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A Catastrophic Cascade: Multi Organ Dysfunction Syndrome in a Case of Severe Acute Necrotizing Pancreatitis – A Case Report

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Abstract
Background: Acute necrotizing pancreatitis is a life-threatening condition that may rapidly progress to multi-organ dysfunction syndrome (MODS). Early recognition and intensive supportive care are crucial in reducing morbidity and mortality.
Case Presentation: We report a case of a 30-year-old male with severe acute necrotizing pancreatitis, complicated by acute respiratory distress syndrome (ARDS), pleural effusion, acute kidney injury (AKI), ventilator-associated pneumonia, and ultimately MODS.
Investigations: Laboratory investigations revealed anemia, leukocytosis, metabolic acidosis, deranged renal and liver function tests, and positive cultures for multiple pathogens. Imaging confirmed necrotizing pancreatitis with fluid collections, ascites, pleural effusion, and omental thickening.
Treatment: The patient was managed with broad-spectrum antibiotics, organ support (mechanical ventilation, tracheostomy, SLED dialysis), nutritional support, and interventional procedures including intercostal drainage, percutaneous endoscopic drainage, and pigtail catheter insertion.
Outcome: Despite aggressive multidisciplinary care, the patient's condition deteriorated and he succumbed to the illness.

Keywords: Acute necrotizing pancreatitis, Multi-organ dysfunction syndrome, ARDS, MODS, Sepsis, Dialysis

Introduction
Acute pancreatitis is an acute inflammatory process of the pancreas, most commonly caused by gallstones and alcohol use. Severe necrotizing pancreatitis can trigger systemic inflammatory response syndrome (SIRS) and lead to MODS. Mortality in mild pancreatitis is <5%, but in severe necrotizing pancreatitis with MODS, it may exceed 30–50%.

Etiology and Pathophysiology
Pancreatitis results from premature activation of pancreatic enzymes, leading to autodigestion and release of inflammatory mediators. This cascade produces systemic effects:

- **Lungs:** ARDS due to increased vascular permeability.
- **Kidneys:** Acute tubular necrosis and AKI.
- **Cardiovascular system:** Shock and capillary leak.
- **Gastrointestinal system:** Ischemia, necrosis, ascites.
- **Immune system:** Cytokine storm, predisposing to sepsis.

Classification
Revised Atlanta classification

- **Mild pancreatitis:** No organ failure, no local/systemic complications
- **Moderately severe pancreatitis:** Transient organ failure (<48 h) or local complications
- **Severe pancreatitis:** Persistent organ failure (>48 h), single or multiple organs

Our patient met criteria for severe pancreatitis with persistent multi-organ dysfunction.

Case Presentation

Patient Demographics and History

- **Age:** 30 years
- **Gender:** Male
- **Past History:** Chronic alcohol consumption
- **Chief Complaints:** Diffuse abdominal pain, multiple episodes of vomiting (non-bilious, non-bloody), loss of appetite, fatigue (2 days duration)

History of Present Illness

Patient presented with fever, tachycardia (130 bpm), hypertension (160/100 mmHg), and oliguria. Abdominal pain was dull aching, progressive, and localized to epigastric and periumbilical regions.

Physical Examination

- **General:** Acutely ill, febrile, tachycardic, hypertensive, oliguric
- **Abdomen:** Distension, epigastric/periumbilical tenderness, bowel sounds present
- **Respiratory:** Decreased breath sounds bilaterally, pleural effusion suspected

Investigations

Investigation	Result	Reference Range
Hemoglobin	Anemia	12–16 g/dL
Total Leukocyte Count	Leukocytosis	4,000–11,000/µL
ABG	Metabolic acidosis	—
Renal Function Tests	High creatinine, dyselectrolytemia	0.7–1.3 mg/dL
Liver Function Tests	Elevated enzymes	Normal limits
Coagulation Profile	Elevated INR/PT	Normal limits
Viral Serology	Negative	—
Blood Culture	Staphylococcus epidermidis	—
Urine Culture	Staphylococcus schleiferi	—
Tracheal Aspirate	CRE Klebsiella (VAP)	—
Chest X-ray	Infiltrates, pleural effusion	—
CT Abdomen	Necrotizing pancreatitis, ascites, omental thickening, bowel wall edema	—
HRCT Chest	Pleural effusion, ground-glass opacities	—

Treatment and Management

Immediate Management

- Admission to ICU, fluid resuscitation, strict monitoring
- Intra-abdominal pressure monitoring
- Nasojejunal tube placement for early enteral nutrition

Supportive Care

- **Mechanical Ventilation → Tracheostomy** for prolonged ARDS
- **SLED dialysis** for AKI
- **Drainage Procedures:** Intercostal drainage (pleural effusion), percutaneous endoscopic drainage (necrotic fluid), USG-guided pigtail catheter (ascites)

Pharmacological Management

- **Antibiotics:** Meropenem, Teicoplanin, Polymyxin B, Tigecycline, Aztreonam, Cipza, Eraxis
- **Other drugs:** Pantoprazole, Heparin, Thiamine, Optineuron, Perinorm
- **Infusions:** Fentanyl, Atracurium, Dexmedetomidine
- **Nebulizations:** Mucinac, Levosalbutamol

Nursing Diagnosis

- Acute Pain related to pancreatitis and invasive procedures
- Risk for Infection related to invasive devices and immunosuppression
- Impaired Gas Exchange related to ARDS
- Deficient Fluid Volume related to vomiting and third spacing
- Anxiety related to severity of illness and poor prognosis

Nursing Care and Management

- **Vital Signs:** Hourly monitoring of HR, BP, temperature, oxygen saturation
- **Fluid Balance:** Strict I/O charting, urine output, daily weight
- **Respiratory Care:** Ventilator care, suctioning, infection prevention
- **Nutrition:** Enteral feeding, high-protein supplementation
- **Skin/Wound Care:** Pressure sore prevention, catheter care
- **Psychological Support:**Counseling for family, coping strategy support

Expected Outcomes

- Maintain adequate oxygenation and ventilation
- Stabilization of renal function and fluid balance
- Prevention of secondary infections
- Effective pain control
- Family understanding of condition and prognosis

Complications and Prevention

- **Immediate:** ARDS, AKI, sepsis, metabolic acidosis, intra-abdominalhypertension
- **Long-term:** Pancreatic insufficiency, diabetes mellitus, recurrent infections, psychological impact
- **Prevention Strategies:** Early diagnosis, optimal fluid resuscitation, infection control, avoidance of unnecessary antibiotics

Outcome And Follow-Up

Despite aggressive ICU-level management, the patient's condition deteriorated. He developed refractory MODS and succumbed.

Discussion

This case highlights the devastating progression from acute necrotizing pancreatitis to systemic inflammatory response and MODS. Despite guideline-based management (fluid

resuscitation, organ support, broad-spectrum antimicrobials, drainage procedures, nutrition), prognosis was poor.

Conclusion

Severe necrotizing pancreatitis complicated by MODS carries high mortality despite optimal care. Early recognition, infection control, and advanced supportive strategies remain the cornerstone of management. Novel therapies targeting inflammatory pathways may hold promise for improving outcomes.

Conflict of Interest: None

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