

MODERN APPROACHES TO THE TREATMENT OF PERIPANCREATIC ABSCESES: EFFECTIVENESS OF STEP-UP STRATEGY AND MINIMALLY INVASIVE TECHNOLOGIES**Juraboev Oybek Ulugbek ugli**Master's student (1st year), Department of Surgery and Clinical Sciences
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Abstract: This article analyzes the evolution of treatment methods for peripancreatic abscesses following acute pancreatitis. The clinical effectiveness of open surgery, the step-up approach, and minimally invasive technologies was compared. The results demonstrate that minimally invasive strategies are superior in reducing mortality, decreasing complications, and shortening recovery time.

Keywords: acute pancreatitis, peripancreatic abscess, step-up approach, percutaneous drainage, endoscopic drainage, necrosectomy

Introduction. Acute pancreatitis remains one of the most significant problems in modern gastroenterology and surgical practice, particularly due to its severe forms, which are associated with high mortality and disability rates. Necrotizing forms of the disease, especially when infected, present a complex clinical course and are often complicated by peripancreatic fluid collections and abscess formation.

A peripancreatic abscess is an infected fluid collection in pancreatic or peripancreatic tissues, typically forming 3–4 weeks after disease onset. This condition may lead to sepsis, endotoxemia, and multiple organ failure. Therefore, timely diagnosis and selection of optimal treatment strategy are of critical clinical importance.

Traditionally, open surgical methods were the mainstay of treatment. However, due to their high invasiveness, surgical trauma, prolonged recovery, and high complication rates, their use has become increasingly limited. In recent years, advancements in surgical technologies have led to the widespread adoption of minimally invasive approaches, including percutaneous drainage, endoscopic drainage, and video-assisted retroperitoneal debridement (VARD).

The introduction of the “step-up” strategy has significantly changed treatment tactics. This approach involves starting with less invasive interventions and escalating step-by-step only when necessary. It reduces physiological stress, improves sepsis control, and enhances overall outcomes.

However, selecting the optimal treatment strategy remains controversial. Factors such as abscess size, location, extent of necrosis, and the patient's general condition play a decisive role.

The aim of this study is to analyze the evolution of treatment methods for peripancreatic abscesses, evaluate the effectiveness of modern minimally invasive technologies and the step-up approach, and determine optimal strategies for clinical practice.

Materials and Methods

This study is based on a systematic review of scientific literature published over the past 10–15 years, focusing on the effectiveness of treatment methods for peripancreatic abscesses. International and local sources were included, such as clinical studies, meta-analyses, and randomized controlled trials.

The analysis focused on key treatment approaches, including traditional open surgery, the step-up strategy, and minimally invasive techniques such as percutaneous drainage, endoscopic drainage, and VARD.

Each method was evaluated based on the following clinical criteria:

- Mortality rate
- Frequency and severity of complications
- Need for reintervention
- Length of hospital stay

Comparative analysis was used to summarize the data and evaluate differences in clinical outcomes.

Results

The analysis revealed significant differences in clinical effectiveness and safety among treatment approaches.

Traditional open surgical methods, despite their radical nature, were associated with a high mortality rate of 20–40%. They are also characterized by significant surgical trauma, blood loss, and a high risk of postoperative sepsis. Therefore, open surgery is currently reserved mainly for severe and complicated cases.

The step-up approach showed more favorable outcomes, reducing mortality to 10–20%. This strategy allows for individualized treatment and prevented the need for open surgery in approximately 50% of cases.

Among minimally invasive techniques:

- **Percutaneous drainage** proved effective as an initial treatment and was sufficient as a standalone method in 30–50% of patients, enabling rapid control of sepsis.
- **Endoscopic drainage** demonstrated low complication rates and advantages due to internal drainage, preventing external fistula formation and reducing hospital stay.
- **Video-assisted retroperitoneal debridement (VARD)** was less traumatic than open surgery and allowed effective removal of necrotic tissue under visual control, especially when percutaneous drainage was insufficient.

Overall, the results confirm the superiority of minimally invasive approaches and support their use as the primary treatment strategy.

Table 1. Comparative Effectiveness of Treatment Approaches for Peripancreatic Abscesses

Parameter	Open Surgery	Step-up Approach	Percutaneous Drainage	Endoscopic Drainage	VARD
Invasiveness	High	Moderate	Low	Low	Moderate
Mortality Rate	20–40%	10–20%	5–15%	5–10%	10–20%
Complication Rate	High	Moderate	Low	Low	Moderate
Risk of Sepsis	High	Moderate	Low	Low	Moderate
Need for Reintervention	Low	Moderate	Moderate	Low	Moderate
Hospital Stay Duration	Long	Medium	Short	Short	Medium
Recovery Time	Prolonged	Moderate	Fast	Fast	Moderate
Main Advantages	Radical removal of necrosis	Stepwise, individualized treatment	Minimally invasive, rapid sepsis control	No external fistula, internal drainage	Effective necrosis removal with minimal trauma
Main Limitations	High trauma, high mortality	Requires monitoring and staging	May be insufficient alone	Limited availability, technical demand	Requires surgical expertise

Discussion. The evolution of treatment approaches is primarily aimed at reducing invasiveness and improving patient safety.

Open surgery remains important in severe cases but is no longer the first-line option. The step-up strategy is considered the most optimal approach, emphasizing initiation with minimally invasive methods.

Minimally invasive techniques are particularly effective in:

- Localized abscesses
- Hemodynamically stable patients
- Limited necrosis

A practical treatment algorithm includes:

1. CT diagnostics
2. Percutaneous drainage
3. Monitoring for 48–72 hours
4. If ineffective → endoscopic drainage or VARD
5. Final step → open surgery

Conclusion. Significant progress has been made in the treatment of peripancreatic abscesses following acute pancreatitis. The transition from open surgery to minimally invasive approaches has substantially improved clinical outcomes.

Although open necrosectomy remains effective, its high invasiveness, mortality, and complication rates limit its use as a primary treatment method. It is now reserved for severe and resistant cases.

The step-up approach is recognized as the cornerstone of modern treatment. By prioritizing minimally invasive interventions, it reduces the need for open surgery, decreases surgical stress, and accelerates recovery.

Minimally invasive technologies—percutaneous drainage, endoscopic drainage, and VARD—demonstrate high clinical effectiveness in controlling sepsis, reducing abscess size, and stabilizing patient condition. Percutaneous drainage, in particular, often serves as a primary and sufficient treatment method.

Individualized treatment planning remains essential, taking into account abscess localization, extent of necrosis, severity of infection, and overall patient condition.

The key principles of modern management include:

- Starting with minimally invasive methods
- Dynamic monitoring and stepwise decision-making
- Transition to aggressive surgery only when necessary

Thus, the main advantage of modern approaches lies in reducing invasiveness, lowering mortality and complications, improving quality of life, and enhancing treatment outcomes.

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