

• BASIC RESEARCH •

Early diagnosis and treatment of severe acute cholangitis

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Abstract

AIM: To investigate the diagnostic standard for early identification of severe acute cholangitis in order to lower the incidence of morbidity and mortality rate.

METHODS: A diagnostic standard was proposed in this study as follows: documented biliary duct obstruction by ultrasound or computerized tomography or other imaging tools with the manifestation of systemic inflammatory response syndrome (SIRS). The surgical procedures included emergency common bile duct exploration with T tube insertion or cholecystostomy with secondary common bile duct exploration. And incidence of postoperative multiple organ dysfunction syndrome (MODS), duration of systemic inflammatory response and hospital mortality were analyzed.

RESULTS: Forty-three patients conforming to the diagnostic standard described above were employed in this study. 1 patient was admitted in acutely ill condition and complicated with acute relapse of chronic bronchitis, cholecystostomy procedure was performed but the patient was complicated with postoperative acute lung injury which was treated by assisted mechanical ventilation for 5 d; 2 wk later, two-stage common bile duct Exploration and T tube insertion were performed. The remaining 42 patients underwent primary common bile duct exploration and T tube insertion, 1 developed acute lung injury and recovered 3 d later, 2 patients developed acute renal dysfunction, 1 of which recovered 2 d later and the other died on d 4. For all patients, the postoperative systemic inflammatory response persisted for 2 to 8 d with median of 3 d.

CONCLUSION: Early diagnosis of severe acute cholangitis can be made using this diagnostic standard, further development of systemic inflammatory response could be prevented and incidence of MODS as well as hospital mortality decreased.

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INTRODUCTION

Severe acute cholangitis takes a severe clinical course, systemic inflammatory response syndrome (SIRS) appears at early stage and followed by multiple organ dysfunction syndrome (MODS), which signifies poor prognosis^[1-8]. Recently, the perioperative management and technique of anesthesia have been much improved,

however, the mortality and morbidity of the patients with severe acute cholangitis remain high, especially in local hospitals. This study was performed to investigate the standard for early diagnosis of severe acute cholangitis and its surgical timing in order to decrease the complications.

MATERIALS AND METHODS

Diagnostic criteria

In this study, we proposed the diagnostic criterion for severe acute cholangitis as follows: documented obstruction of biliary duct by ultrasound, CT or other radiological imaging^[9-19] if the patient presents two or more of the following conditions: ① temperature more than 38°C or less than 36°C, ② elevated heart rate more than 90·min⁻¹, ③ respiratory rate more than 20·min⁻¹ or PaCO₂ less than 4.27KPa, and ④ white blood cell count more than 12×10⁹·L⁻¹, less than 4×10⁹·L⁻¹, or immature granulocyte more than 0.10^[20].

Clinical materials

Between January 1997 and November 2000, 43 consecutive patients conforming to proposed diagnostic criterion for severe acute cholangitis were admitted in surgical department of our hospital, of which 26 were male and 17 were female, the average age was 53±8 years and the average APACHE II score was 9. 2±2.6. 27 patients had stones only in common bile duct; the remaining 16 had both intrahepatic and extrahepatic stones.

After admission, proper preoperative preparation was carried out and all patients underwent emergency biliary duct decompression, including common bile duct exploration with T tube drainage or cholecystostomy with secondary choledochostomy.

After operation, patients were intensively monitored on multiple organ systems. Hospital mortality was taken as death during hospitalization for the severe cholangitic attack, and death attributed to the underlying biliary sepsis in the absence of other obvious contributory cause within 48 h after emergency biliary duct drainage. When postoperative serum creatinine doubled or exceeded 180μmol·L⁻¹ among patients who had a normal preoperative value or when it increased 100μmol·L⁻¹ over its deranged preoperative level, the diagnosis was renal dysfunction. Respiratory dysfunction was taken as the necessity for mechanical ventilation at any time after admission because of acute cholangitis. And duration of systemic inflammatory response was measured.

RESULTS

One patient aged 65 years was admitted in critically ill condition with APACHE II score of 15 and was complicated with acute relapse of chronic bronchitis, therefore, cholecystostomy procedure was performed but he was complicated with postoperative acute lung injury which was treated by assisted mechanical ventilation for 5 d; 2 wk later, common bile duct was explored and T tube inserted. After 20 d, he was discharged. The remaining 42 patients underwent first-stage common bile duct exploration and T tube placement, however, 1 developed acute lung injury and was managed by mechanical ventilation for 3 d; 2 patients developed acute renal dysfunction, one of which recovered 2 d later and the other died on d4. For all

patients, the postoperative systemic inflammatory response persisted for 2 to 8 d with median of 3 d.

DISCUSSION

Acute cholangitis caused by obstruction of common bile duct can easily induce systemic inflammatory response and later MODS or MOF, the clinical mortality is high. In China, a symposium on hepatic and biliary duct stones was held by Chinese Association of Surgery at Chongqing city in 1983, and the diagnostic standards for severe acute cholangitis was recommended. The diagnosis was met when patient presents shock or two of following six parameters: nervous symptoms; pulse more than 120 min^{-1} ; white blood cell counts more than $20 \times 10^9 \cdot \text{L}^{-1}$; temperature more than 39°C or less than 35°C ; biliary duct filled with pus and highly pressured; positive blood culture. In western country, diagnosis of severe acute cholangitis was established when septic shock or mental obtundation was confirmed in patients with acute cholangitis^[21]. However, many patients with severe acute cholangitis were not manifested with nervous dysfunction and hypotension; the incidence of Reynolds' pentad was low; recent study showed that culture is far less sensitive than PCR method in detecting microbes present in blood^[22-23]; and with progress in technique of modern imaging, obstruction of biliary duct can be identified early and accurately and proper management can be achieved timely; last but not least, patients with the diagnosis of severe acute cholangitis by this standard usually presented severe systemic inflammatory response, suggestive of the presence of multiple organ dysfunction, so if the patients were operated on at this time, second hit would ensue and course leading to MOF was accelerated^[24], mortality increased accordingly. At that time, when diagnosis was established, biliary drainage was of immediate concern, the surgical procedures included common bile duct exploration and T tube insertion, or cholecystostomy when patient's condition was unstable, but mortality rate carried between 10 per cent and 40 per cent.^[1-3, 25]

