

A Step-up Approach in Acute Pancreatitis – a Review

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ABSTRACT

Acute pancreatitis remains one of the leading causes for hospitalization in the United States. Although most cases are mild and require no surgical treatment, severe acute pancreatitis is still a life-threatening condition requiring active approach in treatment. Until the 80s, the treatment of necrotizing pancreatitis was limited and consisted of ostomies and sump drains and subtotal pancreatectomies. Since then, a variety of methods have been introduced, and today minimally invasive techniques are used. With the introduction of a step-up approach, further improvements in treatment of severe acute pancreatitis have been done with a reduction in mortality rate.

INTRODUCTION

Acute pancreatitis is one of the leading causes for hospitalization due to gastrointestinal disorders (1). The incidence of acute pancreatitis continues to rise in the Western countries and reaches 14/100 000 people per year (2–4). Although most cases are mild and self-limiting, mortality rate of severe acute pancreatitis remains high with more than 3,000 deaths per year in the United States (5).

Before the early 70s of the last century, there were no adequate studies to stratify the severity of acute pancreatitis. In 1974, Ranson et al. published criteria in assessing prognosis in early acute pancreatitis (6). The first widely accepted scoring system was Balthazar-Ranson CT scoring system, published in 1985. Balthazar et al. widened the scoring system by including proofs of necrosis due to application of intravenous contrast in 1990. Still today it is the most commonly used radiological scoring system (6).

The Atlanta classification of severity, published in 1992, made it possible to stratify hospitalized patients into two groups: mild acute pancreatitis and severe acute pancreatitis (6, 7). The Atlanta classification of severity was revised in 2012 and severity of pancreatitis was divided into mild acute pancreatitis, moderately severe acute pancreatitis, and severe acute pancreatitis. It is important to point out that radiological definitions of local complications associated with interstitial and necrotizing pancreatitis were included in the classification (6, 8). In the case of interstitial pancreatitis, peripancreatic fluid collections and pseudocysts can be found on radiological examination, while necrotizing pancreatitis can be radiologically defined as acute necrotic collection and walled-off necrosis (6, 8).

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Nowadays there are two opposite approaches to treating necrotizing pancreatitis. The first one prefers 'step-down' approach in which open necrosectomy is the first choice, followed by less invasive methods used for residual collections. The second one prefers 'step-up' approach, which relies initially on less invasive techniques (9).

TREATMENT OF NECROTIZING PANCREATITIS

Currently, the main indication for surgical treatment in severe acute pancreatitis is the infection of pancreatic or peripancreatic necrosis, especially when it is associated with organ failure (10). Conventional open necrosectomy has a high rate of postoperative complications and a high rate of postoperative diabetes. The earlier the surgery is performed during the development of acute pancreatitis, the poorer the results of surgical treatment (11–16).

In the 70s, surgical treatment of necrotizing pancreatitis consisted of ostomies and sump drains and subtotal pancreatectomies with drainage. However, in the 80s, debridement of necrosis with variety of techniques was widely performed (6). Later, in the first years of 21st century, a minimally invasive retroperitoneal necrosectomy came in use (6, 17).

Radiological drainage of infected pseudocyst and necrosis has undergone improvement so that, in a certain percentage, the collections can be adequately percutaneously drained without the need for surgical intervention (6).

Endoscopic drainage of walled-off necrosis (so-called since 2012) was reported in 1996, suggesting that endoscopic therapy may be a viable management option. Eleven patients were included in the study; nine of them did not need a surgical intervention afterward (18).

In 2006 the Dutch research group presented the randomized controlled multicentre trial where minimally invasive step-up approach was compared to maximal necrosectomy in patients with acute necrotizing pan-

creatitis (PANTER trial) (19). The results were published in 2010 in the *New England Journal of Medicine* (20).

The key in step-up approach is not the removal of all necrotic tissue but rather the control of septic focus (20).

THE PANTER TRIAL

In an article published in the *New England Journal of Medicine*, two approaches in dealing with necrotizing pancreatitis were compared – the step-up approach and, the traditional, open necrosectomy. In the study, 88 patients with necrotizing pancreatitis were randomly assigned to receive either an open necrosectomy or the minimally invasive step-up approach. The step-up approach consisted of percutaneous drainage, followed by a minimally invasive retroperitoneal necrosectomy (video-assisted retroperitoneal debridement) if necessary. Major complications (such as new onset multiple organ failure or multiple systemic complications, perforation of a visceral organ, enterocutaneous fistula, bleeding) or death were observed as primary endpoint. In the group of patients that received open necrosectomy, major morbidity or death was observed in 69% (31/45) of patients as opposed to the group receiving a step-up approach where major morbidity or death was seen in 40% (17/43) of cases. In the latter group, 35% of patients were treated with percutaneous drainage only. The step-up approach group also had less incisional hernias and new-onset diabetes. The study concluded that the new step-up approach had better outcome than open necrosectomy in patients with necrotizing pancreatitis (20).

HOSPITAL DEL MAR GROUP

In an article by Hospital Del Mar group published in *International Journal of Surgery*, two management options for patients with severe acute pancreatitis were compared. In a cohort retrospective study, two groups of patients were observed. Group A consisted of patients treated up to June 2010. Patients were managed primarily with surgery. Group B consisted of patients treated since July 2010. These patients were

primarily managed with minimally invasive methods. In the group A, 19 out of 83 patients had at least one laparotomy, and five were managed with minimally invasive methods. In the group B, 17 out of 81 patients were treated with minimally invasive methods, and three patients had a laparotomy. While there were no differences between the two groups in the time spent in intensive care unit and hospital time in general, there was a significant difference in overall mortality and postoperative mortality (18.1% and 50% in group A versus 6.2% and 0% in group B, respectively). The group concluded that the step-up approach in combination with minimally invasive surgery is a feasible way of dealing with severe acute pancreatitis leading to a significant drop in mortality rate (21).

OUR EXPERIENCE

In our hospital, patients with acute pancreatitis are hospitalized at the Department of Internal Medicine, where further treatment is conducted according to the guidelines. Severe acute pancreatitis cases are hospitalized in the intensive care unit of this department. There, further intensive treatment is done using a step-up approach according to the guidelines if possible or not otherwise indicated.

CONCLUSION

Patients with severe acute pancreatitis should be treated in specialty centers by a multidisciplinary team providing minimally invasive techniques as part of the step-up approach. The benefits of the step-up approach regarding reduction of acute complications, but also late-onset complications such as diabetes, were proven in multiple studies. Accordingly, reduction of complication leads to cost reduction. Taking all of these facts into account, a minimally invasive step-up approach presents a preferred treatment strategy.

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