Nutrition Management on Acute Pancreatitis

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ABSTRACT

Pancreatitis is an inflammatory process in pancreas. Clinical manifestation of acute pancreatitis can be mild to severe. Mortality rate is high in severe acute pancreatitis. Etiology of acute pancreatitis generally remains obscured. Supportive management is important in acute pancreatitis. Nutrition is important part in acute pancreatitis. Patient should not be given enteral nutrition temporarily and meanwhile parenteral nutrition must provide sufficient amount of calories and nutritional requirements. Immune nutrition should also be considered. In mild acute pancreatitis, oral realimentation can be started in 3rd -7th day. In severe acute pancreatitis with prolonged fasting, gradual enteral nutrition via nasoenteral tube is recommended

***Keywords**: nutrition, acute pancreatitis, enteral nutrition*

INTRODUCTION

Pancreatitis is an inflammatory process in pancreas. Pancreatitis can be classified as acute pancreatitis and chronic pancreatitis.[1] Acute pancreatitis is one of gastrointestinal emergencies.[2] In the United States there are 185,000 annual incidence of acute pancreatitis. Common etiologic factors of acute pancreatitis in United States are idiopathic, alcoholism, and gallstones. In Asia, most common factor is Ascaris lumbricoides (10-20%).[2,3,4] Most of acute pancreatitis occured in young adult, more likely due to alcoholism.[3]

Acute pancreatitis can be mild to severe. Complication in severe pancreatitis is common. Multi organ dysfunction leading to death is not rare in severe acute pancreatitis. Mortality rate in mild acute pancreatitis is 10%, and in severe acute pancreatitis the mortality rate increased to 80%.[2]

Assessment of severity acute pancreatitis should be done as the patient hospitalized, as the management is different in severe and in mild pancreatitis. Acute pancreatitis management mostly are supportive care. Management patient with severe acute pancreatitis, should be in intensive care unit. Supportive medical management were fluid and nutritional balance, pain relief and complication management. Adequate nutritional management can prevent complication of acute pancreatitis.[1-6]

PATOPHYSIOLOGY

Pancreas is retroperitoneal organ, locates behind great curve between stomach and duodenum. Pancreas is exocrine and endocrine organs, which endocrine cells produce hormone (insulin, glucagons, somatostatin, pancreatic polypeptide). Asinus cells produce enzyme, secreted through pancreatic duct, and in sphincter of Oddi at duodenum.[1,4,7]

Pancreatic enzyme were amylolysis, lipolysis, and proteolysis. These enzymes were produce in inactive form (preenzyme). Autodigestive process is prevented in normal condition by two reasons, first these preenzyme were inactive and second, there are protease inhibitor.[7] Secretion is regulated by nerve system (parasymphatic, vagal nerve) and hormone system (secretin, cholestocine).[1,4,7]

ACUTE PANCREATITIS

Acute pancreatitis is a clinical syndrome includes acute abdominal pain with elevated enzyme serum; caused by necroinflammation response in pancreas.[4] Acute pancreatitis can be mild to severe (necrotizing pancreatitis). Three or more from Ran-

son's Criteria, or 8 or more in APACHE scoring system can be classified as severe pancreatitis, this scoring system is useful in classification of acute pancreas and making prognosis. Assessment severity by Ranson or APACHE scoring should be done as soon as the patient hospitalized. Medical management in mild pancreatitis is different from severe pancreatitis. There are also there are differences in nutritional therapy.[1,3,6,8]

MANAGEMENT

Most of mild acute pancreatitis (85%-90%) will have spontaneous remission within 3-7 days. Since etiology acute pancreatitis is idiopathic, therefore supportive care is most important in patient's management. One of the supportive cares is nutritional management. It is rather complicated since oral nutrition can provocate autodigestive in acute pancreatitis.[4-7]

Nutrition management on mild acute pancreatitis

Oral nutrition can stimulate abdominal pain in acute pancreatitis, because secretion of pancreatic enzymes and these active enzymes can be an autodigestive process in pancreas. On the other hand, there are complications of parenteral nutrition, intestinal atrophy, malnutrition, catheter related sepsis. Nutrition management in mild acute pancreatitis is different from moderate severe acute pancreatitis. In severe acute pancreatitis, there are more complications than mild pancreatitis. Prolonged fasting is generally needed in severe acute pancreatitis.