In the era of minimally-invasive surgery, when the diagnosis of severe acute cholangitis is confirmed, the principle of management has much changed^[26-32]. Non-operative biliary decompression is attempted before any definitive surgical procedure is undertaken. A nasobiliary catheter by endoscopy can be left in place to provide short-term biliary decompression until the patient's cholangitis resolves. The goal of such treatment is to convert an urgent or emergent problem into one that can be managed in an elective setting. Emergent surgical decompression of the common bile duct is reserved for patients in whom endoscopic procedure is either unsuccessful or unavailable. Should a surgical procedure be necessary, the goal is to establish biliary decompression only by means of a choledochotomy, and placement of a large diameter T-tube. Overall, non-operative drainage can be accomplished with morbidity rates of less than 40 per cent and overall mortality of less than 10 per cent.

Lai *et al* in early 1990s conducted a randomized prospective study on the role of endoscopic biliary drainage for severe acute cholangitis, the diagnosis of severe acute cholangitis was based on the presence of either septicemic shock or evidence of progressive biliary sepsis including mental confusion and persistent or relapsing fever despite appropriate antibiotic treatment, however, the mortality rate remained up to 10 percent. Recently, they conducted a retrospective study to evaluate the combined endoscopic and laparoscopic approach in managing gallstone cholangitis, in their series, 60 patients had severe acute cholangitis defined by the presence of septic shock, mental confusion, or persistent high fever despite antibiotic treatment and the mortality rate among patients with severe acute cholangitis decreased to 5.0 per cent (3/60)^[21]. They concluded that combined approach is safe and effective for managing gallstone cholangitis. Other authors had reported similar advantages of nonoperative

decompression^[27-30].

The advent of endoscopic retrograde cholangiopancreatography, endoscopic sphincterotomy and newer laparoscopic procedures including common bile duct exploration has remarkably decreased the mortality of severe acute cholangitis^[33-37]. However, the performance of these procedures is dependent on training, technical skills and experience of the surgeon. In the hands of an experienced surgeon, a laparoscopic approach is reasonable for the treatment of acute cholangitis in the tertiary hospitals^[33]. But in the primary or local hospitals which don't have the experienced endoscopic surgeon or equipment, the management of patients with severe acute cholangitis has to be turned to traditional procedures. Furthermore, a recent multicenter randomized trial comparing surgical treatment with endoscopic management in patients with common bile duct stones showed that surgical treatment was associated with lower major complications like MODS (4% vs 13%) and less retained stones (6% vs 16%) than endoscopic management^[38]. And other complications of nonoperative management were also noted.^[39-40]

As we know, in the situation of severe acute cholangitis, the intraductal pressure rises secondary to obstruction, bacteria and endotoxins can leak into the systemic circulation and induce systemic inflammatory response^[4-7] and a frequent complication of this inflammatory response is the development of organ system dysfunction or failure^[20, 41-42]. Therefore, the management of severe acute cholangitis should be based on the early awareness of the disease by clinicians, the objective of this study was to establish the early diagnosis of severe acute cholangitis.

An American College of Chest Physicians/Society of Critical Care Medicine Consensus Conference (ACCP/SCCM) was held in August 1991 to produce a series of universal definitions for SIRS (systemic inflammatory response syndrome), sepsis and other clinical conditions related to sepsis, the aim of the consensus conference was to improve our ability to make early detection of the disease possible, and thus allow early therapeutic intervention to decrease morbidity and mortality^[20, 42]. Based on this background, we recommended a new diagnostic standard since January 1997, that was, SIRS manifestation with documented obstruction of biliary duct by imaging, and surgical procedure for decompression mainly was common bile duct exploration and T tube drainage. 43 consecutive patients conforming to proposed diagnostic criterion for severe acute cholangitis were employed in this study. 1 patient aged 65 years was admitted in acutely ill condition and complicated with acute relapse of chronic bronchitis, cholecystostomy procedure was performed but he was complicated with postoperative acute lung injury which was treated by assisted mechanical ventilation for 5 d; 2 wk later, two-stage common bile duct Exploration and T tube insertion were performed. The remaining 42 patients underwent primary common bile duct exploration and T tube insertion, however, 1 developed acute lung injury and recovered later; 2 patients developed acute renal dysfunction, one of which recovered 2 d later and the other died on d4. Therefore, all patients in this cohort were diagnosed and managed timely, preventing SIRS from further progressing, thus the incidence of MOD was low (9.3%, 4/43) and mortality rate decreased (2.3%, 1/43).

In conclusion, the preliminary results of this prospective study showed that if the systemic inflammatory response is identified early in the disease process of severe acute cholangitis, MODS can be effectively prevented and mortality decreased, the proposed definition for severe acute cholangitis is practical and should be clinically accepted. Furthermore, a randomized controlled prospective study should be done to confirm this conclusion.

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