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Management Of Acute Severe Pancreatitis: From Medical Optimization To Surgical Intervention

Dr. Drashti Dhanjibhai Vaddoriya
M.B.B.S.
Intern, Internal Medicine Department, G.C.S. Medical College Hospital And Research Center

Dr. Prachi Kamleshbhai Tandel
M.B.B.S.
Intern, General Surgery Department, G.C.S. Medical College Hospital And Research Center

Dr. Raj Bhaveshbhai Thesia
M.B.B.S.
Intern, Internal Medicine Department, G.C.S. Medical College Hospital And Research Center

Abstract
Acute severe pancreatitis (ASP) is a life-threatening inflammatory condition associated with significant morbidity and mortality. It is characterized by persistent organ failure, systemic inflammatory response, and local pancreatic complications such as necrosis and infection. Early recognition, aggressive medical optimization, and timely escalation to interventional or surgical management are critical determinants of outcome. Advances in intensive care, imaging, minimally invasive interventions, and the step-up approach have significantly improved survival. This review discusses the current concepts in the management of acute severe pancreatitis, focusing on early resuscitation, nutritional support, management of organ failure, role of antibiotics, interventional radiology, endoscopy, and surgical strategies.

Key Words: *Acute severe pancreatitis, pancreatic necrosis, organ failure, step-up approach, necrosectomy*

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I. Introduction

Acute pancreatitis is a common gastrointestinal emergency with an incidence of 13–45 cases per 100,000 population annually [1]. While the majority of patients develop mild disease, approximately 15–20% progress to acute severe pancreatitis, which is associated with persistent organ failure and mortality rates ranging from 20–40% [2].

The Revised Atlanta Classification defines severe pancreatitis as pancreatitis associated with persistent organ failure (>48 hours), involving one or more organ systems [3]. Over the past two decades, management has shifted from early surgical intervention to a multidisciplinary, minimally invasive, step-wise approach.

Pathophysiology Of Acute Severe Pancreatitis

Premature activation of pancreatic enzymes leads to autodigestion of pancreatic tissue, initiating a cascade of inflammation. Local pancreatic injury triggers a systemic inflammatory response syndrome (SIRS), which may progress to multiorgan dysfunction syndrome (MODS) [4].

TABLE 1: Pathophysiological Events in Acute Severe Pancreatitis

Event	Clinical Consequence
Enzyme activation	Pancreatic autodigestion
Cytokine release	SIRS
Capillary leak	Hypovolemia, shock
Pancreatic necrosis	Infection, sepsis
Organ dysfunction	Respiratory, renal, circulatory failure

Assessment And Severity Stratification
Early risk stratification is essential to guide ICU admission and management.

TABLE 2: Severity Assessment Scores in Acute Pancreatitis

Score	Parameters	Clinical Use
BISAP	BUN, mental status, SIRS	Early mortality prediction
APACHE II	Physiological variables	ICU prognostication
CTSI	CT-based scoring	Local complication assessment
Revised Atlanta	Organ failure	Disease classification

Initial Medical Management
Hemodynamic Resuscitation

Early aggressive fluid resuscitation using isotonic crystalloids is the cornerstone of management, preferably within the first 24 hours [5]. Goal-directed therapy aims to maintain urine output >0.5 ml/kg/hr and MAP ≥65 mmHg.

Pain Control
Adequate analgesia with opioids is recommended. Epidural analgesia may be considered in selected ICU patients.

Oxygenation and Organ Support
Early ICU admission is indicated for patients with hypoxemia, hypotension, or renal dysfunction.

TABLE 3: Medical Optimization in Acute Severe Pancreatitis

Component	Strategy
Fluids	Ringer's lactate preferred
Analgesia	IV opioids
Oxygen	Target SpO_2 >94%
Renal failure	Early RRT if needed
Glycemic control	Avoid hyperglycemia

Nutritional Support

Early enteral nutrition (within 24–48 hours) via nasojejunal or nasogastric route reduces infectious complications and mortality [6]. Parenteral nutrition is reserved for cases where enteral feeding is not tolerated.

TABLE 4: Nutritional Strategies

Method	Indication
Oral feeding	Mild disease
Enteral feeding	Severe pancreatitis
Parenteral nutrition	Intolerant to enteral

Role Of Antibiotics

Routine prophylactic antibiotics are not recommended in sterile pancreatic necrosis [7]. Antibiotics are indicated only in documented or strongly suspected infected necrosis.

Local Complications And Interventional Management
Local complications include acute necrotic collections, walled-off necrosis, and pseudocysts.

