

Comparison of Early Endoscopic Ultrasonography and Endoscopic Retrograde Cholangiopancreatography in the Management of Acute Biliary Pancreatitis: A Prospective Randomized Study

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Background & Aims: The role and potential benefits of endoscopic ultrasonography (EUS) in the management of acute biliary pancreatitis have not been documented. We report a large prospective randomized study comparing early EUS and endoscopic retrograde cholangiopancreatography (ERCP) in the management of these patients. **Methods:** A prospective randomized study was performed on 140 patients with acute pancreatitis suspected to have a biliary cause. The patients were randomized to have EUS (n = 70) or ERCP (n = 70) within 24 hours from admission. In the EUS group, when EUS detected choledocholithiasis, therapeutic ERCP was performed during the same endoscopy session. In the ERCP group, diagnostic ERCP was performed, followed by therapeutic endoscopy when choledocholithiasis was detected. **Results:** Examination of the biliary tree by EUS was successful in all patients in the EUS group, whereas cannulation of the common duct during ERCP was unsuccessful in 10 patients (14%) in the ERCP group (P = .001). Combined percutaneous ultrasonography and ERCP missed detection of cholelithiasis in 6 patients in the ERCP group. The overall morbidity rate was 7% in the EUS group, and that in the ERCP group was 14% (P = .172). The hospital stay and mortality rates were comparable in both groups. **Conclusions:** In selected patients with acute biliary pancreatitis, EUS could safely replace diagnostic ERCP in the management for selecting patients with choledocholithiasis for therapeutic ERCP with a higher successful examination rate, a higher sensitivity in the detection of cholelithiasis, and a comparable morbidity rate.

Because it is associated with significant morbidity and mortality, acute pancreatitis can be a serious abdominal emergency. Cholelithiasis is one of the most common etiologies of acute pancreatitis,¹ although the reported incidence varies among populations. Early endoscopic retrograde cholangiopancreatography (ERCP) with endoscopic sphincterotomy (ES) when choledocholithiasis is detected has been reported to reduce the morbidity rates.^{2,3}

The procedure has been considered the standard study for imaging the bile duct in patients with acute pancreatitis. However, this approach is characterized by a high number of unnecessary ERCPs. The complication rate associated with ERCP is significant with a nontrivial mortality rate.⁴⁻⁶ Endoscopic ultrasonography (EUS) has been shown to have a higher accuracy in the detection of cholecystolithiasis compared with percutaneous ultrasonography (USG) and a similar accuracy in the detection of choledocholithiasis compared with ERCP in patients with acute pancreatitis.^{7,8} In addition, EUS has the benefit of early detection of microlithiasis in the gallbladder that would otherwise escape detection, rendering prompt early endoscopic or surgical treatment possible.^{9,10} It also appeared that EUS has a potential role in selecting patients with choledocholithiasis for therapeutic ERCP, thus avoiding the potential morbidities associated with an unnecessary diagnostic ERCP in about two thirds of patients with acute pancreatitis.⁷ However, its role and the potential advantages in the management of patients with acute biliary pancreatitis have not been fully documented. We therefore performed a prospective randomized study to evaluate the role of EUS in the management of patients with acute pancreatitis and to assess whether early EUS examination would reduce the morbidity by avoiding unnecessary invasive diagnostic ERCP.

Abbreviations used in this paper: ERCP, endoscopic retrograde cholangiopancreatography; ES, endoscopic sphincterotomy; EUS, endoscopic ultrasonography; MRI, magnetic resonance imaging; USG, percutaneous ultrasonography.