There is increasing basal metabolism in acute pancreatitis. This condition can lead to negative nitrogen balance. Other metabolic conditions in acute pancreatitis are hyperglycemia, and hypocalcemia. Goal in nutrition management in acute pancreatitis is to fulfil energy requirement, with minimum negative balance, and minimize metabolic disorder.[6]

Oral nutrition in acute pancreatitis is contra indicated, considering the autodigestive process. Route of nutrition can be given enteral or parenteral route. Parenteral nutrition can increase the risk of catheter related sepsis, and bacterial translocation. Parenteral nutrition is indicated in severe pancreatitis and mild pancreatitis with ileus.[5] Total parenteral nutrition is indicated for severe pancreatitis, and mild pancreatitis with ileus. In mild acute pancreatitis oral nutrition can be given, if the abdominal pain not worsening while nutrition given orally.[7] Oral nutrition can be started in 3rd -5th day hospitalization. Parenteral nutrition is not related with elevated enzyme. Parenteral lipid infusion can be given with special precaution since it can worsen hypertrygliceridemia and pancreatitis.

Fasting in nutrition management is to prevent elevated pancreatic enzymes; nutrition support should be given to maintain electrolyte balance, hydration status and to prevent complication. Alcohol and coffee is contraindicated. Nutrition should contain adequate calories and protein as well as electrolyte, vitamin and mineral. Mineral compositions are calcium 1,500 mg/day, magnesium 1,000 mg/day, zinc 50 mg/day, vitamin B complex 50 mg/hour, niacin 50 mg/day, pantotenic acid 100 mg/day, vitamin C 1,000 mg/day, and vitamin E 200- 800 iu/d.[9]

Nutrition is given in small portion and the portion is increased daily.[6] Liquid diet can be given intermittent every 2-3 hours, and started 50 ml, the amount can be increased daily. Oral nutrition is started in liquid form. As soon as the patient can tolerate better, liquid diet can be switched to more solid form. It is suggested that nutrition contain medium chain triglyceride.[9]

There are few considerations in acute pancreatitis nutrition. Nutrition should give adequate calories, protein, mineral, and vitamins. Nutrition should not stimulate autodigestive in pancreas. Medium chain triglyceride and long chain can prevent gut mucosal atrophy and prevent bacterial translocation from gut. Glutamine deficiency can be corrected by parenteral glutamine infusion. Total parenteral nutrition is not associated with shortening natural course of disease of acute pancreatitis.[10-13]

In general, management of mild pancreatitis patient is in the regular ward. There is no evidence that aggressive parenteral nutrition can shorten hospitalisation, and differ in mortality rate in mild acute pancreatitis.[14] Total parenteral nutrition is related with higher insulin requirement, higher catheter related infection, and higher cost.[15] Mc Clave et al studied group of patients with nasojejunal tube compare to total parenteral nutrition. There was no difference between these groups. Total parenteral nutrition is not recommended in mild acute pancreatitis, since oral nutrition can be started in 3-5 days.[8,10-13,16-19] Abdominal pain is related to triglyceride above 500 mg/dL, therefore nutrition should be given in low lipid diet. Patient who was given enteral nutrition should receive oral pancreatic enzyme until triglyceride serum level below 500 mg/dL.[20]

Nutrition management on severe acute pancreatitis

In severe acute pancreatitis, there is increasing basal metabolism rate. Catabolic process is followed by negative balance protein, and it is related with it's severerity.[3,4,20] Nutrition management in severe acute pancreatitis should be more aggressive than in mild pancreatitis. Since patient cannot be given oral nutrition in longer period, nutrition is given through parenteral route or enteral route. Enteral nutrition is recommended, although there is no significant difference in mortality and natural illness in acute

pancreatitis.[12,17,19] Recommendation is based on difference in complications of pancreatitis.[10,15,16] These complications are sepsis, catheter related sepsis, and peripancreatic abscess.[3,4,5]

Enteral nutrition is given with nasoenteral tube or jejunostomy. Nasoenteral tube is placed with fluoroscopy guided or by endoscopic procedure. Tube is placed within day 3-4 after hospitalization. As the patient tolerates enteral nutrition, nutrition can be increased slowly until fulfilled nutrition requirement, polymer enteral nutrition can be given.[19] If enteral nutrition cannot be tolerate by the patient, combination of enteral and parenteral nutrition is recommended.[20] Its composition is as same as with mild pancreatitis with consideration of lipid emulsion cannot be given in patients with hypertriglyceridemia.[19]

