Common bile duct stones: if you can't sweep them, vacuum them!

Fig. 1 Cholangiogram taken during endoscopic retrograde cholangiopancreatography (ERCP) showing a markedly dilated common bile duct with a filling defect that could not be removed by repeated balloon sweeps.

Stone extraction from markedly dilated extrahepatic bile ducts can be challenging because of difficulty in achieving effective balloon apposition with the ductal wall. Studies examining stone extraction strategies in such cases are lacking. We describe this scenario in three patients and report a novel technique to overcome this technical difficulty.

Patient #1 was a 64-year-old woman with right upper quadrant pain who was found to have cholelithiasis and common bile duct (CBD) dilatation of 20 mm on imag-

ing. Laboratory tests revealed elevated results for liver chemistry. Patient #2 was an 87-year-old woman with *Escherichia coli* bacteremia and ascending cholangitis who was found on imaging to have a CBD that was dilated up to 23 mm, with an 11-mm filling defect in the distal segment. Patient #3 was an 11-year-old boy with sickle cell disease who had previously undergone cholecystectomy but exhibited persistent common hepatic duct (CHD) dilatation up to 24 mm on magnetic resonance cholangiopancreatography (MRCP) in the setting of abnormal liver chemistry results, despite having undergone two prior endoscopic retrograde cholangiopancreatography (ERCP) procedures with sphincterotomy and stent placement.

In the ERCPs of all three patients, filling defects were visualized in large, dilated extrahepatic biliary ducts (● **Fig. 1**). Despite multiple attempts, balloon sweeps were not able to achieve sufficient apposition with the biliary wall to clear all the retained biliary stones or sludge.

The balloon was therefore advanced to the bifurcation of the left and right intrahepatic ducts. During subsequent balloon sweeps, negative pressure was gently applied to the biliary system using a 60-mL syringe on a wire port to collapse the proximal bile duct (● **Fig. 2**). This allowed apposition of the balloon and the wall of

extrahepatic bile duct, which allowed stones and debris to be successfully swept out by the balloon. Complete clearance of the bile duct was confirmed by an occlusion cholangiogram (● **Fig. 3**) in patients #1 and #3, and by cholangioscopy in patient #2.

The treatment of these three patients illustrates a novel and successful technique using negative pressure during ERCP to clear difficult-to-remove biliary stones from markedly dilated extrahepatic bile ducts, and one which can be readily employed in practice.

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Bibliography

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Fig. 2 Air cholangiograms during the novel stone extraction procedure showing: **a** a decrease in the caliber of the common hepatic duct (yellow arrows) when the negative pressure was initially applied to the biliary system; **b** further narrowing of the common hepatic duct (yellow arrows) due to the negative intraductal pressure above the sweeping balloon, which allowed better balloon apposition against the ductal wall.

Fig. 3 Occlusion cholangiogram following negative-pressure balloon sweeps showing the common bile duct without any filling defects.