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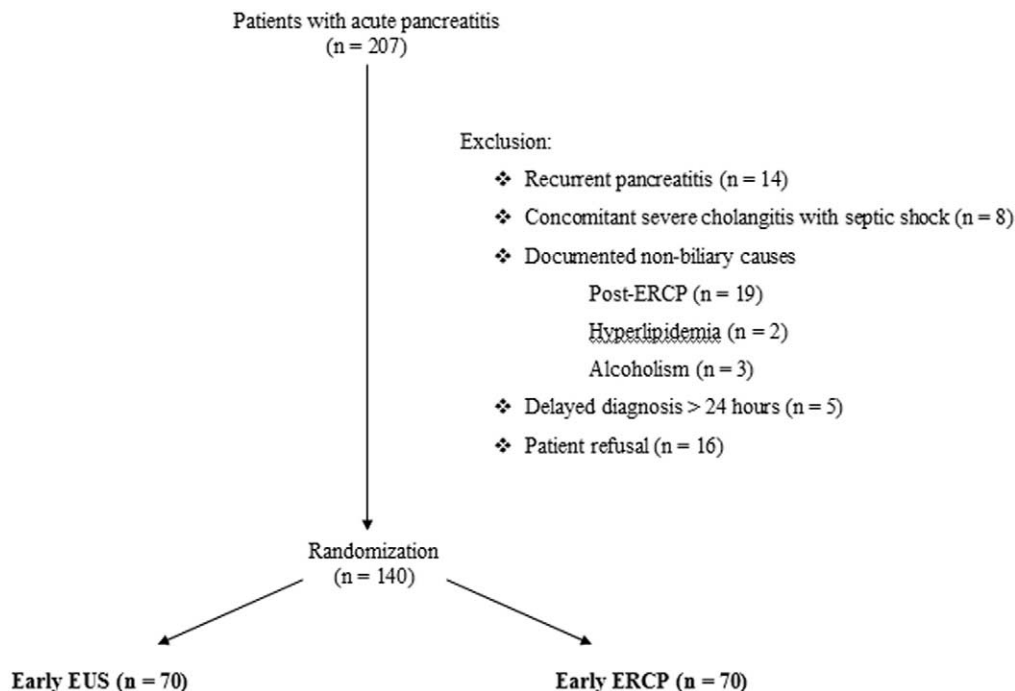


Figure 1. Flow diagram of patient allocation.

Methods

We performed a single-centered, open-labeled, prospective randomized controlled study to test the hypothesis that the management of patients with acute biliary pancreatitis could be improved by an early EUS examination. During a 30-month study period from July 2001–December 2003, 207 patients with the diagnosis of acute pancreatitis were managed at the Department of Surgery, Queen Mary Hospital, Hong Kong. One hundred forty patients with the first episode of acute pancreatitis, which was suspected to have a biliary cause of the attack, were included in the present study. When the clinical staff identified patients who were suitable to be included in the study, a single research assistant was informed. The patients were randomized by drawing consecutively sealed and numbered envelopes to undergo EUS (EUS group, $n = 70$) or ERCP (ERCP group, $n = 70$) within 24 hours from admission. Exclusion criteria included patients with recurrent pancreatitis ($n = 14$), concomitant severe cholangitis with septic shock that warranted emergency ERCP ($n = 8$), documented clinical causes other than biliary stones for acute pancreatitis, including post-ERCP pancreatitis ($n = 19$), hyperlipidemia ($n = 2$), and chronic alcoholism ($n = 3$), patients with delayed diagnosis of acute pancreatitis for more than 24 hours from admission ($n = 5$), and patients who refused to participate in the study ($n = 16$) (Figure 1). Acute pancreatitis was diagnosed when patients presented with acute abdominal pain and a serum amylase level greater than 3 times the normal upper limit (normal range, 30–110 U/L). Patients were suspected to have a biliary cause of acute pancreatitis when the liver function was deranged and other possible etiology was not identified in the clinical history such as hyperlipidemia or alcoholism on admission. All patients were kept fasting with

intravenous fluid infusion, and intravenous cefuroxime was prescribed for antibiotic prophylaxis. Blood samples for biochemical analyses, including liver and renal function tests, arterial blood gases, calcium level, and lipid profiles were obtained after admission. Vital signs of patients were closely monitored. Routine USG was performed on all patients soon after admission by experienced radiologists with the use of 2- to 4-MHz percutaneous ultrasound probes (XP10; Acuson, Mountain View, CA).

All endoscopic procedures were performed in the Endoscopy Unit of Queen Mary Hospital. In the EUS group, early EUS was performed for all patients within the first 24 hours of admission. During EUS examinations, all patients were placed in the left lateral position. Pharyngeal anesthetic spray was used, and sedation was accomplished with intravenous diazepam and pethidine hydrochloride. A 7.5-MHz endoultrasound scope (GF-UM20 or JF-UM20; Olympus, Tokyo, Japan) was inserted into the upper gastrointestinal tract. The gallbladder and the common bile duct were examined with the endoultrasound scope placed in the gastric antrum, duodenal bulb, and descending duodenum. Biliary tract images were obtained at different angles by adjusting the position of the probe to minimize examination “blind spots.” Any persistent echogenic foci with or without posterior acoustic shadowing were considered biliary stones, microlithiasis, or sludge. The number and size of stones inside the gallbladder and common duct were recorded. When EUS detected choledocholithiasis, therapeutic ERCP with ES and stone extraction were performed during the same endoscopy session and sedation. When choledocholithiasis was not detected, the patients were put on conservative treatment without ERCP.

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