

Introduction

Endoscopic retrograde cholangiopancreatography (ERCP) is a treatment option for post-operative bile leaks (PBL). In this study, we aimed to evaluate the ERCP outcomes for PBL at our tertiary institution.

Methods and Materials

We created a retrospective database of patients with PBL who underwent ERCP between July 2011 to January 2021. We reviewed the fluoroscopic images and reports of each ERCP and defined a high-grade PBL as visualization of contrast extravasation from the bile duct defect before contrast filling the intrahepatic biliary branches. Initial ERCP success was defined as resolution of PBL seen on the 2nd ERCP cholangiogram. Final ERCP success was defined as resolution of PBL after one or more interventional ERCP sessions. We used Strasberg classification for post cholecystectomy bile leaks (C-BL), Nagano classification for post hepatectomy bile leaks (H-BL) and we distinguished bile leaks from orthotopic liver transplants (OLT-BL) as duct-to-duct biliary anastomotic leak or other locations.

Discussion

For initial ERCP treatment of PBL, our endoscopists generally preferred combination therapy with BES and plastic stenting. Regardless of the surgery and location of leak, high-grade PBL were more likely to require multiple ERCP sessions to resolve, suggesting that a high-grade PBL may warrant more aggressive ERCP therapy from the start. In our cohort, it appears that low-grade OLT-BL were most likely to resolve after 1 ERCP intervention and high-grade H-BL were the most likely to need repeated ERCP therapies. However, our study was limited by an overwhelming proportion of C-BL.