Kotani et al, showed in animal study that enteral nutrition can prevent bacterial translocation from gut.[11] Kalafarentzoz et al, in a randomised prospective study showed that less complication in nasojejunal nutrition than in parenteral group.[21] Assi et al, investigated patients who had fasted 48 hours since admission.[22] Nasoenteral tube was placed by endoscopic procedure and guided by fluoroscopy. Then, a 25 kcal/kg/day of total calories and 1.5 mg/kg/day total protein was given. Patient with mild pancreatitis were not undergone these procedure since oral nutrition is started on day 2 after hospitalisation, and patient were sent home after 4 days. He concluded that enteral nutrition should be recommended because of less complication and less cost compare to total parenteral group.[22]

Marik et al, in meta-analysis study, infections complication is higher in parenteral nutrition than in enteral group.[16] The assumption was parenteral nutrition were related with mucosal atrophy, and gut associated lymphoid tissue (GALT). All these would increase risk of bacterial translocation. Another assumption was parenteral nutrition is related to disability of T/B lymphocyte, changed chemotaxis, phagocytosis, and decreased of leukocyte ability in neutralizing bacteria or fungal. In abscess peripancreas, same bacteria were found more than in the gut.[16,10] Enteral nutrition is also recommended in chronic pancreatitis. Nutrition is given by jejunostomy, placed by endoscopic procedure or surgical. Olah et al recommend enteral nutrition with commercial enteral formula, 1 kkal/ml, protein 22.5 g/500ml, osmolarity 400 mosm/L. They concluded that enteral nutrition could prevent sepsis and complication.[13,18,19]

Immunonutrition in severe pancreatitis showed promising result. Arginin, glutamine, 2-3 PUFA (polyunsaturated fatty acid), N-3 PUFA contained in fish oil 3.3 g, 1.66 g EPA, 1.18 g DHA, and vitamin E were given. N-3 PUFA had anti atherogenic effect and lower cytokine proinflammatory, and triglyceride. Approximately 1.95 g linoleic acid containing N-3 PUFA gave better result compared to standard enteral nutrition.[23]

Glutamine is an amino acid which has many function and found in many organs, glutamine also activation in immune cells, enterocyte, and lymphocyte, anti oxidant effect.[7] Glutamine deficiency is related with bacterial translocation, thus, glutamine should be considered in acute pancreatitis. An animal study showed glutamine might prevent pancreatic asinus atrophy. Ockenga et al. found that glutamine in nutrition parenteral could shorten fasting phase, elevated protein serum level, and less infection complication.[24]

ESPEN recommendation in acute pancreatitis suggested that patient should fast in day 2-5. Oral nutrition can be started in day 3-7 with composition of high carbohydrate, medium protein, and low lipid. If well-tolerated, nutrition can be switch to normal nutrition. In severe pancreatitis, supportive nutrition should be more aggressive, given by enteral or parenteral, and should fulfil adequate calories. Nutrition recommendations are 25-35 kcal/kg/day calories, 1.2-1.5 g/kg protein, and 2 g/kg/day lipid. In paralytic ileus, immunonutrition should be given 10-30 ml/hour continuously to jejunum.[20]

CONCLUSIONS

Acute pancreatitis is an inflammatory in pancreas. Management of acute pancreatitis is mostly supportive management. Nutrition management is important part of supportive management. Nutritional management should be given appropriately according to severity of pancreatitis. Therefore, assessment of severity is highly recommended in management of acute pancreatitis.

Nutritional management should considered adequate amount of calories, protein, mineral, vitamins, appropriate route and timing of nutrition. In mild acute pancreatitis, patient fasted for 48 hours. Oral nutrition must be started in liquid and small portion. If patient could tolerate oral nutrition, liquid diet can be switched gradually to soft diet and finally to regular food.

In acute severe pancreatitis, oral nutrition is contra indicated. After two days of fasting condition, enteral nutrition is recommended. Non invasive procedure is more preferred. Nasojejunal tube is placed by endoscopic procedure. Jejunostomi is recommended only if the patient would undergo abdominal surgery. Nutrition composition is the same as in mild acute pancreatitis. Additional immunonutrition should also be considered.

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