

## NUTRITIONAL SUPPORT - FUNDAMENTAL OBJECTIVE IN POSTOPERATIVE DIGESTIVE FISTULAS THERAPY

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### Abstract

The exceptional gravity of digestive fistulas with a high flow is caused by important losses of digestive secretions containing proteins and electrolytes, which leads to hypoproteinemia, electrolyte and metabolic imbalances, accompanied by secondary immunosuppression. The sepsis encumbered on a body with severe malnutrition, represents the main cause of death. The aim of this paper is to present the significance of the intensive care, nutritional and pharmacological measures for a young patient suffering from a megadolicocolon, who has been operated several times in the abdominal area, diagnosed with septic shock, generalized bilious purulent peritonitis occlusive form through ileal perforation and severe malnutrition.

The nutritional management of the patient played an extremely important part in the therapeutic success.

### Rezumat

Gravitatea excepțională a fistulelor digestive cu debit mare este determinată de pierderile importante de secreții digestive cu conținut proteic și electrolitic, rezultând hipoproteinemie, dezechilibre hidroelectrolitice, metabolice, cu imunosupresie secundară. Sepsisul gravat pe un organism cu malnutriție severă, reprezintă cauza principală de deces. Scopul acestei lucrări este de a prezenta importanța metodelor farmacologice în terapia intensivă nutrițională, în cazul unui pacient tânăr, cunoscut cu megadolicocolon, multiplu operat în sfera abdominală, internat în stare critică cu diagnosticul de șoc septic, peritonită biliopurulentă generalizată forma ocluzivă prin perforație ileală și malnutriție severă.

Managementul nutrițional al pacientului a avut un rol extrem de important în succesul terapeutic.

**Keywords:** digestive fistula, sepsis, nutrition

### Introduction

Postoperative digestive fistulas with high flow represent a serious complication, due to their multiple consequences they have: hypovolemia, metabolic and acid-base imbalances, severe undernourishment, immunosuppression, mental disorders. At the same time, nutritional depletion or protein caloric malnutrition is associated with an increased rate of mortality and morbidity. The therapeutic approach of the critically ill

patient, involving major abdominal surgery, is complex, interdisciplinary, the nutritional management of the patient being extremely important.

### Materials and Methods

We present the case of a patient, aged 27, hospitalized in an extremely severe condition, with multiple organic dysfunctions caused by septic shock, with an abdominal starting point, generalized bilious purulent peritonitis occlusive form through ileal perforation after multiple surgeries, entirely colectomized, with terminal ileostomy and severe malnutrition.

The surgical background of the young patient is significant (eleven surgeries in seven years), grouped by several stages:

- between 2005-2008- four interventions for intestinal obstruction by volvulus of megadolicosigmoid and postoperative perivisceritis, using devolvulation, viscerolysis, sigmoidopexy.

At the first intervention he was diagnosed with megadolicocecolon, with no previous symptoms.

- in 2009 the patient was diagnosed with intestinal obstruction, postoperative perivisceritis, through segmental sigmoid colectomy with termino-terminal colorectal anastomosis, the transit being resumed late, on the eighth day.

The digestive symptomatology reappears about two years after his last surgery, as mezocealic phlegmonous acute appendicitis followed by appendectomy with severe viscerolysis. The postoperative evolution was unfavorable, severe sepsis caused by feces peritonitis through multiple perforations of megadolicocecolon and therefore another intervention was necessary, using total colectomy and terminal ileostomy. As the general condition worsened because intestinal content went out in the drainage tubes in an increased quantity, other three surgeries took place, consisting of multiple enteroraphies, peritoneal lavage and multiple drainage, the patient being already in septic shock.

Thus, when he has been received at the Intensive Care Clinic, the patient was in a critical condition, febrile, with multiple organic dysfunctions (respiratory, cardio circulatory, digestive, metabolic), caused by septic shock, being on ventilator and vasopressor support, the flow capacity of the gastro-intestinal fistula being of around 1000mL. The biohumoral tests showed moderate anemia (7.5g/dL), leucocytis ( $11890/\text{mm}^3$ ), severe lymphocytopenia, hypokalemia (2.79mmol/L), hypoproteinemia (3.94g/dL), severe hypoalbuminaemia (1.58g/dL), C-reactive protein, fibrinogen, procalcitonin with high values. The severe hypoalbuminaemia (values under 2.5g/dL) is associated with a mortality of

42% at the patients with gastro-intestinal fistulas[1], being also a predictor of morbidity.

