Abstract
Endoscopic therapy is the first line treatment for patients with common bile duct (CBD) stones. Removing bile duct stones by ERCP requires enlarging the papillary opening, either by cutting the biliary sphincter with an endoscopic sphincterotomy or by endoscopic papillary balloon dilation. Dilation has the advantage of sphincter preservation and a lower risk of hemorrhage but carries an increased risk of post-ERCP pancreatitis. Although popular in Asia in the Western world this technique is therefore reserved for patients with a major risk of bleeding or difficult anatomy. Here we demonstrate the technique of balloon dilation of the papillary sphincter in a patient with cholangiosepsis and septic coagulopathy.

Keywords
Papillotomy, bleeding, biliary stone, coagulopathy

Technique
Endoscopic retrograde cholangiopancreatography (ERCP)

Materials

Endoscope : ED 3440 TK, Pentax, Tokyo, Japan
Biliary balloon dilation catheter : Max Force, 8 mm width, 4 cm length, Boston Scientific
Balloon catheter : Extraction balloon, Escort II, 15 mm diameter, Cook Medical, Winston-Salem, NC
Guide wire : Cook Medical, Winston-Salem, NC

Endoscopic Procedure
Endoscopic therapy is the first line treatment for patients with common bile duct (CBD) stones. In patients with cholestasis there is a high prevalence of bacterial cholangitis and therefore prior to performing ERCP an initiation of antibiotics is recommended to prevent procedure-related bacteremia and cholangiosepsis. Removing bile duct stones by ERCP requires enlarging the papillary opening, either by cutting the biliary sphincter with an endoscopic sphincterotomy or by endoscopic papillary balloon dilation. Dilation has the advantage of sphincter preservation (1) and a lower risk of hemorrhage but carries an increased risk of post-ERCP pancreatitis (up to 15 %) (2). Although popular in Asia in the Western world this technique is therefore reserved for patients with a major risk of bleeding or difficult anatomy.

A 65-year-old woman presented with jaundice and severe coagulopathy (INR of 2.5) due to cholangiosepsis. Antibiotics were promptly initiated and sonography showed a single bile duct stone. At ERCP spontaneous emptying of white pus through the papilla occurs which can be enforced by suction. After cannulation of the common bile duct fluoroscopy identifies a singular 1 cm stone in the middle portion of the duct. In view of the coagulopathy in this case a dilation of the papilla is preferred rather than papillotomy. A dilation catheter (1 cm width and 4 cm length) is introduced over a guide wire. When the middle portion of the balloon reaches the site of the papilla the balloon is inflated. Fluoroscopic control shows the indentation that is
caused by the papilla. The balloon is being inflated for 20 seconds. There is some new evidence that 5-minute dilation achieves greater sphincter Oddi loosening than does conventional short term dilation and that it reduces the rate of failed stone extraction and the rate of pancreatitis (3). However, these data need to be confirmed by other trials. During dilation extra care should be taken to provide adequate analgesia and sedation because this intervention might be painful. Moreover, to avoid perforation we strongly recommend that the size of the inflated balloon does not exceed the width of the bile duct. Most of the times balloon dilation of 8 – 10 mm is sufficient. This might also minimize the risk of post-ERCP pancreatitis. After dilation the balloon is deflated and removed. There is no significant bleeding and dilation offers a nice access to the biliary tract. In the next step a balloon catheter is introduced and inflated above the stone. Some suction and a straighter patient position help to dislocate the stone to the distal portion of the bile duct. From here the stone is easily removed by pulling the half-way blocked balloon catheter through the bile duct. Subsequent fluoroscopic control shows complete extraction of the stone.

Endoscopic extraction of bile duct stones is successful in > 95 %. Post-procedure monitoring of patients is important because of the risk of cholangiosepsis and post-ERCP pancreatitis.

Tips & Tricks

- In patients with a major risk of bleeding papillary balloon dilation might be preferred over sphincterotomy
- The size of the balloon should be adopted to the diameter of the stone but should not exceed the diameter of the CBD
- Because of the substantially higher risk of post-ERCP pancreatitis balloon dilation it is not the standard procedure for biliary access.
- To lower the risk of post-ERCP pancreatitis after balloon dilation of the papilla prophylactic stent placement in the pancreatic duct might be performed.

Complications and Risk Factors

In patients with known episodes of post-ERCP pancreatitis balloon dilatation should be avoided.

Alternatives

Placement of a nasobiliary tube or placement of a biliary stent for drainage of the CBD without sphincterotomy or dilation of the papilla. Although this procedures have a low complication rate the disadvantage are that 1.) the obstructing stone can not be retrieved and 2.) stents are rapidly occluded in this situation due to the pus.

Scribed voiceover

A 65-year-old woman presented with jaundice and severe coagulopathy with an INR of 2.5 due to cholangiosepsis. ERCP shows spontaneous emptying of large amounts of white pus through the papilla. This is enforced by suction. After cannulation of the common bile duct fluoroscopy shows a singular 1 cm stone in the middle portion of the duct.

Because of the coagulopathy we decided to avoid papillotomy but rather perform dilation of the papilla to minimize the risk of procedure-realted bleeding. A dilation catheter was introduced over a guide wire. The balloon has a 1 cm width and 4 cm length. To avoid perforation of the duct the maximum width of the balloon should not exceed the width of the bile duct.

Fluoroscopic control shows the indentation that is caused by the papilla. The balloon is kept inflated for 20 seconds. During dilation it is important to provide adequate analgesia and sedation for the patient as dilation of the papilla might be painful.

After dilation the balloon is deflated and removed. There is no significant bleeding and dilation offers a comfortable tract.

In the next step a balloon catheter is introduced and inflated above the stone.

Some suction and a straighter patient position help to dislocate the stone to the distal portion of the bile duct. From here the stone is easily removed by pulling the half-way blocked balloon catheter through the bile duct.

The biliary tract is decompressed and the stone is extracted.

Subsequent fluoroscopic control shows complete extraction of the stone. The patient recovered quickly thereafter and was discharged three days later.

(Runtime of video: 3 mins 12 secs)
References

Further Readings