

**PERIPANCREATIC ABSCESS AFTER ACUTE PANCREATITIS: MODERN  
CONCEPTS OF DIAGNOSIS AND TREATMENT**

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**Abstract**

Peripancreatic abscess is one of the most severe infectious complications of acute necrotizing pancreatitis. Despite advances in intensive care and minimally invasive interventions, morbidity and mortality remain significant. This article presents a comprehensive literature review of Uzbek, Russian, and international sources regarding the pathogenesis, diagnostic criteria, and modern treatment strategies of peripancreatic abscesses. Current evidence supports a step-up, minimally invasive approach as the preferred therapeutic strategy. Early diagnosis using contrast-enhanced computed tomography (CECT) and timely drainage significantly improve clinical outcomes.

**Keywords**

acute pancreatitis, peripancreatic abscess, infected necrosis, minimally invasive treatment, step-up approach, drainage.

**Introduction.** Acute pancreatitis (AP) is a common inflammatory disease with an increasing global incidence. Approximately 15–20% of patients develop severe disease characterized by pancreatic and peripancreatic necrosis [1,2]. Infection of necrotic tissue may result in the formation of a peripancreatic abscess, typically occurring after the third to fourth week of disease progression [3].

According to the revised Atlanta classification (2012), peripancreatic abscess is categorized under infected pancreatic and peripancreatic necrosis [4]. Mortality rates in infected necrotizing pancreatitis range from 20% to 40% depending on the extent of organ failure and timing of intervention [5,6].

Modern management has shifted from early open necrosectomy toward minimally invasive and staged approaches, which have demonstrated improved outcomes and reduced complications [7,8].

**Pathogenesis.** The pathogenesis of peripancreatic abscess involves pancreatic acinar cell injury leading to premature enzyme activation and autodigestion [9]. Microcirculatory disturbances result in pancreatic necrosis. Secondary bacterial translocation from the gut is considered the primary mechanism of infection [10].



Gram-negative organisms such as *Escherichia coli* and *Klebsiella spp.* predominate, although polymicrobial infections are common [11]. Systemic inflammatory response syndrome (SIRS) may progress to multiple organ dysfunction syndrome (MODS), significantly increasing mortality [12].

**Diagnosis.** Contrast-enhanced computed tomography (CECT) remains the gold standard for diagnosing necrosis and abscess formation [4,13]. Imaging typically reveals encapsulated fluid collections with gas bubbles or heterogeneous necrotic content.

Fine-needle aspiration (FNA) for microbiological confirmation is recommended in selected cases [14]. Laboratory markers such as elevated C-reactive protein (CRP >150 mg/L) and procalcitonin support suspicion of infection [15].

Magnetic resonance imaging (MRI) and endoscopic ultrasound (EUS) provide additional diagnostic value in selected patients [16].

## Treatment strategies

**Conservative Management.** Initial management includes intensive care support, fluid resuscitation, organ support, and broad-spectrum antibiotics targeting Gram-negative and anaerobic organisms [5,17].

**Minimally Invasive Approaches.** The “step-up approach,” first validated by van Santvoort et al. [7], begins with percutaneous catheter drainage (PCD). If clinical improvement is insufficient, minimally invasive necrosectomy follows.

Endoscopic transluminal drainage has gained popularity due to lower morbidity compared to surgical approaches [18]. Lumen-apposing metal stents (LAMS) have improved drainage efficiency [19].

Video-assisted retroperitoneal debridement (VARD) is another effective minimally invasive technique [7,20].

**Surgical Management.** Open necrosectomy is now reserved for refractory cases. Studies demonstrate higher complication rates and longer recovery compared to minimally invasive strategies [6,21].

**Discussion.** Current literature consistently supports delayed intervention (after 4 weeks) when feasible, allowing encapsulation of necrotic collections [3,22]. Early aggressive surgery increases mortality.

Multidisciplinary management involving surgeons, gastroenterologists, and interventional radiologists improves outcomes [23].

In post-Soviet clinical practice, integration of minimally invasive technologies has reduced postoperative complications and hospital stay duration [24,25].



Uzbek clinical reports also indicate improved survival with ultrasound-guided percutaneous drainage in infected pancreatic collections [26].

**Conclusion.** Peripancreatic abscess represents one of the most severe infectious complications of acute necrotizing pancreatitis and remains a major determinant of morbidity and mortality. Contemporary evidence demonstrates that the outcome of this condition depends primarily on three critical factors: timely diagnosis, accurate assessment of infection and organ failure, and the appropriate selection and timing of intervention.

The literature consistently confirms that contrast-enhanced computed tomography based on the revised Atlanta classification proposed by Banks P.A. and colleagues provides a standardized framework for differentiating sterile necrosis from infected collections. Early identification of infected necrosis through imaging and laboratory markers such as CRP and procalcitonin allows clinicians to stratify patients according to risk and to initiate targeted therapy without unnecessary surgical trauma.

The paradigm shift from early open necrosectomy to minimally invasive staged management has significantly improved clinical outcomes. The landmark PANTER trial conducted by van Santvoort H.C. demonstrated that the step-up approach—beginning with percutaneous drainage and escalating only when necessary—reduces major complications, organ failure, and mortality compared with primary open surgery. Subsequent randomized trials and meta-analyses confirmed that minimally invasive techniques, including percutaneous catheter drainage, endoscopic transluminal drainage, and video-assisted retroperitoneal debridement, are associated with shorter hospital stays, lower systemic inflammatory response, and improved recovery.

An important principle supported by international guidelines is delayed intervention, ideally after four weeks from disease onset, when necrotic collections become encapsulated (“walled-off”). Premature surgical intervention during the early inflammatory phase is associated with increased bleeding, higher risk of multiorgan failure, and worse prognosis. Therefore, the decision-making process must be individualized, based on clinical stability, presence of sepsis, and radiological findings.

Multidisciplinary management is another decisive factor. Optimal outcomes are achieved when surgeons, gastroenterologists, interventional radiologists, and intensivists collaborate within specialized pancreatic centers. Evidence from Eastern European and Central Asian surgical practice indicates that the integration of ultrasound-guided drainage and minimally invasive retroperitoneal approaches has reduced postoperative complications and mortality rates.

Despite significant progress, several challenges remain. There is ongoing debate regarding the optimal timing of intervention in early infected necrosis, the selection criteria for endoscopic versus percutaneous drainage, and the management of complex multiloculated collections. Furthermore, antibiotic stewardship is essential to prevent resistant infections.

In summary, the accumulated scientific evidence supports the following key conclusions:

1. Peripancreatic abscess is a life-threatening but potentially controllable complication of acute pancreatitis when managed appropriately.



2. Standardized radiological classification and early risk stratification are fundamental for treatment planning.
3. The step-up minimally invasive strategy is currently the gold standard for most patients.
4. Open necrosectomy should be reserved for refractory or complicated cases.
5. Future research should focus on refining patient selection criteria, improving minimally invasive technologies, and developing predictive biomarkers for infection and organ failure.

Thus, enhancement of clinical effectiveness in treating peripancreatic abscesses depends not on radical surgical aggressiveness, but on precise diagnostics, evidence-based staged intervention, and coordinated multidisciplinary care.

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