



POST-SURGICAL PARENTERAL NUTRITION REVIEW AND UPDATE

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886

SUMMARY:

Objective: To carry out a review of scientific literature of a descriptive nature that provides an update on useful concepts on postoperative parenteral nutrition. Brief Description: The goal of nutritional support is to ensure the patient's energy requirements, reduce micronutrient deficiencies, maintain muscle, improve food intake and quality of life. In surgical patients, nutritional support therapy has an important role in the prevention and treatment of malnutrition and catabolism. Total parenteral nutrition (TPN) is indicated in the postoperative period in the following circumstances: a) malnourished patients; b) patients who tolerate enteral nutrition poorly; c) postoperative complications that impair gastrointestinal function in patients who are unable to receive and absorb adequate amounts of oral or enteral feeding for at least seven days; and d) gastrointestinal surgeries. This support could be enhanced by supplementing with immunomodulatory nutrients such as glutamine. This amino acid can be considered when patients require parenteral nutrition.



Conclusions: Scientific articles from the last 5 years were evaluated, which after the respective study conclude that parenteral nutrition in postoperative patients improves the patient's quality of life, however, no significant variations were observed in the inflammatory response 4 days after surgery, supplementation of parenteral nutrition with glutamine is more beneficial for patients with intestinal cancer

Key Words: *postoperative disease, early parenteral nutrition, operation trauma, cancer*

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INTRODUCTION

The pathophysiology associated with surgical therapy has been studied intensively for the past 20-30 years. The founder of modern perioperative care, H. Kehlet, presented his first lecture on the pathophysiology of surgical trauma more than forty years ago. The justification for their perioperative care methods is the improvement of overall psychosomatic health, well-being and quality of life in newly operated patients (1)

The increasing mean age and multimorbidity of our patients and the impact of external toxicants and other negative harmful effects on them were the reasons behind this pilot study. Many articles have focused on minute details in preparation, steps of perioperative surgical and anesthesiological management, and postoperative care of patients according to surgery of the individual region of the GIT. (2)

In addition, some more recent recommendations for perioperative management of patients in the form of guidelines have been presented in cardiac surgery, urology, and other surgical disciplines [3, 4]. Lohsiriwat published an interesting article on the curve of the ERAS program in open colorectal surgery [5]. Their findings came from a series of 76 colorectal operations and required a multidisciplinary team to achieve an increasing rate of optimal recovery and high compliance with the full ERAS program. Some very important facts have

been detailed by Scandinavian authors [6]: the results of their clinical trial in a group of patients undergoing endoscopic resection for rectal tumors (where compliance with the ERAS protocol was 81.1% in the robotic group and 83.4% in the laparoscopic group) showed that robotic-assisted surgery was associated with substantially better outcomes than laparoscopic surgery. In addition, this method of surgery appears to add benefits to the ERAS protocol. The ERAS protocol has also been certified as safe and effective in bowel resection in children with Crohn's disease.

Although ERAS methods in perioperative care are known and have recently been recommended according to the ESPEN guideline "Clinical nutrition in surgery" (8). There are situations in clinical practice when a patient cannot accept the oral diet immediately after surgery, as in the case of advanced elderly or malnourished or polytraumatized patients who need supplementation by parenteral intake of high energy volume nutrition during the first postoperative days. Neopterin, tryptophan and kynurenine have been discovered during the last ten years as interesting and appropriate markers for the evaluation of intensity of the inflammatory reaction after surgery in the context of postoperative imaging of the disease, and have been successfully implemented in our previous clinical trials. A primary objective of this pilot study was to find possible differences in the intensity

887



of the inflammatory response after major surgery between the administration of a simple sugar (glucose) or the management of total parenteral nutrition. An additional objective of this trial was to compare the intensity of the postoperative inflammatory response in laparotomy and laparoscopic surgery by monitoring serum and urinary levels of neopterin, tryptophan and kynurenine, their serum proportions and their urinary proportions with creatinine concentration (serum concentrations of pro-calcitonin were added for comparison).

