

Management of Necrotizing Pancreatitis by Repeated Operative Necrosectomy Using a Zipper Technique

Gregory G. Tsiotos, MD, Enrique Luque-de León, MD, Jon A. Søreide, MD, Michael P. Bannon, MD, Scott P. Zietlow, MD, Yvonne Baerga-Varela, MD, Michael G. Sarr, MD

METHODS: From 1983 to 1995, 72 patients with necrotizing pancreatitis were treated with a general approach involving planned reoperative necrosectomies and interval abdominal wound closure using a zipper.

RESULTS: Hospital mortality was 25%. Multiple organ failure without sepsis caused early mortality in 3 of 4 patients and sepsis caused late mortality in 11 of the remaining 14. The mean number of reoperative necrosectomies/debridements was 2 (0 to 7). Fistulae developed in 25 patients (35%); 64% were treated conservatively. Recurrent intraabdominal abscesses developed in 9 patients (13%) but were drained percutaneously in 5. Hemorrhage required intervention in 13 patients (18%). Prognostic factors included APACHE-II score on admission <13 ($P = 0.005$), absence of postoperative hemorrhage ($P = 0.01$), and peripancreatic tissue necrosis alone ($P < 0.05$).

CONCLUSIONS: The zipper approach effectively maximizes the necrosectomy and decreases the incidence of recurrent intraabdominal infection requiring reoperation. APACHE-II score ≥ 13 , extensive parenchymal necrosis, and postoperative hemorrhage signify worse outcome. *Am J Surg.* 1998;175:91-98. © 1998 by Excerpta Medica, Inc.

Necrotizing pancreatitis is the most severe form of acute pancreatitis and accounts for as many as 3% to 5% of all patients with acute pancreatitis in tertiary referral centers. A better understanding of the pathophysiology of necrotizing pancreatitis and its subsequent "superinfection" has led to improved treatment modalities and outcomes. Recognition that necrosis and infection of the pancreatic parenchyma and its extension into the peripancreatic retroperitoneal tissues requires op-

erative necrosectomy^{1,2} has led most pancreatic surgeons to advocate an extensive initial necrosectomy/debridement complimented by various techniques to evacuate residual suppuration and control extravasation of pancreatic exocrine secretions.³⁻⁶ Our earlier change from simple peripancreatic drainage to necrosectomy and controlled, open lesser sac drainage⁷ decreased mortality, but recurrent intraabdominal sepsis necessitating formal reoperation occurred in greater than 20% of patients. Hoping to improve outcome, we continued to perform an initial necrosectomy but added planned, every-other-day reoperations for repeated necrosectomy/debridement. Fascial zipper closure as suggested by Stone et al⁸ facilitated the repeated abdominal reentries necessitated by this new approach. Once all devitalized tissue had been removed and the surgeon was convinced that the necrotizing process had clearly abated, the abdomen was closed in a delayed primary fashion over peripancreatic drains.⁸ This report reviews our experience with 72 patients treated with this technique and defines in this severely ill patient population prognostic factors derived from univariate and multivariate analyses.

PATIENTS AND METHODS

We prospectively collected data on 72 consecutive patients with necrotizing pancreatitis treated at our institution from 1983 to 1995 with a basic concept of initial necrosectomy, and planned reoperations for debridement until delayed primary closure over drains was possible. Diagnosis of necrotizing pancreatitis was made with contrast-enhanced computed tomography (CT). Indications for operation included positive cultures from percutaneous aspirates, extraluminal gas on CT, or less commonly, clinical deterioration. Only patients with pancreatic or peripancreatic necrosis confirmed intraoperatively were included; patients with pancreatic abscess or infected pseudocysts were specifically excluded. All clinical definitions complied with the 1993 Atlanta classification system for acute pancreatitis.⁹ Because most patients were transferred to our institution for tertiary care after the onset of acute pancreatitis, severity of disease was quantitated by APACHE-II scores calculated on arrival. Data collected prospectively detailed etiology, CT and operative findings, bacteriology, extent of necrosis, number of reoperations, postoperative complications, and cause of death. The extent of pancreatic parenchymal necrosis (expressed in percentage of the gland necrosed) was estimated based on a combination of contrast-enhanced CT and intraoperative findings. Devitalization of the head of the gland alone was scored as 50% necrosis, of the head and neck 60%, of the body and tail 40%, and of the head, neck, and body 90%. Follow-up has been complete to date.

From the Department of Surgery, Mayo Clinic and Mayo Foundation, Rochester, Minnesota.

Portions of this paper were presented at the Second World Congress of the International Hepato-Pancreato-Biliary Association, Bologna, Italy, June 2-6, 1996, and at the American Hepato-Pancreato-Biliary Association, Miami, Florida, February 20-23, 1997.

Requests for reprints should be addressed to Michael G. Sarr, MD, Gastroenterology Research Unit (AL 2-435), Mayo Clinic, 200 First Street SW, Rochester, Minnesota 55905.

Manuscript submitted May 9, 1997 and accepted in revised form September 11, 1997.