioscope was passed again to remove the lower calculus in the same manner after tilting the sheath in a downward direction (Fig 3).

**Cases 2 and 3:** In these patients it was not possible to remove the calculi with a Dormia basket because in case 2, the calculus was impacted in the bile duct and in case 3, the calculus size was bigger than the diameter of the sheath. Therefore in these patients a rigid nephroscope was passed into the biliary tree through the Amplatz sheath and the stone visualised (Fig 4). In case 2, a tripod nephrolithotomy forceps was passed down the channel of the scope and the stone caught, disimpacted and removed. In case 3, the calculus was broken into pieces with a biprong forceps.

The fragments were then removed with a biopsea forceps and a combination of irrigation and suction.

A cholangiogram was performed to confirm complete clearance of the bile duct. At the end of the procedure in all the cases, a 16F straight tube was passed into the bile duct through the sheath for drainage. It was removed after 48 hours after performing a check cholangiogram.

All the patients recovered uneventfully; there was no complication.

**Discussion**

Endoscopic removal of retained bile duct stones via the T-tube tract could be accomplished successfully in all three cases at a single setting, without any complication. Other non-operative methods for treatment of retained bile duct stones, such as perfusion with solutions via the T-tube tract, are useful only for cholesterol stones and take about 7–14 days to accomplish stone dissolution. The results are unpredictable and there are associated problems of sepsis and diarrhea. Radiological methods for extraction of stone using steerable instruments via the T-tube tract under fluoroscopic guidance have been described, with good success. However, these techniques are blind and complications like perforation have been reported.
tract after dilating the tract up to 18F over a period of 3-4 days.\textsuperscript{1,2} In the present technique we dilated the T-tube tract immediately up to 32F under fluoroscopic guidance using Amplatz dilators, thus avoiding further waiting period. Unlike others, we passed the choledochoscope through the sheath and not through the tract itself. Keeping the sheath in place allows repeated and easy passage of the instrument, without discomfort to the patient. Moreover a large stone can be removed through the sheath. It also allows the use of suction and irrigation for the removal of fragments of calculi, as was done in our case 3. It also allows passage of a rigid endoscope if required for removal of large calculi.

Though a fiberoptic flexible choledochoscope has the advantage of maneuverability, it has limitations for removal of an impacted stone, where the basket cannot be negotiated beyond the calculus, as in our case 2. A similar limitation has been reported by others also.\textsuperscript{3} In such a situation the use of a rigid nephroscope allows the passage of a large triprow or biprow forceps, with which the stone can be disimpacted and removed in one piece, or if it is too large, can be crushed into smaller pieces and the fragments removed by irrigation and suction.

The use of an endoscope allows proper visualization of radiological defects mistakenly thought to be stones.\textsuperscript{1} One can also enter into the duodenum and inspect the periampullary region to rule out associated tumor.

Although we did not encounter any complications related to the procedure, there is a possibility of disruption of the T-tube tract or perforation of the bile duct during manipulation. To avoid these one should wait for at least 4-6 weeks after the primary operation. Dilatation should be done under fluoroscopy with constant opacification of the bile duct, to prevent extraductal passage of the dilators. The T-tube tract should be straight; if it is tortuous, one should refrain from using this technique.

Cholecdochoscopic removal of residual bile duct stones through a T-tube tract appears to be a safe and simple technique which allows removal of calculi under direct vision; the technique requires further evaluation, to assess if a single sitting dilatation to the extent we could achieve is without hazards.

References