Repeated ERCP for the Management of Recurrent CBD Stones

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Introduction

The recurrence rate of choledocholithiasis after endoscopic stone extraction differs from 6.4% to 24%.1 Although the etiology of stone recurrence after initial ERCP has not been fully elucidated, some risk factors for stone recurrence have been reported: a common bile duct (CBD) dilatation, periampullary diverticula (PAD), pneumobilia, and acute CBD angulation.2 The early detection and treatment of recurrent CBD stones may help to avoid life threatening complications such as acute suppurative cholangitis and septic shock. Several studies have reported that regular clinical follow-up of patients after CBD stones removal is valuable and it decreases the morbidity related to stone recurrence.3,4 However, early detection of CBD stone is not easy even after physical examinations, biochemical tests, ultrasonography, computed tomography (CT) and magnetic resonance cholangiopancreatography (MRCP). In addition, follow-up ERCP has been proven to be safer than the initial ERCP.3,4 Therefore, the ideal follow-up strategy after CBD stone removal is to follow up the high risk patients with ERCP.

Early scheduled follow-up ERCP

Kim JN et al enrolled the patients who underwent endoscopic removal of CBD stones and who had at least one risk factor for stone recurrence (maximum CBD diameter >15 mm, CBD angle≤145°, PAD).3 After complete clearance of the CBD stones, the patients were recommended to undergo early scheduled follow-up ERCP 6 months later irrespective of their symptoms. The patients who refused to undergo early scheduled follow-up ERCP were recommended to have regular clinical follow-ups that included an interview and biochemical tests, including liver function tests (LFTs), every 3 months. If recurrent CBD stones were suspected, then they were readmitted and ERCP was performed. They reported that the early scheduled follow-up ERCP group had a significantly lower frequency of cholangitis than that of the late symptom based follow-up ERCP group (9.5% vs. 33.3%, p=0.02). In addition, a shorter hospital stay was achieved in early scheduled follow-up ERCP group (2.4 vs. 6.1 days, p<0.01). Therefore, they recommended early scheduled follow-up ERCP for the patients who were at a high risk of recurrence, irrespective of symptoms.

Ampullary intervention for recurrent CBD stones

Endoscopic sphincterotomy (EST), endoscopic papillary balloon dilatation (EPBD), endoscopic papillary large balloon dilatation (EPLBD) after previous EST were the current methods for ampullary intervention for the management of recurrent CBD stones. Among them, EPLBD seemed to a good substitute for enlargement of biliary opening from previous EST with safe and effective outcomes.5,6 The large conduit by EPLBD might allow complete retrieval of the CBD stones without the need of mechanical lithotripsy, thus preventing further nidus formation. EPBLD might reduce the short-term recurrence of CBD stones in patients with previous EST because the distal bile duct and whole
biliary sphincter were dilated and destructed simultaneously, thus facilitating bile drainage and smooth passage of residual stone fragments.\textsuperscript{5,6} The pathogenesis of ampullary stenosis is not well known. Papillary stenosis is divided into 2 subtypes: type I means the stenosis is confined in the intraduodenal part of the papillary sphincter, and type II means the stenosis extends into the CBD.\textsuperscript{7} In type II stenosis, repeated sphincterotomy is not helpful, and balloon-based methods seem to be more effective. Furthermore, repeated EST may result in a higher complication rate.\textsuperscript{7} EPBD seems to be more effective and is associated with a lower rate of occurrence of papillary stenosis.

**Temporary stenting for irretrievable biliary stones**

In patients with irretrievable biliary stones, insertion of a plastic stent is effective in the short term to drain the bile ducts; it is frequently associated with partial stone dissolution that facilitates delayed endoscopic stone removal in most cases. Biliary stenting using a double-pigtail stent proved to be a useful alternative therapy to stone clearance following EST in the management of choledocholithiasis in elderly patients.\textsuperscript{8} Addition of oral ursodeoxycholic acid (UDCA) does not increase the dissolution rate but a combination of oral UDCA and terpene could be more effective. Mortality/morbidity is high in the case of long-term biliary stenting.\textsuperscript{9} If ERCP fails to remove difficult biliary stones or is contraindicated, temporary (e.g., 3-month) plastic stenting should be considered. After biliary stent placement, the patient and referring physicians should be warned that, when used as long-term measure, stent placement is associated with a high risk of cholangitis. Plastic stents as long-term measure acted as a nidus for stone formation in the CBD and hepatic duct.\textsuperscript{10} In patients with CBD stones who were treated with biliary plastic stents, the best stent management to avoid cholangitis was stent changing at defined intervals (every 3 months).\textsuperscript{11} Addition of oral UDCA associated with terpene should be considered.\textsuperscript{9} UDCA makes cholesterol stones soluble, thereby improving biliary emptying. Conversely, however, UDCA can also form stones via an unknown mechanism, as shown in a few previous reports of cholangitis caused by the formation of UDCA stones in the CBD.\textsuperscript{12} Recent study showed that the plastic stent coated with 50% EDTA and sodium cholate enhanced CBD stone dissolution \textit{in vivo} and may be a promising tool for patients with difficult biliary stones.\textsuperscript{13}

**Conclusions**

Early detection of CBD stone in the patients who underwent previous ERCP is not easy after physical examinations, biochemical tests, ultrasonography, CT and MRCP. Repeated ERCP has been proven to be safer than the initial ERCP. Therefore, the ideal follow-up strategy after CBD stone removal is to follow up the high risk patients with ERCP. EPBD and EPLBD seemed to a good substitute for enlargement of biliary opening from previous EST with safe and effective outcomes. In patients with irretrievable biliary stones, insertion of a plastic stent is effective in the short term to drain the bile ducts.

**References**

4. Lai KH, Lo GH, Lin CK, et al. Do patients with recurrent choledocholithiasis after endoscopic sphincterotomy benefit from regular