Step-Up Approach
The step-up approach involves minimally invasive drainage before considering surgery.

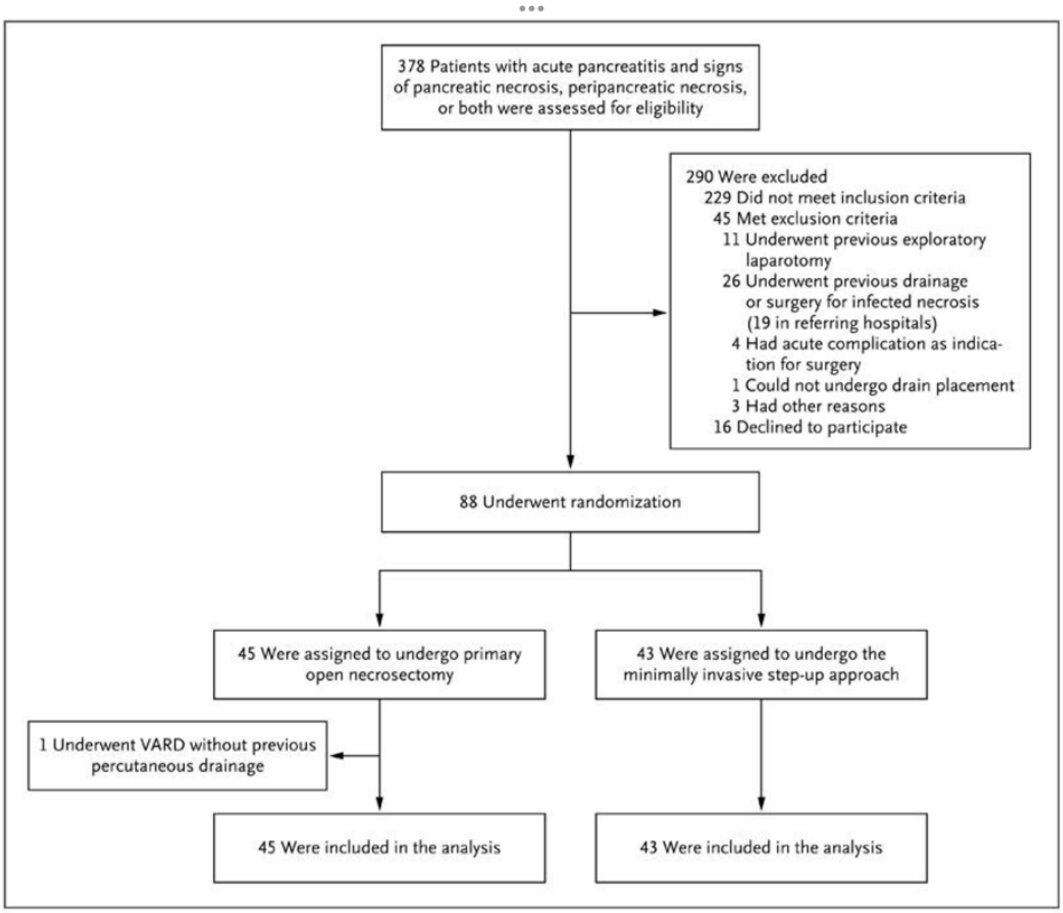

TABLE 5: Step-Up Management Strategy

Step	Intervention
Step 1	Percutaneous / endoscopic drainage
Step 2	Minimally invasive necrosectomy
Step 3	Open necrosectomy (last resort)

Surgical Management

Surgery is reserved for patients with infected necrosis not responding to minimally invasive methods or complications such as bowel ischemia or uncontrolled bleeding [8].

Delayed surgery (>4 weeks) after disease onset is associated with better outcomes.

TABLE 6: Indications for Surgical Intervention

Indication	Timing
Infected necrosis	After failure of drainage
Abdominal compartment syndrome	Emergency
GI perforation	Emergency
Persistent sepsis	Delayed

Outcomes And Prognosis

Mortality in acute severe pancreatitis depends on the presence of persistent organ failure and infected necrosis. Multidisciplinary care in high-volume centers significantly improves survival [9].

II. Conclusions

Management of acute severe pancreatitis has evolved from early surgery to a conservative, multidisciplinary, step-wise approach. Early medical optimization, enteral nutrition, organ support, and minimally invasive interventions form the cornerstone of treatment. Surgery should be delayed and reserved for selected cases. Adoption of evidence-based protocols has significantly reduced morbidity and mortality in this devastating disease.

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