

## Review Article

# Progress in Nutritional Support for Acute Pancreatitis

Yanan Zhao; Mingyue Yang; Chunchun Yang\*

First Hospital of Hebei Medical University, Shijiazhuang, Hebei, 050000, China

\*Corresponding author: Chunchun Yang

First Hospital of Hebei Medical University, Shijiazhuang, Hebei, 050000, China.

Email: 1835605952@qq.com

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**Abstract**

Acute Pancreatitis (AP) refers to an inflammatory reaction disease in which pancreatic enzymes are activated due to a variety of causes, leading to pancreatic tissue self digestion, edema, bleeding and even necrosis, with or without functional damage to other organs. In addition to conventional treatment, nutritional support treatment plays a very important role in the treatment of acute pancreatitis. However, the previous theory of "pancreatic rest" has been gradually questioned and challenged. At present, there is no clear guidance on the time and type of eating in acute pancreatitis. This article reviews the current nutritional treatment schemes for acute pancreatitis at home and abroad, with a view to providing more reference for clinical treatment.

**Keywords:** Acute pancreatitis; Enteral nutrition; Eating time; Eating type

**Introduction**

Common causes of acute pancreatitis include cholelithiasis, alcohol consumption, hyperlipidemia, pancreatic tumors, drugs and toxins, autoimmune factors, or iatrogenic factors, such as Endoscopic Retrograde Cholangio Pancreatography (ERCP), small bowel surgery, surgical procedures, etc. It can cause symptoms such as abdominal pain, bloating, fever, nausea and vomiting in patients, seriously affecting their emotions, physiology, economy, and other aspects. It can be divided into three types: mild, moderate, and severe. Acute severe pancreatitis accounts for about 15% to 30% of patients. The condition is critical and prone to serious complications such as organ failure, local necrosis, abscess, and pseudocyst, with a mortality rate of up to 45%. About clinical treatment, in addition to conventional treatment such as actively suppressing pancreatic enzyme secretion, fluid resuscitation, acid suppression, and rational use of antibiotics, patients also need to be given pain relief, defecation Nutritional support and other treatments are used to improve symptoms such as abdominal pain and bloating, in order to alleviate symptoms, accelerate exhaust and defecation, and shorten hospital stay. Especially for acute severe pancreatitis, if early and reasonable enteral nutrition is not provided, it will exacerbate the inflammatory response and affect the patient's prognosis.

Endotoxins and bacteria in the body of patients with severe acute pancreatitis can directly participate in blood circulation, leading to endotoxemia and intestinal infections. Under the ac-

tion of various inflammatory factors, a waterfall like cascade reaction is formed, leading to systemic inflammatory response syndrome and ultimately organ failure syndrome. At this time, the patient's body is in a high metabolic state, with accelerated protein breakdown and fat mobilization, promoting gluconeogenesis, causes the patient's malnutrition to worsen. Nutritional support not only provides nutrition, but more importantly, enables cells to obtain the necessary nutrient substrates for metabolism, thereby improving the structure and function of tissues and organs, reducing cell apoptosis, preventing organ failure, and achieving the goal of effectively improving patient prognosis. Therefore, systemic nutritional support therapy is very important [1].

**Enteral Nutrition and Parenteral Nutrition**

Nutritional support includes parenteral nutrition and enteral nutrition. During parenteral nutrition, the patient is in a state of fasting water, which reduces gastric acid, trypsin, Gastrin and other secretions, helps maintain the normal level of urinary amylase, and enables the pancreas to rest. However, as research shows [2-3], complete parenteral nutrition is prone to cause a series of problems such as intestinal failure, bacterial translocation, and decreased immunity. In recent years, there has been increasing questioning of the "pancreatic rest" theory in clinical practice both domestically and internationally. Multiple studies have shown that early enteral nutrition can maintain the physi-

ological function of the patient's intestine, improve the barrier function of the intestinal mucosa, and enhance the ability to clear bacteria from the pancreas and Mesenteric Lymph Nodes (MLN); It can also protect and maintain the integrity of intestinal epidermal cells, ensuring that immune cells can function normally and stably [4-6]. The 2019 World Association of Emergency Surgeons Consensus on the Diagnosis and Treatment of Severe Acute Pancreatitis states that complete parenteral nutrition should be avoided. If the enteral pathway is not fully tolerated, partial parenteral nutrition should be considered to meet calorie and protein requirements. Compared with parenteral nutrition, enteral nutrition has many advantages such as affordability, non-invasive, more physiological, and fewer complications. Therefore, most scholars currently tend to advocate early enteral nutrition support therapy.

