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RECOMMENDATIONS FOR SPECIALIZED NUTRITIONAL-METABOLIC MANAGEMENT OF THE CRITICAL PATIENT

Recommendations for specialized nutritional-metabolic management of the critical patient: Digestive tract surgery. Metabolism and Nutrition Working Group of the Spanish Society of Intensive and Critical Care Medicine and Coronary Units (SEMICYUC)☆

Recomendaciones para el tratamiento nutrometabólico especializado del paciente crítico: cirugía de aparato digestivo. Grupo de Trabajo de Metabolismo y Nutrición de la Sociedad Española de Medicina Intensiva, Crítica y Unidades Coronarias (SEMICYUC)

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Introduction

The surgical critical patient presents a metabolic response characterized by increased energy expenditure, hypercatabolism, increased proteolysis, hyperglycemia, gradual loss of muscle mass, water retention and diminished visceral protein synthesis. Protein loss is even greater in the presence of intestinal fistulas and/or open abdomen. The patient is at risk of suffering malnutrition, with a resulting poor clinical course. In this context, nutritional management could reduce catabolism, improve the clinical course and shorten the recovery period.

Questions

What patients can benefit from early postsurgery enteral nutrition?

Patients at high nutritional risk according to the Nutritional Risk Screening (2002) suffer a greater number of complications during hospital stay.[1]

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Surgical critical patients are at high nutritional risk. On applying the prognostic Nutric Score,[2] it is seen that patients with a high score present greater mortality after 28 days and 6 months. Specifically, mortality and the duration of mechanical ventilation (MV) increase with Nutric Score $\geq$ 5 (simplified score without considering IL-6). This scale allows us to identify critical patients who are more likely to benefit from more individualized energy-protein therapy. By definition, surgical critical patients are at nutritional risk due to the intense inflammatory response, augmented hypercatabolism and increased caloric-protein requirements. Early enteral nutrition (EN) is therefore advised.

What is the most recommended feeding route in these patients? When is postpyloric nutrition indicated?

Although traditionally the strategies referred to the early introduction of oral feeding and EN in patients after gastrointestinal surgery have been restrictive, in the last decade randomized and controlled trials have been made involving early EN in both upper digestive tract and colorectal surgery. Early EN (in the first 48 h) has been found to be associated to a decrease in infectious complications, fewer anastomotic dehiscences, lesser postoperative ileus, shorter hospital stay, and lower mortality.[3,4]

The early postoperative administration of EN in the gastrointestinal tract distal to the anastomosis is safe and well tolerated, and can be regarded as the first nutritional management option in these patients. A meta-analysis conducted by Osland et al. revealed good tolerance of EN administered proximal to the anastomosis, with a significant decrease in postoperative complications.[3]

When is nutritional management with parenteral nutrition indicated?

Parenteral nutrition (PN) is indicated in the presence of an absolute contraindication to EN (intestinal obstruction, bowel ischemia or acute peritonitis), or if the patient does not tolerate the enteral route.

If there is no adequate tolerance of EN and the patient previously had a normal nutritional status, the introduction of PN should not be considered on such an early basis as in the case of EN, though it must be introduced once the patient is hemodynamically and metabolically stable, in order to avoid progressive caloric deficiency, which is associated to increased morbidity. In the case of previous malnutrition, PN should be introduced early (in the first 48 h), starting with low doses. Nevertheless, if the patient tolerates a certain amount of EN, the latter should be used, even if at trophic doses complemented with PN. Parenteral nutrition complementary to EN should be considered in patients at risk if after three days more than 60% of the caloric-protein requirements cannot be covered via the enteral route.[5]

On the other hand, Harvey et al.[6] recorded no differences in mortality after 30 days when comparing early EN versus early PN – thus indicating that PN is safe, provided it is used with a correct indication and at the required dose.

Is glutamine indicated in these patients?

The use of glutamine (Gln) in PN has been the subject of controversy in recent years. Different studies and meta-analyses have revealed its benefits in the surgical critical patient. In the meta-analysis published by Wang et al., comparing PN with or without Gln in the surgical patient, a statistically significant decrease was observed in the duration of hospital stay and in the incidence of infections among the patients administered Gln.[7]

Another meta-analysis recorded a decrease in the incidence of infections and a shorter hospital stay.[8] Chen et al. reported a decrease in nosocomial infectious processes among surgical patients, though with no reduction in either mortality or in the duration of hospital admission.[9] The study carried out by Grau et al. likewise associated Gln to a decrease in the number of nosocomial infections, a shorter stay in the Intensive Care Unit (ICU), lower mortality, and improved blood glucose control.[10] In these studies, the critical patients that benefitted most were postsurgical patients receiving PN with Gln. Administration of glutamine dipeptide at adequate doses (0.25–0.35 g of glutamine/kg body weight and day) is advised in the absence of contraindications, as part of the nutritional management of critical patients receiving PN.

What is the most adequate formula for specialized nutritional management? Do diets enriched with arginine, pharmaconutrients and other substrates such as fiber play a role?

There are no diets with specific characteristics indicated in EN among gastrointestinal surgery patients. The existing scientific evidence advises the perioperative supply of oral/enteral pharmaconutrition in the 5–7 days before surgery, since it reduces infectious complications and shortens hospital stay – though with no impact upon patient mortality.[11] In the postoperative period the evidence is less clear; recommendations therefore cannot be made in this regard.

