

Nutritional Treatment of Acute Pancreatitis in Pediatric Patients

Vardakastani Dionysia*

Clinical Dietetics and Nutrition (MSc), Greece

***Corresponding Author:** Vardakastani Dionysia, Clinical Dietetics and Nutrition (MSc), Greece.

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Abstract

Acute pancreatitis occurs in a high frequency in pediatric patients, but no nutritional components have yet been identified for the treatment of the disease, so the same treatment line as adult treatment is followed. The aim of the review is to evaluate the nutritional support of pediatric patients with acute pancreatitis immediately after hospitalization and diagnosis of the disease. Research material from the Pubmed database was searched. Year of publication and type of surveys were limitations. The results showed that early hydration and nutritional support within 24 hours lead to a lower risk of disease progression. It was observed that early onset of enteral feeding, in contrast to total parenteral feeding, reduced the risk of pancreatic necrosis and the incidence of systemic inflammatory response and multi-organic failure. In addition, the need for surgery was lower in patients who received early enteral feeding, while at the same time they had a shorter stay in the hospital and lower mortality rates. In conclusion, the pediatric patient's tolerance to the nutritional treatment, but also the withdrawal of symptoms, should be taken into account. However, prospective clinical studies are needed to thoroughly formulate dietary recommendations for acute pancreatitis in pediatric patients.

Keywords: *Acute Pancreatitis; Pediatric; Enteral; Parenteral; Nutrition Treatment*

Introduction

The incidence of acute pancreatitis in children are increasing steadily in recent years. It is inflammation of the pancreas tissues, which may cause the presence of edema, cellular apoptosis and bleeding. However, it is a reversible condition, in contrast to chronic pancreatitis, where it causes permanent changes in anatomy and can lead to exocrine or endocrine pancreatic dysfunction [1]. The onset of the disease at this age, may be due to biliary damage, neoplasms, infections, drugs, trauma, anatomical abnormality or it may also be hereditary [2]. Both the pathogenesis and treatment of the disease, did not significantly differ between adults and children, which is why most of the recommendations in pediatric diagnosis and clinical management of acute pancreatitis, derived from studies with recommendations for adults. Diagnosis according to Atlanta criteria is based on a combination of clinical symptoms such as abdominal pain, nausea, vomiting, ascites, pleural effusion, fever, jaundice, back pain, and laboratory tests of pancreatic enzymes in serum amylase and lipase, (serum trypsinogen, appears to have higher sensitivity than amylase) whose levels are increased ≥ 3 times the upper limit of normal. Moreover, radiographic imaging is required to confirm the disease by ultrasound or computed tomography. Ultrasounds are preferred as the primary imaging tool for children [1,3]. Patients with severe acute pancreatitis present a hypermetabolic condition. In addition to increased energy needs, they also have high protein needs due to protein catabolism as the body's response to inflammation, where energy production from exogenous glucose is suppressed, and gluconeogenesis increases. There are no published studies on the optimal timing of nutritional intervention and how to feed pediatric pancreatitis. However, the data for adults are convincing that the sooner the feeding starts, the less is the risk of disease progression [4]. In this review, the aim is to record and evaluate the nutritional support in pediatric patients with acute pancreatitis, immediately after hospitalization and diagnosis of the disease.

Method

Material from the PubMed database was searched on acute pancreatitis in children. The restrictions related to the publication year: 2005 - 2017 and the type of study: randomized clinical trials and meta-analyzes. From the above articles were chosen those that were

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considered to approach the study topic in the best possible way, including the reports. Exclusion criteria were those that did not show statistically significant results. The validity of the investigations was assessed using the following criteria if randomization was under protocol conditions, if the experimental procedure was blind and the study was intended to treat patients. At the same time, it was examined whether the results of the intervention were extensively described and whether a change in the clinical indices of the population was confirmed.

