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Aspects of interventional endoscopic treatment of common bile duct stones

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Abstract

Background: During the last 30 years, important changes have been introduced in the management of common bile duct stones (CBDS) which can be detected in about 10% of patients undergoing cholecystectomy because of symptomatic gallstone disease. Established minimally-invasive treatment options for CBDS include endoscopic retrograde cholangiopancreatography (ERCP) and laparoscopic common bile duct exploration. A complex and demanding situation occurs if conventional ERCP extraction methods fail because of the large size and/or the location of the CBDS.

Objectives: The hypothesis of the thesis were: 1). The peroperative combination of laparoscopy and endoscopy, with so-called rendezvous ERCP (RV-ERCP) is by comparison with conventional ERCP, a safe and efficient treatment method regarding feasibility in clinical practice, complete stone clearance and ERCP associated complications. 2). Extremely large or so-called difficult CBDS can safely and efficiently be managed with ERCP assisted peroral cholangioscopy in conjunction with laser lithotripsy (LL) or by electrohydraulic lithotripsy (EHL), in order to obtain complete stone clearance.

Methods: Study I and II are descriptive case series. Study I included patients from 2000 through 2001 at the Karolinska University Hospital that was treated with RV-ERCP because of CBDS. Study II included patients from 1995 through 2006 recruited from the Karolinska and Östersunds Hospitals, treated with peroral cholangioscopy assisted EHL or LL due to difficult CBDS. In study III, patients with symptomatic gallstone disease were prospectively enrolled in a comparative case-control study. Patients who underwent laparoscopic cholecystectomy were, depending on the peroperative cholangiography results, either treated for CBDS using RV-ERCP or assigned to the control group if their cholangiograms were negative. Pancreatic proenzymes were analyzed at 0, 4, 8 and 24 hours. Study IV was a nationwide population-based nested case-control study within a cohort of 12,718 ERCP investigations selected from the Swedish Registry for Gallstone Surgery and ERCP (GallRiks) from 2007 through 2009. The outcome of post-ERCP pancreatitis (PEP) was analysed for a number of possible risk factors.

Results: In study I, 34 patients had a RV-ERCP that was successful in terms of biliary cannulation (100%), duct clearance (94%) and no ERCP related complications such as PEP. The operation time was quite long (mean 82 min), but the hospital stay was equal to those who were operated with LC alone. In study II, 44 patients were treated with EHL or LL and overall ductal clearance was achieved in 34 (74%) cases, of which 13 (30%) patients needed repeated sessions. Large stones (>20 mm) were associated with failure. Old age (≥ 80 years) and poor physical condition did not affect clinical outcomes, and a majority of the patients remained free from biliary symptoms for many years at follow-up. In study III, the patients treated with RV-ERCP and the control group without ERCP, had significantly less pancreatic enzyme leakage, 4 hours after the intervention and at later time points, compared with the conventional ERCP group. Inadvertent pancreatic duct cannulation and contrast injection into it, were positively associated with higher levels of pancreatic enzymes. Among 17,787 patients registered in GallRiks and observed in study IV, 12,718 patients with no previous ERCP, were eligible for further analysis. The overall rate of PEP was 3.6%. A 50% reduction in the risk of PEP was noted in patients treated with RV-ERCP compared with those who were cannulated by conventional means (OR 0.5, 95% confidence interval 0.2-0.9, $p = 0.02$). Other factors associated with an increased risk of PEP were young age, prolonged procedure time and elective ERCP.

Conclusion: Taken together evidence is hereby provided that RV-ERCP reduces pancreatic damage and decreases the frequency of PEP. CBDS identified during LC can safely and effectively be managed by RV-ERCP in a routine clinical setting. These findings challenges the current management concept of two-step ERCP for treatment of CBDS. In addition, ERCP is an efficient and safe first line method in the management of difficult CBDS and should be recommended even for old and/or frail patients.

Keywords: ERCP, common bile duct stones, rendezvous, post-ERCP pancreatitis, electrohydraulic lithotripsy, laser lithotripsy.