Fluid rebalancing therapy was applied, and also correction of the electrolyte imbalances, broad-spectrum antibiotics, antifungals, gastric antisecretories, he was administered erythrocyte mass, albumin, the patient being analgosedated, with medium-dose vasopressor support, ventilated in a controlled mode.

Six hours after receiving the patient, he was operated under general anaesthesia balanced on the volatile pivot and double ileal perforation was recorded, generalized bilious purulent peritonitis, adherents block and significant perivisceritis, using enteroraphies, abdominal lavage and multiple peritoneal drainages. Intraoperatively, it was attempted mounting a jejunal nourishment probe, but the tight supramesocolic perivisceritis did not allow leading the probe beyond the duodenojejunal angle, making thus impossible the use of a nourishment jejunostomy.



Postoperatively, the patient returned to reanimation where the specific intensive care measures continued to be applied. It was calculated the APACHE II (Acute Physiology and Chronic Health Evaluation) score, prognosis score that provides an evaluation of the disease severity based on the current physiological measurements, age and pre-existing chronic diseases and the output was a value of 20 points correlated with 40% mortality.

### Results and Discussion

The assessment of nutritional status, according to ESPEN (European Society of Clinic Nutrition and Metabolism) included anamnestic data (weight loss and recent contribution), clinic data (anthropometric

measurements), laboratory data, nutritional risk score (Nutritional Risk Screening 2002) and it was noticed the presence of severe malnutrition that required an immediate administration of the nutritional support.

The favorable evolution allowed removing the vasopressor and the ventilator support, about 72 hours after the reintervention.

The nutritional support is a fundamental aim and we will present the strategy used in this case.

The enteral nutrition, with the aid of nourishment probes, represents the best choice for the patients who are in a critical condition and an important method of counteraction of the hypercatabolism present on all metabolic lines. Its advantages are significant in comparison with the parenteral nutrition: it maintains the intestinal mucosa functional, the enzyme activity at the level of villusities, it keeps the immune function of barrier of the intestinal mucous membrane, the balance of the intestinal bacterial environment, intestinal micro flora and it is less associated with morbidities. The first option was clearly the precocious initiation of enteral nutrition (associated with the decrease of infectious complications and hospitalization days, in comparison with both the late enteral nutrition and the precocious or late parenteral one) [2] impossible intragastric due to the presence of a gastric residuum of around 1200mL in the first 24 hours from admission; the jejunal probe and the nourishment jejunostomy were not placed intraoperatively for the reasons given above.

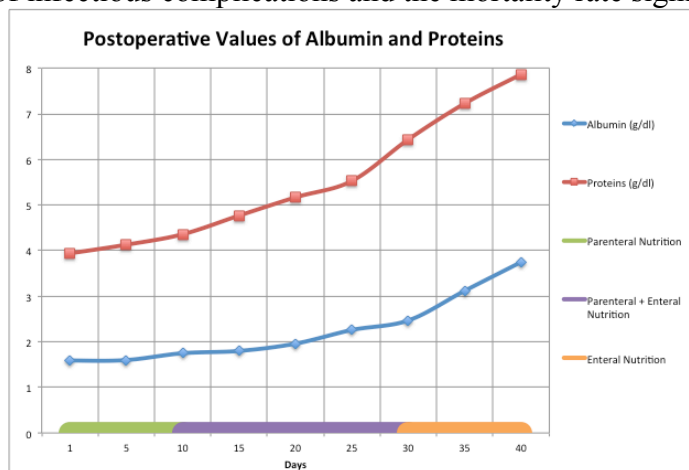
The alternative was represented by the total parenteral nutrition administered as a complete tricameral bag (3 in 1), containing amino acids, lipids and carbohydrates, administered from the first 24 hours postoperatively, using the central venous approach, at a rate of 40mL/h. A consensus of ASPEN (American Society for Parenteral and Enteral Nutrition) recommends a standardized process for the administration of parenteral nutrition, with the aim to increase the safety and the benefits of the patient and, at the same time, to make efficient use of resources.

The best method for determining the energetic need is the indirect calorimetry, the equations recommended in practice, such as the classic Harris-Benedict, being irrelevant for the critically ill patient, as they can overestimate or underestimate the caloric needs[3]. Consequently, we provided an energetic supply of 25 kcal/kg b.w./day, value deduced from repeated measurements through indirect calorimetry, a simple and fast method to use in practice.

The patient was administered amino acids (1, 3-1, 5 g/kg ideal body weight/day) in order to provide precursors for the protean synthesis at the immune system level and digestive mucous membrane, sparing in this way

the protein reserves of the organism. The amino acid solution included in parenteral nutrition must contain 0.2-0.4 g/kg b.w./day of glutamine (corresponding to 0.3-0.6 g/kg b.w./day of Ala-Gln).