### Ways of Enteral Nutrition

The methods of enteral nutrition include through nasogastric tubes, nasogastric tubes, and oral feeding. In order to prevent the stimulation of pancreatic secretion by enteral nutrition, most physicians basing on previous experience advocate the use of nasal jejunal tubes for enteral nutrition. However, the placement of the nasal jejunal tube requires the involvement of endoscopists and radiologists, which may limit the early implementation of enteral nutrition. Therefore, in clinical practice, nasogastric tubes may be more convenient and relatively cheaper. There have also been studies indicating that there is no significant difference in the mortality rate, aspiration rate, diarrhea rate, and pain exacerbation rate between nasogastric and nasojejunointestinal tubes for enteral nutrition. Nasal tube feeding may pose risks such as patient intolerance, aspiration pneumonia, reflux esophagitis, gastrointestinal ischemia, and peptic ulcers. Therefore, multiple scholars currently recommend that patients with acute pancreatitis eat orally as much as possible. Even in severe acute pancreatitis, the pancreatic acinar secretion function in the patient's body is significantly inhibited and does not respond to physical stimuli. Oral feeding is also safe in clinical treatment; Meanwhile, the intestinal hormones secreted under the induction of oral feeding can directly act on the pancreas, effectively suppressing the inflammatory response and having a protective effect on the pancreas. Therefore, oral feeding methods have a protective effect on the pancreas [8,9]. There is currently limited research on early oral feeding in patients with pancreatitis, and further research is needed to confirm whether it is equally applicable in patients with severe pancreatitis.

### Time for Enteral Nutrition

Regarding the timing of eating, traditionally, patients with acute pancreatitis only begin eating when abdominal pain is significantly relieved, amylase is normal, and there is no significant leakage of the pancreas on CT. However, the European Society for Extracorporeal and Enteral Nutrition stipulates that patients with mild acute pancreatitis should eat orally as early as possible, as early enteral nutrition helps maintain intestinal function and prevent bacterial translocation from causing secondary pancreatic infections. Therefore, early recovery of oral feeding is crucial. There are also literature points out that [10], in cases where patients can tolerate it, it is recommended to eat orally early within 24 hours. Some studies have even confirmed that it is safe to start eating immediately when mild pancreatitis occurs. Studies have shown that early enteral nutrition, especially starting to eat within 72 hours of onset, can provide glutamine to the intestinal mucosa and pancreatic acinar cells, prevent

intestinal mucosal atrophy, protect intestinal barrier function, and thereby reduce the complications and mortality rate of severe pancreatitis patients. Therefore, foreign scholars suggest that for patients with moderate or severe acute pancreatitis, enteral nutrition should be provided within 72 hours. If there is no intestinal obstruction, it is recommended to provide enteral nutrition within 48 hours after sufficient fluid resuscitation. The 2019 Chinese Guidelines for the Diagnosis and Treatment of Acute Pancreatitis also pointed out that the timing of enteral nutrition for patients with severe pancreatitis depends on the severity of the condition and the recovery of the gastrointestinal tract. As long as the patient's gastrointestinal motility is tolerable, it is recommended to implement enteral nutrition as soon as possible (admission 24-72 hours). Further experimental research is needed to provide guidance for clinical work.

### Types of Enteral Nutrition

There is limited research on the types of enteral nutrition, and for patients with hyperlipidemia, the supplementation of fatty substances should be reduced. When performing enteral nutrition, attention should be paid to observing whether the patient's symptoms and signs such as abdominal pain, intestinal paralysis, and abdominal tenderness have worsened, and regular blood routine checks, liver and kidney function, electrolytes, blood lipids, blood sugar, and other indicators should be reviewed to evaluate the metabolic status of the body and adjust the dosage and dosage form of enteral nutrition. It is generally recommended that patients take liquid food such as millet porridge at an early stage and gradually switch to solid food. There are also studies that suggest that consuming low-fat soft foods for the first time is safe and reduces hospital stay [13]. Scholars have recommended that patients should be given oral nutrient formulations with peptides as the main nitrogen source in the early stages. After the patient's intestinal related functions have been improved to a certain extent, they should be given a comprehensive and easily absorbed, less stimulating mixed nutrient formulation rich in glucose, fat, amino acids, or small molecule peptides, vitamins, minerals, and other nutrients. There is not enough evidence to show the specific differences in digestion between the components of enteral nutrition preparations, but considering the viscosity and osmotic pressure, enteral nutrition is recommended to provide digestible nutrients, semi digestible nutrients and component nutrients. For patients with severe acute pancreatitis, it is recommended to use a standard polymer formula as an enteral nutrition prescription [14].

### Conclusion

This article provides a review of nutritional support methods, enteral nutrition pathways, food intake time, and food intake types for acute pancreatitis. In summary, regarding the nutritional support treatment plan for acute pancreatitis, most scholars recommend early enteral nutrition when the patient's body conditions permit, and advocate oral feeding to reduce the risk of other complications such as infectious peripancreatic necrosis and systemic inflammatory response syndrome. Of course, more large-scale experimental studies are needed to provide clinical diagnosis and treatment ideas.

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