In relation to the use of synbiotics and fiber in these patients, a study involving the perioperative administration of synbiotics (prebiotics/probiotics) in abdominal surgery patients has demonstrated optimization of the intestinal microbiota and a tendency towards fewer postoperative infections.[12] Early EN with soluble fiber in the postoperative phase of gastric or pancreatic surgery reduces the incidence of infectious complications.[13] Nevertheless, more studies are needed in order to establish recommendations regarding the use of synbiotics and fiber in the postsurgical critical patient.

Should patients with intestinal fistula and those with an open abdominal wall receive specific nutritional management in terms of quantity and quality? What is the most appropriate administration route?

Nutritional management is indicated after water, ion and vitamin corrective measures have been adopted. Monitoring is required of electrolytes such as phosphate, magnesium, potassium and sodium, together with the avoidance of refeeding syndrome.

Nutritional management should start as soon as possible after hemodynamic stabilization of the patient, and preferably using the enteral route. Complementary PN is indicated if EN alone is unable to cover the caloric-protein requirements.

In the case of patients with gastric or duodenal fistulas, and provided the rest of the intestine is functional, EN should be administered through a nasojejunal tube or via jejunostomy.[14,15] Parenteral nutrition is indicated in the case of jejunal fistulas.

The loss of gastrointestinal fluids implies a loss of electrolytes, minerals and proteins – this in turn leading to dehydration, malnutrition and electrolyte imbalances. Due to the increased loss of proteins, in patients with a low fistular output (<500 ml/day), a protein supply of 1.2–1.5 g/kg/day is advised, while in the case of high output fistulas (>500 ml/day) the dose should be increased to 2 g/kg/day), with the administration of up to 2.5 g/kg/day in patients with enteroatmospheric fistulas.[14,16] It is advisable to increase the supply of minerals, vitamins and oligoelements, especially in patients with high output fistulas.

Patients with open abdomen have a high energy expenditure. There are difficulties in securing the early start of EN, due to the possibility of abdominal bloating, with the resulting incapacity to close the abdomen. Enteral nutrition should be administered at doses tolerated by the patient (even trophic doses are of benefit), with complementary PN if the caloric-protein requirements are not covered. A retrospective study involving patients with abdominal trauma and open abdomen, in which one-half of the subjects presented intestinal damage, found that EN could be administered without evidence of more complications.[17] Due to the important protein losses through the abdominal exudate, these patients should receive 2–2.5 g/kg/day of proteins, with adequate amounts of vitamins and oligoelementos.[18]

What is the most adequate nutritional management strategy in liver transplant patients?

Nutritional management should be started in liver transplant patients within the first 24 h whenever possible.[19] The oral route is recommended, with EN as a second option, using a transpyloric access. These patients are characterized by an increase in both the energy and protein requirements. The administration of 25—35 kcal/kg/day and 1.5—2 g/kg/day of proteins is advised. No definitive recommendation regarding pharmaconutrient use can be made in these patients,[20] since the findings of the different studies are contradictory.

Recommendations

- Nutritional risk should be evaluated in all digestive tract surgery patients admitted to intensive care. (Level of evidence: low. Grade of recommendation: moderate).
- Early enteral nutrition is advised in the presence of enteral access distal to the anastomosis. (Level of evidence: moderate. Grade of recommendation: moderate).
- In post-abdominal surgery critical patients with enteral access proximal to the anastomosis, early EN is advised even if at trophic doses, provided there are no manifestations of intolerance or intestinal alarming signs. (Level of evidence: low. Grade of recommendation: moderate).
- Glutamine dipeptide at adequate doses is advised, in the absence of contraindications, as part of the nutritional management of post-abdominal surgery critical patients receiving PN. (Level of evidence: moderate. Grade of recommendation: moderate).
- Enteral nutrition is recommended in patients with open surgery, and proves safe. (Level of evidence: low. Grade of recommendation: moderate).
- In patients with gastric and/or duodenal fistulas, EN should be administered in the jejunum through a nasojejunal tube. (Level of evidence: low. Grade of recommendation: moderate).
- Parenteral nutrition is recommended in patients with jejunal fistulas. (Level of evidence: low. Grade of recommendation: moderate).
- In patients with a high output intestinal fistula and/or open abdomen, it is advisable to increase the protein supply to 2–2.5 g/kg/day. (Level of evidence: low. Grade of recommendation: moderate).
- Vitamin and trace element supplementing is recommended in patients with high output gastrointestinal fistulas. (Level of evidence: low. Grade of recommendation: moderate).
- The administration of early EN is safe in liver transplant patients if oral feeding (the first choice option) is not possible. (Level of evidence: low. Grade of recommendation: moderate).

Conflicts of interest

Dr. Alcázar-Espín has received payment from Vegenat and Abbott Nutrition for conferences in training courses. This does not imply any conflict affecting the recommendations of the present study, however. Dr. Macaya-Redín has received payment from Abbott Nutrition for conferences in training courses. This does not imply any conflict affecting the recommendations of the present study, however. Dr. Moreno-Clarí and Dr. Sánchez-Álvarez declare that they have no conflicts of interest.

Note to supplement

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