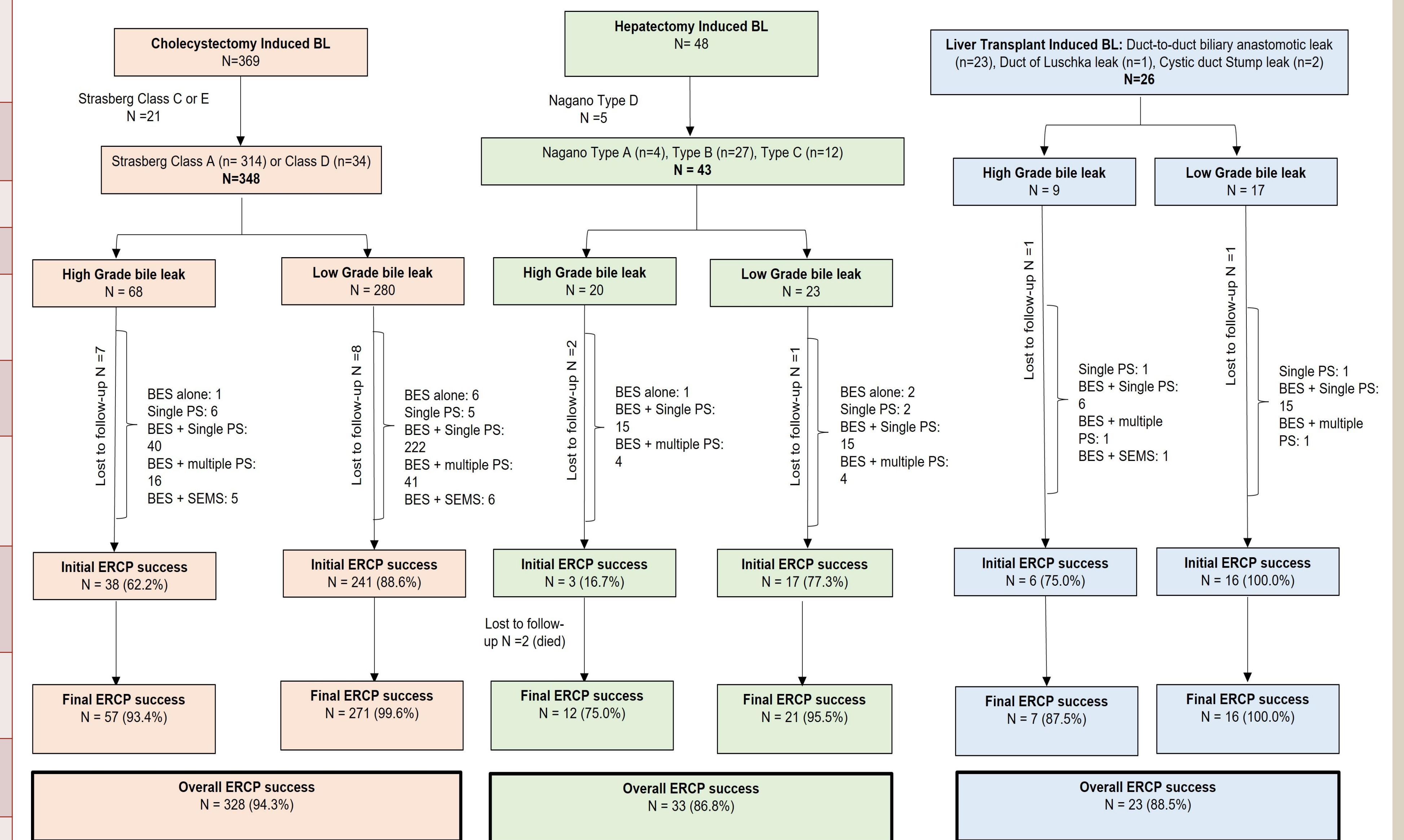
Results

Out of 443 cases - 369 (83.3%) were C-BL, 48 (10.8%) were H-BL, and 26 (5.9%) were OLT-BL. Baseline characteristics are summarized in Table 1. Median time from surgery to ERCP was 6 days; 84% had ERCP performed at least 3 days after the inciting surgery. The initial ERCP interventions and ERCP outcomes are shown in detail in Image 1. The median time from initial ERCP to the 2nd ERCP was 5 weeks. The overall ERCP success rate was better for C-BL (94.3%) vs H-BL (86.8%) and OLT-BL (88.5%), (P=0.0004). Across the different groups, high-grade PBL was associated with a higher likelihood of persistent PBL needing multiple ERCP therapy sessions (P < 0.0001). Overall ERCP-related adverse events occurred in 19 (4.3%) patients – 17 post-ERCP pancreatitis, 1 perforation and 1 post-ERCP bleed. 7 had severe post-ERCP pancreatitis that required escalation of care. None of these cases resulted in in-hospital mortality.

Table 1. Baseline Characteristics of Patient Cohort

Variables	Cholecystectomy induced Bile leaks (N=369)	Hepatectomy induced Bile Leaks (N=48)	Liver Transplant induced Bile Leaks (N=26)
Median Age (years) [IQR]	56.0 [41.0, 68.0]	57.5 [51.0, 65.0]	51.5 [39.0, 58.0]
Female Gender (%)	220 (60%)	27 (56%)	10 (38%)
Median BMI [IQR]	31.0 [26.0, 35.0]	26.0 [22.5, 32.0]	27.0 [25.0, 29.0]
Diabetic on medical management (%)	67 (18%)	5 (10%)	7 (27%)
Active tobacco use (%)	144 (39%)	24 (51%)	8 (32%)
On immunosuppressants (%)	16 (4.3%)	10 (20.8%)	26 (100.0%)
Altered anatomy from prior surgery (%)	12 (3%)	4 (8%)	25 (96%)
Surgery performed for malignancy (%)	4 (1%)	37 (77%)	3 (12%)
Jaundice present at initial ERCP (%)	137 (40%)	18 (38%)	21 (81%)
Documented biloma before initial ERCP (%)	131 (39%)	32 (68%)	7 (28%)
Percutaneous abdominal drain in-situ at initial ERCP (%)	228 (62%)	34 (71%)	6 (23%)
Biliary stones found at initial ERCP (%)	71 (19%)	3 (6%)	1 (4%)
Biliary stricture found at initial ERCP (%)	25 (7%)	11 (23%)	16 (62%)

Image 1: Outcomes of initial ERCP interventions.



Abbreviations: BL : Bile leak. BES: Biliary endoscopic sphincterotomy. PS: Plastic Stent. SEMS: Self-expandable metallic stent.