Post-surgical malnutrition; A review article

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Introduction
Malnutrition among patients in hospitals is associated with high morbidity and mortality worldwide¹-⁴ and up to 30% to 40% of the patients in general hospitals demonstrate some degree of malnutrition⁵-⁹. Malnutrition among hospitalized patients is particularly high among those that have undergone gastrointestinal surgery⁸. However, malnutrition may occur among patient groups with other forms of surgery such as orthopedic, neurosurgery and others.

What causes malnutrition among post-surgical patients?
Malnutrition may arise because post-surgical patients are in a state of hyper-metabolism, with increased nutritional requirements yet they usually experience insufficient intake because of poor appetite. Gastrointestinal diseases may interfere with swallowing, digestion and absorption of food. Complications related to malnutrition in post-surgical patients include increased number of infections, poor wound healing and longer hospital stay among others¹². It is therefore necessary to assess the nutritional status of all surgical patients and address their nutritional demands accordingly.

Nutritional status assessment

There is no single clinical or laboratory test that precisely determines nutritional status. The nutritional status of hospitalized patients may be assessed by a variety of methods. Traditional methods rely on anthropometric measurements like body-weight, height, arm-circumference (AC), triceps skin fold thickness (TST), and calf-circumference (CC). Body mass index (BMI), arm
muscle-circumference (AMC), arm muscle-area (AMA), and arm fat-area (AFA) are then calculated. Reference should also be made to laboratory tests like serum albumin and total leukocyte count. Nutritional status (NS) can be obtained by using Subjective Global assessment (SBA) as described by Detsky et al \(^{13}\) and this is widely used.

**Frequency and risk factors**

There is limited data regarding post-surgical nutrition in Africa but its prevalence is expected to be higher given the poor socio-economic status, food insecurity and the high rate of malnutrition in the African population. In the UK, Edington et al \(^{14}\) reported the prevalence of malnutrition in patients who had undergone major surgery within 6 weeks to be 10.6% and the problem was more prevalent in those who had undergone genitourinary and gastrointestinal surgery, of whom 33% and 20.6% respectively, were malnourished. Other studies have reported malnutrition rates among patients with gastrointestinal disease to be as high as 50\(^{1,8}\). In Brazil, a middle income country, Isabel et al \(^{11}\) found out that 55% of post-surgical patients had malnutrition.

The major risk factors for post-surgical malnutrition include: male sex, age greater than 60 years, presence of cancer, infection, gastrointestinal surgery and longer length of hospital stay \(^{11,13}\).

**Prevention and management**

Prevention of malnutrition among surgical patients requires routine pre-operative nutritional assessment, with good nutritional rehabilitation prior to surgery in malnourished patients and early post-operative feeding in all patients \(^{14}\). Management of malnutrition in post-surgical patients requires proper administration of enteral feeding and/ or parenteral nutrition in order to improve patients’ outcomes. Recent study\(^{15}\) have shown that enteral feeding can be used effectively in the first days after surgery, and this is associated with few early complications and similar nutritional outcomes compared with the parenteral method. The same study also showed that enteral feeding was associated with reduced inflammation and was associated
with an improvement in immunological responses, with quicker return of bowel movements, and reduced costs in comparison with parenteral feeding.

**Total parenteral nutrition (TPN)**

Total parenteral nutrition via a central venous catheter provides nutritional support when patients are incapable of absorbing nutrients via the gastrointestinal tract. Due to its direct central venous administration, parenteral nutrition can rapidly improve nitrogen balance, which allows for quicker lymphocyte recovery, and improved wound healing. With the addition of vitamins and trace elements, decreases in both infectious and non-infectious complications have been demonstrated. Although found to be beneficial for the severely malnourished, parenteral nutrition for well nourished, or mildly depleted patients, has been shown to have a greater morbidity and should not be used. TPN has potential complications of phlebitis, pneumothorax, subclavian vein thrombosis and septicemia. Volume overload can cause respiratory compromise particularly in individuals with marginal cardiopulmonary reserve. Patients receiving TPN are also at risk of hyperglycemia and this is associated with dysfunction of the immune response due to abnormalities in granulocyte adhesion, chemotaxis, phagocytosis, respiratory burst function, complement function and intracellular killing. Overfeeding is another concern with TPN especially in patients at extreme ages or those who are very small or very big and this can lead to azotemia, hypertonic dehydration, and metabolic acidosis. Excessive carbohydrate infusion results in hyperglycemia, hypertriglyceridemia, and hepatic steatosis. High lipid infusions can cause hypertriglyceridemia and fat-overload syndrome. Hypercapnia and refeeding syndrome may also result from aggressive feeding.

**Enteral Nutrition (EN):**

Clinically malnourished patients may require a 7–10 day course of preoperative nutrition. If the gut is functioning, the enteral route is preferred over the parenteral route, provided that the patient can tolerate the feeds. Routine preoperative EN supplementation is however
unnecessary and of no benefit unless specific nutritional deficiencies are identified\textsuperscript{20}. Post operatively, enteral feeding should be commenced as soon as the patient can tolerate feeds.

Specific benefits to perioperative EN include a reduction in the incidence of postoperative infections and complications, as well as improved wound healing. This would also include fewer life threatening surgical complications, such as anastomotic stenosis or leak, delayed gastric emptying, recurrent nerve palsy, and superficial or deep fascial surgical site infections\textsuperscript{17}. This will in turn reduce on the length of hospital stay for most patients. These effects are thought to be due to the capacity of EN to maintain gastrointestinal integrity thus preventing villous atrophy, to attenuate the body’s response to stress and maintain immunocompetency through IgA secretion.

Contraindications to EN include the presence of intestinal obstruction, malabsorption, multiple fistulas with high output, intestinal ischemia, severe shock with impaired splanchnic perfusion, and fulminant sepsis\textsuperscript{19}.

Generally, complications of EN can be divided into gastrointestinal, mechanical, and metabolic complications. Mechanical complications include aspiration, tube mal-position and tube clogging. Gastrointestinal complications include nausea, vomiting diarrhea or constipation and malabsorption/ maldigestion. Metabolic complications include hyperglycemia or hypoglycemia, electrolyte imbalance, early satiety, dehydration and re-feeding syndrome.

Overall, EN is associated with fewer complications, a decrease in the length of hospital stay, and a favorable cost-benefit analysis, compared to TPN\textsuperscript{21-23}.

The benefits of additional EN to TPN in surgical and critically ill patients are not clear. However, it may be a reasonable approach in patients who can tolerate limited amount of EN due to gastrointestinal dysfunction.
**Immunonutrition (IN)**

Immunonutrition is a conceptual framework which enhances enteral nutrition with arginine, omega 3 polyunsaturated fatty acids, glutamine or ribonucleic acid thought to enhance the immune function.\(^{22}\)

**Conclusion**

All surgical patients need proper nutritional assessment in order to identify those who are malnourished or those at risk of malnutrition in order to minimize nutritionally related complications and improve surgical outcomes.

**References**