Results and Discussion

The initial treatment for acute pancreatitis is the early replenishment of fluids and electrolytes (prevention of complications such as hyperglycaemia, hyponatraemia). Early hydration can help prevent hypovolemia, enhance blood flow to the pancreas, and thus reduce the risk of pancreas necrosis [5]. Early aggressive hydration has been associated with a reduction in the incidence of systemic inflammatory response and multiorgan failure. In the first line of treatment, until now, oral food suspension is also considered to prevent pancreatic stimulation, but this theory is not well documented. On the contrary, emphasis has been placed in early enteral feeding [5]. Enteral feeding, according to two recent meta-analyses, which included randomized controlled clinical trials, was shown to be preferred to total parenteral in patients with acute pancreatitis. This is due to the statistically significant, less frequent occurrence of complications, multi-organ insufficiency and the need for surgical intervention [6,7]. Even if it is difficult to place the catheter in pediatric patients, it is superior to total parenteral nutrition as it has a lower incidence of infections, resulting in lower hospitalization and lower mortality rates [4].

Besides choosing how to feed the patient, the time of feeding starts to play a special role. According to the results of a randomized clinical trial, the enteral feeding should be administered within 24 hours of admission to the hospital, as it provides better control of glucose as opposed to parenteral feeding where adverse hyperglycemia has been observed [8]. Furthermore, early start of enteral feeding has been associated with shorter duration of hospitalization, pancreatic death and mortality [9]. In severe pancreatitis with probability of starvation, due to inability to eat, early enteral feeding may be delayed, but even in small amounts, it prevents intestinal mucosal atrophy and maintains the normal intestinal bacterial flora, limiting the movement of bacteria into the portal and systemic circulation and subsequent sepsis. Continuous feeding of 1 cc/kg/hour (25 cc/kg/day) (1cc = 0.67 kcal) is recommended via a catheter. From the fifth day there should be daily increases in the volume of 1 cc/kg/hour (25 cc/kg/day) to reach 150 kcal/kg/day until the second week of enteral feeding [4]. Total parenteral nutrition is generally not recommended unless the patient experiences anxiety in the enteral feeding, manifested by vomiting and abdominal distension [1,10].

There are no particular differences between diet with polymers and elemental diets, diets with or without probiotics and diets with or without immunomodulators [5]. However, in a randomized, blind, clinical trial, it appeared that administration of *Lactobacillus plantarum* via enteral feeding managed to reduce c-reactive serum protein, intestinal permeability and septic complications, as compared to parenteral feeding [11]. The findings of the study are also confirmed by the prospective study of Karakan., *et al.* in which early supplementation of prebiotic fibers through a nasojejunal catheter was given, in patients with severe acute pancreatitis who had to discontinue the oral diet for 48 hours. It also appeared to improve hospital stay, duration of nutritional therapy, acute phase response and disease complications as compared to the standard enteral feeding treatment without prebiotics [12].

However, a specific elemental free amino acid, or semi-elemental formula with hydrolyzed protein, glucose and medium chain triglycerides (40:60) should be used in infants. It is necessary to combine enteral and parenteral feeding for the first seven days. According to baby/child tolerance, parenteral nutrition should be withdrawn after the first week. From the second week onwards, depending on the tolerance and progression, the feed tube can be removed and the ingestion of the food can be promoted orally. Branched chain amino acids (glutamine, arginine) are preferred as they have beneficial effects on the immune system, while inhibit intestinal mucosal atrophy [4]. In the prospective clinical trial of Fuentes-Orozco., *et al.* in which parenteral alanine and glutamine supplementation was administered to patients with severe acute pancreatitis, it appeared to have increased statistically significantly the levels of serum IL-10, serum lymphocyte and serum albumin. At the same time the nitrogen balance improved and the morbidity rate was lower in the intervention group compared to the control group [13].

In general, oral nutrition should be preferred. If the clinical assessment does not allow it, it should be administered via a catheter. The nasojejunal catheter is preferred for minimal secretion of pancreatic enzymes. According to a recent meta-analysis, including three controlled randomized clinical trials, the use of a nasogastric catheter is as effective as the nasojejunal catheter [14]. On the other hand, exact placement of the catheter requires an introspection process and can cause serious risks for the child. In this situation, the increase in food intake should be slower. There are no precise recommendations for the initial volume of diet and its progression, in any case it should be administered according to diet tolerance and the appearance of symptoms [15]. Pancreatic serum enzymes as well as abdominal pain should be considered in order to decide when to start oral feeding. If serum levels of pancreatic enzymes decrease, abdominal pain has subsided and the overall condition is good, then fluid intake may start [2]. However, it has been shown that in patients with mild acute pancreatitis, starting a meal with a soft diet rather than a clear liquid is a better solution as it requires a shorter duration of hospitalization and refeeding [16]. Otherwise, where serum amylase and serum lipase levels are slightly less than twice above the upper limit of normal, a fat-restricted diet should be started. Energy and fat intake can be increased gradually with careful monitoring [2].

