**Introduction**

Acute cholangitis is an inflammatory process due to bacterial infection of the bile duct and can be potentially fatal. In most patients, cholestasis is an underlying etiology of bacterial overgrowth in the biliary system and can cause cholangiovenous reflux and resultant sepsis. In addition to the administration of antibiotics as initial therapy, emergent biliary decompression is required to improve clinical outcomes of patients with severe acute cholangitis. Endoscopic retrograde cholangiopancreatography (ERCP) with biliary stent placement is currently performed as a first-line biliary drainage method for patients with acute cholangitis. The current version of the Tokyo Guidelines for management of acute cholangitis and cholecystitis recommends urgent biliary drainage within 24 h of admission for severe acute cholangitis, but the role of urgent biliary drainage in non-severe acute cholangitis remains to be determined.

Clinical outcomes including mortality among patients with acute cholangitis may worsen due to delays in biliary interventions. Observational studies suggest weekend effects in a variety of acute diseases, i.e., worse clinical outcomes associated with weekend admissions compared with weekday admissions, which can be attributed to delayed intensive treatments owing to unavailability of expertized medical staff or specialized procedures. On the other hand, drawbacks of urgent biliary drainage may include personnel burden, referral to a tertiary care center, and a potentially higher rate of procedure-related adverse events such as aspiration pneumonia due to non-fasting endoscopic procedures and post-ERCP pancreatitis due to the lack of experienced endoscopists. A few studies have examined the association between the timing of endoscopic biliary drainage and clinical outcomes of patients who are admitted for non-severe acute cholangitis. Therefore, we conducted a retrospective single-center study to compare clinical outcomes between elective and urgent endoscopic biliary drainage in patients with non-severe acute cholangitis.

**Study Design**

This study was designed as a retrospective study to compare the clinical outcome of elective drainage for non-severe acute cholangitis with that of urgent drainage. Using electronic medical records and our prospectively maintained endoscopy database, data on consecutive patients who underwent biliary stent placement via ERCP for acute cholangitis at The University of Tokyo Hospital (Tokyo, Japan) were retrospectively studied. The medical records also included times of admission and ERCP on a minute basis. Written informed consent for ERCP procedures was obtained from all patients before the procedure. This study was approved by the ethical committee at the University of Tokyo Hospital and was conducted in accordance with the “Helsinki Declaration.”

We retrospectively collected data on consecutive adult patients (20–25 years or older) who underwent ERCP for acute cholangitis between August 1, 2010, and July 31, 2017. For patients who underwent multiple ERCP procedures for the same indication during the study period, the initial procedure was included in the analysis. The exclusion criteria were as follows: (1) patients who underwent subsequent procedures such as surgery and chemotherapy during the index hospitalization (considering the substantial influence of the care on length of stay [LOS]), (2) patients who had a percutaneous transhepatic biliary catheter, and (3) patients with unsuccessful endoscopic biliary drainage.

**Study Outcomes**

The primary outcome of this study was LOS. The secondary outcomes included in-hospital mortality, admission to intensive care unit (ICU), organ failure, recurrence of cholangitis within 30 days of discharge, readmission within 30 days of discharge, and early adverse events associated with ERCP. Organ failure was defined as vasopressor-requiring hypotension, need for mechanical ventilation, or acute kidney injury (1.5-fold increase in the serum creatinine level from baseline or need for dialysis), which lasted more than 48 h. Early adverse events of ERCP (e.g., pancreatitis, cholecystitis, or cholangitis) were defined, and the severity was graded according to the Lexicon Guidelines of the American Society for Gastrointestinal Endoscopy.

**Discussion**

LOS did not differ significantly between the elective and urgent drainage groups. Adjustment with a variety of confounders did not materially alter our findings. In addition, we found no between-group differences in the rates of in-hospital mortality, ICU admission, recurrence of cholangitis, or early adverse events associated with ERCP. Despite the undoubted necessity of urgent endoscopic biliary drainage for severe acute cholangitis, our findings do not support this procedure for patients with mild or moderate acute cholangitis.

Delayed biliary drainage may lead to worse clinical outcomes in patients with acute cholangitis as undrained infectious bile can cause sepsis and organ failure through the cholangiovenous reflux. Several studies indicated the association between the delay in ERCP and worse clinical outcomes. In a retrospective study of 90 patients at a single referral center in the USA, delayed and unsuccessful ERCP procedures were associated with longer LOS. In contrast to prior studies, our study focused on patients with non-severe acute cholangitis and did not find ERCP timing–LOS association. The severity criteria of the TG13 guidelines have been shown to be useful to stratify patients with acute cholangitis, and our previous study showed a significant increase in plasma levels of procalcitonin.

Disadvantages of urgent biliary drainage should be taken into account when discussing the timing of ERCP for acute cholangitis. Urgent biliary drainage, particularly when performed at night or weekends, requires medical resources, including personnel costs for specialized staff (e.g., expertized endoscopists, technicians, and nurses) and patient transfer to tertiary care centers. There are some limitations to be acknowledged in this study. First, a retrospective study design at a single referral center might have led to selection biases of treatments and patients. Nonetheless, we included all eligible patients who were consecutively identified during the study period, and our detailed electric medical records and endoscopy database allowed us to comprehensively examine the association of the timing of ERCP with clinical outcomes while adjusting for potential confounders. However, our findings require external validation by studies at multiple hospitals in different settings. Second, a relatively small sample size was another limitation. Finally, we only included cases where endoscopic biliary drainage was successfully carried out, and therefore, we did not evaluate technical success rates or other biliary drainage procedures.

In conclusion, urgent biliary drainage for non-severe cholangitis was not necessarily associated with short LOS or other clinical outcomes compared to elective biliary drainage. Further investigation is warranted to evaluate the trade-off of potentially higher morbidities due to the delay in ERCP and medical resources associated with urgent biliary drainage.