

Nutritional Therapy in Adult Short Bowel Syndrome Patients with Chronic Intestinal Failure

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KEYWORDS

- Nutrition • Diet • Enteral nutrition • Short bowel syndrome • Intestinal insufficiency
- Intestinal failure

KEY POINTS

- Nutritional therapy is described as one of the cornerstones of intestinal rehabilitation in patients with intestinal failure (IF), but the evidence base for general recommendations is weak.
- Due to the heterogeneity of the IF population and due to significant effect heterogeneity an individualized approach on nutritional management is mandated.
- Successful nutritional interventions defined by the ability to maintain or wean off parenteral support are most likely to be achieved in patients located in the borderline between severe intestinal insufficiency and mild intestinal failure.
- Ideally, the effects of nutritional therapy should be evaluated by objective measures, and the interventions should respect patient autonomy to achieve best compliance and quality of life in patients with IF.

INTRODUCTION

Multiple factors should to be taken into considerations when discussing nutritional therapy in adult patients with chronic, type 3 intestinal failure (IF). As a large patient heterogeneity exists within this group of rare patients, this article provides a brief introduction with suggestions of definitions and concepts in the field of interest that may be relevant before the discussion of the potential effects of nutrition interventions.

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Classification of Intestinal Failure

The hallmark of IF is the reduction in intestinal function below a minimum necessary for absorption of fluid, electrolytes, and/or macronutrients to maintain health and/or growth.¹ Consequently, supplemental or even total parenteral support (PS) is mandated. The European Society for Clinical Nutrition and Metabolism (ESPEN) recently defined 5 major pathophysiological conditions causing IF: short bowel, intestinal fistula, intestinal dysmotility, mechanical obstruction, and extensive mucosal disease.¹ Based on the convalescence outcome following the event leading to IF, IF can be classified as an acute (Type 1), prolonged acute (Type 2), or chronic condition (Type 3).² In adults, the most common cause of IF is short bowel syndrome (SBS),³⁻⁵ in which the small bowel length by definition is less than 200 cm.¹ Frequently, patients with SBS are subdivided into 3 anatomic groups: *jejunostomy* or *ileostomy* (group 1), *jejunocolonic anastomosis* (group 2), and *jejunoleocolonic anastomosis* (group 3).⁶ Regarding a classification according to diagnosis, in most cases, SBS occurs as a consequence of extensive surgery related to inflammatory bowel disease, mesenteric vascular disease, cancer, and complications of other surgery. In the pediatric population, intestinal malformation, Hirschsprung disease, necrotizing enterocolitis, volvulus, and rare conditions may be the cause of surgery.¹

Anatomically, in adults, the patients at greatest risk of IF and dependence on PS are those with an end-jejunostomy and less than 115 cm of residual, functional small bowel; those with a jejunocolic anastomosis and less than 60 cm of residual small intestine (absent ileocecal valve); and those with a jejunoleal anastomosis and less than 35 cm of residual small intestine (but presence of ileocecal valve and colon).^{7,8} However, because a relatively poor correlation exists between remnant bowel anatomy and remnant bowel function, it has been suggested that patients with suspected "dys-homeostasis in the nutritional equilibrium" should be categorized based on results obtained in metabolic balance studies within a spectrum ranging from mild, moderate, and severe intestinal insufficiency, coping without need for PS, across a borderline to mild, moderate, and severe IF.^{9,10} By these balance studies, in clinical practice, the borderline between intestinal insufficiency and failure has been defined as an energy absorption of 81% of the calculated basal metabolic rate (BMR) and a wet weight absorption of 21 g/kg body weight per day equaling findings in research settings (84% of BMR and 23 g/body weight per day, respectively).^{9,10}

Because the access to performing metabolic balance studies is limited even in most centers of experience in providing care for patients with IF, the provision of PS has been suggested as an indirect measure of intestinal function.¹¹ However, it should be noted that in instable patients, in whom PS may be used to accelerate recovery from nutritional deficits, this may not be valid. Furthermore, the net intestinal absorptive capacity may not be stationary over time, as the bowel is able to adapt to endogenous and exogenous stimulations. Thus, the residual absorptive capacity of the intestine is dynamic and highly coordinated, and it does not only depend on oral intake, but also on multiple neuro-endocrine regulations of digestive and absorptive mechanisms, mucosal growth, motility, and blood flow. The adaptive potential of the gastrointestinal tract is illustrated by the finding that some patients with Type 3 SBS-IF may eventually regain intestinal autonomy several years after the diagnosis even without restorative surgery.^{3,4,12} The likelihood of gradually regaining intestinal autonomy by gaining the adaptive effects on top on those achieved by the conventional dietary and pharmacologic therapies seem to be best in patients with a preserved segment of the ileum and colon in continuity, whereas improvements in intestinal absorption over time seem to be less predominant in patients with end-jejunostomies.^{13,14}

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