Results

A study was developed at University Hospital Hradec Králové in the Czech Republic that focused on evaluating the possible influence of parenteral nutrition on the intensity of the postoperative inflammatory response to trauma operation in surgical patients. As a model of these conditions, patients with colorectal cancer undergoing major surgery were chosen. (5). No statistically significant differences were found in the impact of early infusion type on the intensity of inflammatory response after major surgery. Changes in serum PCT concentrations after laparotomic operations were dynamic and significantly higher compared to those in laparoscopic operations subgroup (D) during postoperative days 1, 2 and 4 ($p=0.004$, $p=0.006$ and $p=0.001$, respectively). The intensity of the inflammatory response after the different surgical techniques (laparotomy or laparoscopy) in subgroups C and D respectively, evaluated postoperatively by serum or urinary concentrations of kynurenine, tryptophan, neopterin, and their proportions and proportions to creatinine, was not found to be significantly different (Table 3) This pilot test has focused on a single component/detail in the ERAS methodology in postoperative care – The

possible impact of a simple sugar infusion versus total parenteral nutrition on the intensity of the inflammatory response during the first four days postoperatively. No statistically significant differences in response to postoperative trauma were observed between these two methods of early postoperative nutrition intravenous treatment.

A 2020 study from The American Society of Colon & Rectal Surgeons in China evaluated the association between the overall prevalence of intra-abdominal septic complications after surgery for Crohn's disease was 11.6%. predictors included a preoperative C-reactive protein level ≥ 40 mg/L (odds ratio = 3.545), preoperative glucocorticoids (odds ratio = 1.829), and infliximab use (odds ratio = 3.365), gastrointestinal involvement higher (odds ratio = 2.072) and hypoalbuminemia (albumin <30 g / L, odds ratio = 2.406). Concluding that parenteral nutrition or partial enteral nutrition is less effective in relation to exclusive preoperative enteral nutrition since it was a protector for postoperative septic complications (odds ratio = 0.192. A nomogram was calculated to facilitate risk calculation; This had a predictive discrimination, measured as area under the curve of the receiver operating characteristic, of 0.82 (4)

Another study comparing postoperative parenteral nutrition in corectal cancer randomized patients into two groups, 1 group received parenteral nutrition supplemented with glutamine (0.4 g/kg/day), and the other group did not supplement. Measurements were taken on day one and day seven after surgery; In both, nutritional status was evaluated, a blood sample was taken to analyze biochemical parameters and a gastrointestinal function questionnaire was



applied. Post-intervention outcomes, nutritional status improved in both groups, however, in the supplemented group it improved significantly ($p = 0.008$). According to gastrointestinal function, the supplemented group progressed from severe to mild dysfunction ($p = 0.0001$), while the non-supplemented group progressed from moderate to severe dysfunction. Regarding biochemical parameters, there were no changes in the non-supplemented group. In both groups there was no change in plasma albumin concentrations. In the supplemented group, lymphocyte ($p = 0.014$) and prealbumin ($p = 0.012$) concentrations improved significantly.

They concluded that glutamine could improve gastrointestinal function, decrease diarrhea, urgency, abdominal pain and bloating. When gastrointestinal function improves, nutrient absorption increases, thus improving nutritional status. In addition, glutamine has a positive effect on prealbumin, lymphocyte concentrations of monocytes and monocytes, which is reflected in a better nutritional status.

Conclusions:

Enhanced recovery after surgery (ERAS) is currently the modern method of perioperative care to improve the patient's condition after surgery and to minimize various postoperative complications. No negative impact of postoperative parenteral nutrition on the intensity of the postoperative inflammatory response. There is no statistically significant difference between total parenteral nutrition and enteral nutrition on the fourth postoperative day, however, inflammatory response values decrease after total parenteral nutrition after 7 days in patients with colorectal cancer and Crohn's disease

Total parenteral nutrition or partial enteral nutrition is less effective relative to preoperative exclusive enteral nutrition as it was a protector for postoperative septic complications (odds ratio = 0.192).

Glutamine has a positive effect on prealbumin, lymphocyte concentrations of monocytes and monocytes, which is reflected in a better nutritional status.

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