



Effectiveness of extracorporeal shock wave lithotripsy on intrahepatic biliary calculi developing after choledochal cyst surgery: A case report

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ABSTRACT

The development of intra- and extrahepatic bile duct stones has been reported as one of the most serious complications after choledochal cyst excision with biliary-enteric reconstruction through Roux-en-Y hepaticojejunostomy (HJ). Here, we report our experience with extracorporeal shock wave lithotripsy (ESWL) in a case of giant intrahepatic stones developing after choledochal cyst surgery. ESWL is an excellent therapeutic modality for large intrahepatic biliary calculi, and after dilating the HJ anastomosis percutaneously, it can be offered as first-line therapy to these patients.

Keywords: Choledochal cyst, ESWL, intrahepatic biliary calculi, hepaticojejunostomy

INTRODUCTION

The traditional management of choledochal cysts includes complete excision of extrahepatic cysts with biliary-enteric reconstruction through Roux-en-Y hepaticojejunostomy (HJ) (1). Long-term complications following this procedure include stone formation, recurrent cholangitis, and malignant transformation (2). According to Dabbas et al. (3), stone formation occurs in up to 5% of cases during follow-up. Various procedures have been reported to treat this condition (4,5). Here, we report our experience with extracorporeal shock wave lithotripsy (ESWL) in a patient with giant intrahepatic stones developing after choledochal cyst surgery.

CASE PRESENTATION

A 15-year-old male patient was referred to our clinic because of recurrent bouts of cholangitis. At the age of five, he had been operated in a different clinic because of a Type 1 choledochal cyst, and the cyst had been resected with Roux-en-Y HJ. His total bilirubin, aspartate transaminase (AST), and alanine transaminase (ALT) levels were elevated to 6,18 mg/dL, 296 U/L and 332 U/L respectively. Magnetic resonance (MR) cholangiopancreatography showed air bubbles in the dilated

intrahepatic bile ducts, and biliary sludge in the Roux loop. With the diagnosis of stenosis at the hepaticojejunal anastomosis, surgery was recommended; however, his parents disapproved.

The patient visited our clinic again one year later with recurrent bouts of cholangitis every 15-20 days. The arm of the Roux-and-Y loop, which was shorter than 30 cm, was removed with the narrow hepaticojejunal anastomosis; a novel 60 cm long jejunal segment was anastomosed just distal to the bifurcation of the intrahepatic channels. The early postoperative course was uneventful.

After 18 months, episodes of cholangitis recurred. Minimal partial obstruction was detected in the hepatobiliary scintigraphy in the postoperative second year. Sludge and stone formation and dilation of the right and left main bile ducts (particularly the left main biliary duct) were detected on MR cholangiography. After the informed consent given by the parents, percutaneous transhepatic cholangiography (PTC) was performed to evaluate the HJ anastomosis and balloon dilatation was performed, reaching up to 18 F over three weeks,

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in five different sessions. After the dilation, large amounts of sludge began to pass through the PTC catheter, so it was left in its place to irrigate the hepatic channels until the drainage was clear without sludge and particles. The patient experienced no bouts of cholangitis within this one-year-period. Two months after removal of the catheter, attacks of cholangitis started again, and CT imaging revealed calculi in both right and left intrahepatic ducts (Figures 1, 2).

Accompanied by ultrasonography and fluoroscopy, extracorporeal shock wave lithotripsy was performed using a piezoelectric lithotripter (Wolf Piezolith 3000; Richard Wolf, Knittlingen, Germany) at a shock wave discharge of 0.9 mJ/mm² for 20 min/session, without local or general anesthesia. CT imaging following the two ESWL sessions revealed a nearly stone-free left intrahepatic biliary duct and a completely open right channel (Figure 3).

After seven sessions over four months, the wishbone-like stone had disappeared. The patient did not have any perioperative or postoperative complications. The first year of follow-up has been event-free.



Figure 1. a,b. Abdominal CT showing large intrahepatic bile duct stones and dilation of both channels.

DISCUSSION

The development of intra- and extrahepatic bile duct stones has been reported as one of the most serious complications following choledochal cyst excision (3,4,6-8). ESWL, which is performed without laparotomy or puncture, is a less invasive, novel technique, which uses shock waves to fragment calculi. It was first used to treat bile duct stones in 1985, after its success and safety in treating renal calculi had been well established (9,10). Sauerbruch et al. (9) demonstrated the efficacy of ESWL in achieving Common Bile Duct, stone disintegration in more than 90% of patients with minimal side effects. Okada et al. (4) reported excellent results using this method for intrahepatic bile duct stone after choledochal cyst resection, and to the best of our knowledge, this was the first report showing the effectiveness of ESWL on biliary stones after choledochal cyst surgery. Intrahepatic bile ducts were filled with debris in that case, because of the occlusion of the biliodigestive anastomosis by impacted stones. The stones in our case were bigger and they were located in the liver, rather than at the HJ anastomosis. In another report, Obatake et al. were not successful in using ESWL because they were unable to maintain focus on the intrahepatic duct stones, as the shock waves caused them to move. They concluded that this approach is useful only in special cases, e.g., cases of impacted intrahepatic bile duct stones or immobile stones, such as ureteral calculi (6). The present case had multiple stones; one of them was big and clogged into the right intrahepatic bile duct. To the best of our knowledge, this is the third reported and second successful case in the literature on the effectiveness of ESWL for managing intrahepatic bile duct stones developing after choledochal cyst excision and HJ. Okada et al. (4) recommended at least five sessions for the complete clearance of bile ducts; ESWL was effective in breaking the stones in seven sessions in our patient.

Therefore, ESWL is an excellent therapeutic modality for large intrahepatic biliary calculi. The high efficacy, the non-invasive nature of the procedure, and the low complication rate make it



Figure 2. Abdominal CT showing a wishbone-like stone in the left intrahepatic channel.

a procedure of choice; after percutaneously dilating the biliodigestive HJ anastomosis, this method can be offered to patients with intrahepatic impacted-staghorn biliary stones developing after choledochal cyst surgery.

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