

Nutritional Therapy in Chronic Pancreatitis

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KEYWORDS

- Pancreatic exocrine insufficiency • Fecal elastase • Vitamins • Proteins
- Nutritional markers • Anthropometry • Micronutrients
- Pancreatic enzyme replacement therapy

KEY POINTS

- Malnutrition is a frequent complication in patients with chronic pancreatitis that is associated with a high morbidity and increased mortality.
- Pancreatic exocrine insufficiency is the main cause of malnutrition in patients with chronic pancreatitis, supplemented by toxic habits (alcohol abuse), symptoms limiting food ingestion (abdominal pain), and complications (obstruction of the gastroduodenal tract).
- Patients with chronic pancreatitis must be screened for malnutrition and malnutrition-related complications with a nutritional evaluation that includes anthropometric parameters, biochemical markers, and imaging procedures.
- Pancreatic exocrine insufficiency may be diagnosed by pancreatic function tests and the evaluation of maldigestion-related symptoms (diarrhea, flatulence, abdominal distention and cramps, weight loss), nutritional status, and fecal elastase-1 concentration.
- Therapy for malnutrition in chronic pancreatitis includes a normal healthy diet with food fortification, and adequate pancreatic enzyme replacement therapy with nutritional supplements if needed.

INTRODUCTION

Chronic pancreatitis (CP) is a complex disease in which different factors, such as alcohol, smoking, autoimmune disorders, or obstruction of the main pancreatic duct, lead, in genetically predisposed patients, to acinar, ductal and islet cells damage, chronic inflammatory infiltration, and fibrosis. Although pain is the main symptom in

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most patients, malnutrition is a major issue in patients with CP. Exocrine and endocrine pancreatic insufficiency and local alterations (eg, pseudocyst, biliary and duodenal obstruction, splenic and portal vein thrombosis, pancreatic cancer) are complications that frequently develop along the natural history of the disease. As a consequence, the mortality of CP is increased as compared with the general population.^{1,2}

Alcohol is the single most common etiologic factor and accounts for 44% to 65% cases in the population.³ In addition, smoking is the most frequent risk factor of CP that is often associated with alcohol consumption. These toxic habits and the social and psychological factors frequently associated with them play a relevant role in the development of malnutrition in patients with CP. Pancreatic exocrine insufficiency (PEI) is the main pancreatic cause of malnutrition in these patients. Its appropriate diagnosis and therapy, together with an adequate nutritional support, play a major role in the treatment of CP.

This article aims to review the risk factors of malnutrition and the nutritional evaluation and nutritional support in patients with CP. In addition, the diagnosis and therapy for PEI as the major cause of malnutrition in these patients is also discussed.

Risk Factors for Malnutrition in Chronic Pancreatitis

Malnutrition is multifactorial in CP, and the degree of malnutrition ranges from over-nourished obesity to severe malnutrition. Malnutrition may be macronutrient in nature leading to weight loss, sarcopenia, and poor quality of life⁴ or micronutrient malnutrition, which causes osteopenia and osteoporosis,⁵ vitamin A deficiency night blindness,⁶ or other micronutrient deficiencies.^{7,8} More recently, malnutrition has been shown to be associated with increased mortality in CP.²

Patients with CP may require surgery. A retrospective review of 313 patients who underwent surgery for CP found a higher incidence of infectious and intra-abdominal complications after surgery in those with more significant malnutrition.⁹ In addition, pancreatic surgery may further impair digestive pancreatic function in patients with CP because of resection of the gland and anatomic changes of the gastrointestinal tract.¹⁰

Physical causes of malnutrition include food avoidance (secondary to pain) and maldigestion secondary to PEI. Duodenal stenosis or extrinsic compressions of the duodenum or stomach from pseudocysts result in delayed gastric emptying, causing nausea, vomiting, and poor oral intake.

Nutritional requirements are estimated at 25 to 35 kcal/kg energy and 1.2 to 1.5 g/kg protein^{11,12}; however, there are concerns over the use of estimated weight-based nutritional requirements, as these do not adjust for malabsorption. There is limited research in this field, but an observational study of male patients with CP suggested a higher energy expenditure than healthy controls estimated from increased nutrient intake and lower nutritional markers.¹³ The use of pancreatic enzyme replacement therapy (PERT) in 32 of 40 subjects confirmed the presence of exocrine dysfunction; but it remains unclear whether the nutritional deficit is from malabsorption of nutrients, increased energy expenditure, or a combination of both.

Furthermore, patients with CP often have a history of alcohol abuse and cigarette smoking; consequently, social and psychological factors, including poor compliance, financial constraints, and poor clinic attendance, often contribute significantly to malnutrition.

Nutritional Evaluation in Chronic Pancreatitis

Assessment of nutritional status is complex in CP, and no single isolated marker should be used.¹⁴ Factors to consider when assessing nutritional status in CP are summarized in **Table 1**. **Fig. 1** summarizes the nutritional evaluation of patients

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