Several studies have proved the unfavorable prognostic effects of glutamine depletion for critically ill patients, leading to the idea that glutamine becomes an essential conditioned amino acid in acute stress [4], being a deficit between the needs of glutamine at liver and immune cells level and its synthesis capacity in the skeletal muscle. Its functions are multiple: main energetic substrate in tissues with rapid replication, donor of atoms of carbon in the Krebs cycle, precursor of glutathione, inhibitor of cytokine synthesis, decreases the incidence of hyperglycemia and the insulin need, improves the barrier function of the intestinal mucosa. It has been demonstrated that glutamine stimulates the proliferation of the enterocytes *in vitro* and *in vivo*, diminishes their apoptosis rate, stimulates the intestinal protein synthesis *in vitro* and in human intestinal mucosa, decreases the incidence of infectious complications and the mortality rate significantly.



**Figure 1**  
Postoperative Values of Albumin and Proteins

His intravenous supplement was restricted for a long time because of the stability and solubility of natural L-glutamine in solution, inconvenience solved by the development and the introduction into practice of glutamine in dipeptide form, related to alanine or glycine, the dipeptide being stable in solution for a long time and without solubility problems, the commercial product widely used today is Ala-Gln.

The administered quantity of carbohydrates was of 2g/kg b.w./day, safe and efficient energy source because it can provide ATP in the absence

of oxygen as well, playing a significant role in the homeostasis of the oxidative stress, amino acids synthesis by providing intermediaries in Krebs cycle, sparing muscle protein.

The infused quantity of lipids varied between 0.7- 1.5 g/kg b.w./day, being an important energy source, with immunomodulator and inflammatory role; it was given a balanced lipid emulsion, based on a mixture of soybean oil, olive oil and fish oil. The major advantage of mixing various types of oils consists of optimizing the fatty acids profile that allows us to obtain an omega report 6 /omega 3 similar to current recommendations.

The Soybean oil is an important source of essential fatty acids, the olive oil has an inflammatory effect, as it is rich in oleic acid, whose peroxidation is greatly reduced in comparison with the polyunsaturated fatty acids (PUFA), helping to preserve the lymphocyte function. The omega-3 fatty acids from the fish oil modify the inflammatory response at the cellular level, through the inhibition of proinflammatory genes induction, of cytokines release and adhesion molecules [6].

The industrial parenteral solutions do not contain micronutrients because of the degradation problems of the photosensitive vitamins and the stability of the solution with trace elements addition. These were added daily, just before starting the intravenous perfusion of the parenteral nutrition solution. The trace elements need cannot be measured for most of the critically ill patients; therefore, generally it is recommended 'a daily dose', regardless of the catabolic status or the patient's weight. The trace elements are involved in enzymatic and immune reactions; their presence determines the activity of most of the biocatalysis systems. A depletion of antioxidants reserves appears in major surgeries and critical conditions, their supplementation being necessary (zinc, vitamin C, vitamin E, beta-carotene, selenium). At the same time, hypophosphataemia was corrected by administering glycerofosfat with a concentration of 1mmol/L, this deficiency being associated with respiratory muscle dysfunction and the difficulty of detaching the patient from the ventilator.

### Conclusions

The delay in assuring the necessary caloric support determines the consumption of the own supplies of the organism due to the inflammatory response and the catabolism induced by it, that is associated with a favorable prognosis. It has been noticed that the energy shortage accumulated after 7 days spent into the Intensive Care is about 12600kcal and it is correlated with an increasing number of complications, including the infectious ones, with the duration of the mechanical ventilation, antibiotics and

hospitalization [7]. For this reason the initiation of the nutritional support must be done precociously, malnutrition being associated with an increased mortality and morbidity.

The suction drainage on nasogastric tube was performed for ten days postoperatively, this being subsequently suppressed, during this period the nutritional support being exclusively parenteral.

The *per os* nourishment was introduced gradually with the digestive tolerance testing, at the beginning hidrolactate regimen and standardized preparations for enteral nutrition, increasing its contribution in comparison with parenteral nutrition. We intended to suppress the parenteral nutrition as soon as possible and we tried to provide the caloric need exclusively by *per os* enteral way, objective achieved after thirty days, the patient being discharged from the hospital and being expected to return after six months for the reintegration intervention.

In this case, the therapeutic success was due to the minimum aggressive surgery (in the context of a significant perivisceritis, adherents block, found intraoperatively), the sustained intensive care measures, the appropriate nursing, and the nutritional support being a fundamental objective.

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