Study constraints were the small sample size, the percentage of children belonging to different age groups, the severity of the disease, the diagnostic criteria for inclusion and the classification by etiology. However, blind randomization was not performed in all studies due to the nature of the interventions, which eventually increased partiality. More clinical studies are required to better document the aspects associated with acute pancreatitis in children and it is also necessary to formulate recommendations for the nutritional treatment of patients with acute pancreatitis in this age group.

Conclusion

Early diagnosis and appropriate treatment of acute pancreatitis can help prevent the complications associated with the disease. However due to the lack of guidelines for pediatric patients, its management is based on research data of adults, which support the use of intravenous fluids, early enteral nutrition versus parenteral, and management of symptoms. Thus, the reduction of disease progression and the occurrence of complications is achieved.

Conflict of Interest

There is no financial interest or any conflict of interest.

Bibliography

1. Bai HX., *et al.* "What have we learned about acute pancreatitis in children?" *Journal of Pediatric Gastroenterology and Nutrition* 52.3 (2011): 262-270.
2. Suzuki Sai and Shimizu. "Acute pancreatitis in children and adolescents". *World Journal of Gastrointestinal Pathophysiology* 5.4 (2014): 416-426.
3. Abu-El-Haija M., *et al.* "An Update to the Management of Pediatric Acute Pancreatitis". *Journal of Pediatric Gastroenterology and Nutrition* 58.6 (2014): 689-693.
4. Ger R. "Pancreatitis in children". *Critical Care Nurse* 34.4 (2014): 43-53.
5. Meyer A., *et al.* "Contrasts and comparisons between childhood and adult onset acute pancreatitis". *Pancreatology* 13.4 (2013): 429-435.
6. Quan H., *et al.* "A meta-analysis of enteral nutrition and total parenteral nutrition in patients with acute pancreatitis". *Gastroenterology Research and Practice* (2011): 698248.

7. Yi F, *et al.* "Meta-analysis: total parenteral nutrition versus total enteral nutrition in predicted severe acute pancreatitis". *Internal Medicine* 51.6 (2012): 523-530.
8. Gunilla Eckerwall, *et al.* "Early Nasogastric Feeding in Predicted Severe Acute Pancreatitis". *Annals of Surgery* 244.6 (2006): 959-967.
9. Hegazi Ra and DeWitt T. "Enteral nutrition and immune modulation of acute pancreatitis". *World Journal of Gastroenterology* 20.43 (2014): 16101-16105.
10. Mekitarian FE, *et al.* "Acute pancreatitis in pediatrics: A systematic review of the literature". *Jornal de Pediatria* 88.2 (2012): 101-114.
11. Qin HL, *et al.* "Effect of Lactobacillus plantarum enteral feeding on the gut permeability and septic complications in the patients with acute pancreatitis". *European Journal of Clinical Nutrition* 62.7 (2008): 923-930.
12. Karakan T, *et al.* "Comparison of early enteral nutrition in severe acute pancreatitis with prebiotic fiber supplementation versus standard enteral solution". *World Journal of Gastroenterology* 13.19 (2007): 2733-2737.
13. Fuentes-orozco C, *et al.* "L-alanyl-L-glutamine-supplemented parenteral nutrition decreases infectious morbidity rate in patients with severe acute pancreatitis". *Journal of Parenteral and Enteral Nutrition* 32.4 (2008): 403-411.
14. Chang Y, *et al.* "Nasogastric or nasojejunal feeding in predicted severe acute pancreatitis: a meta-analysis". *Critical Care* 17.3 (2013): R118.
15. Piciocchi M, *et al.* "Nasogastric or nasointestinal feeding in severe acute pancreatitis". *World Journal of Gastroenterology* 16.29 (2010): 3692-3696.
16. Rajkumar N, *et al.* "Clear Liquid Diet vs Soft Diet as the Initial Meal in Patients With Mild Acute Pancreatitis: A Randomized Interventional Trial". *Nutrition in Clinical Practice* 28.3 (2013): 365-370.

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