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Short Communication

Nutrition in Critically Ill Patients

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Introduction

The use of nutrition in treating diseases isn't a new born concept. Many philosophers and ancient physicians like Hippocrates and Celsius used food to treat several diseases and improve patient's health. However the term "Dietetics" wasn't introduced until the 19th century, where nutrition is now considered one of the basic fundamentals in the management of critically ill patients [1]. It is well established that early enteral feeding support during critical illness decreases length of stay in the Intensive Care Unit (ICU), disease severity, and time of mechanical ventilation, morbidity and mortality as well as maintains gut barrier [2-5].

Malnutrition is one of the most complicated challenges that critical care physicians might face in ICU. Many physiologic changes occur in response to stress leading to increase in protein catabolism, decrease in lean body mass thus leading to increase in infection rate and wound dehiscence [6].

Although current guidelines support the use of nutritional therapy in critically ill patients, many ICU patients still receive inadequate feeding [7].

Enteral Nutrition

Gastrointestinal tract is the major organ of digestion and absorption, barrier against bacteria and toxins as well as major secretion site of immunoglobulins, especially IgA [8]. Maintaining that barrier through enteral feeding will stimulate intestinal growth and function, directly by supplying substrates for enterocyte oxidation and indirectly by promoting hormonal secretion which all together prohibit bacterial translocation and decrease rate of infection [8].

Enteral Nutrition (EN) should be initiated early (within 48 hours) from the time of admission to ICU in patients who are unable to maintain oral intake independently [1,9-10]. Although EN should provide 25 to 30 kcal/kg/day and 1-2 g/kg/day protein to most critically ill patients, nutritional support should also be adjusted according to patient's overall clinical status and body habitus. For instance, morbidly obese patients should receive less total caloric intake (between 14 to 18 kcal/kg/day and 2.5 g/kg/day protein).

"Bowel rest" is a misguided myth being used especially in some disorders such as inflammatory bowel disease, diverticulitis, acute and chronic pancreatitis believing that removal of stimulus will cause less damage and inflammation to the gastrointestinal tract. However, protein and lipid rich formula may have an anti-inflammatory effect on gastrointestinal mucosa and initiating early EN might improve patient outcome [11,12].

Moreover, hemodynamic stability is an important aspect in ICU patients and could be maintained by vasopressors with shunting blood from peripheral circulation to the brain and heart. Clinicians speculated that decrease blood flow to the gut together with the introduction of enetral feeding would lead to intestinal ischemia. However, Berger et al showed that even in hemodynamically unstable cardiac surgery patients receiving EN, intestinal absorption was preserved during vasopressor administration [13]. Never the less, it is still recommended to hold EN in hemodynamically unstable patients requiring escalating doses of vasopressors.

Furthermore, many mechanically ventilated ICU patients have delayed nutrition, since intensivists are dealing with other acute emerging issues during patient care. However, Barr et al showed that early nutritional management was associated with early weaning from mechanical ventilation and decreased risk of death [14].

Many nurses and physicians are often reluctant to resume EN when there is an increase in Gastric Residual Volume (GRV) as it might be a risk for aspiration pneumonia. This will cause lower caloric intake in such critically ill patients. However, Mc Clave et al showed that the prevalence of aspiration was similar between a group of patients with GRV more than 200 ml and those with GRV of more than 400 ml [15]. Furthermore, ventilator associated pneumonia rates were similar in patients with and without frequent GRV monitoring [16].

Although it was believed that bowel sounds are needed to initiate caloric feeding, guidelines recommend that in ICU patients neither bowel sounds nor passage of flatus is required for caloric feeding [1].

Furthermore, early post-operative enteral feeding might be well tolerated in patients who had recent gastrointestinal surgery and had shown to decrease post-operative complications such as infections, improve wound healing and decrease hospital stay. [17,18] However, EN should be stopped if abdominal distension, vomiting and pain develop.

It was believed that in patients who develop acute pancreatitis, Total Parenteral Nutrition (TPN) and bowel rest were the treatment of choice. Multiple randomized controlled trials and meta-analyses have shown that early EN is associated with less infectious complications, organ failure, hospital stay and mortality when compared with parenteral feeding [19,20] (Table 1). Summarizes EN recommendations for critically ill patients.

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Table 1: Enteral nutrition for critically ill patients.

Initiate enteral nutrition early within 48 hours of admission
Usually provide 25 to 30 kcal/kg/day and 1-2 g/kg/day protein
Rely on clinical signs for evidence of feeding intolerance (regurgitation and vomiting) or high gastric residual volume (>300 ml)
Avoid total parenteral nutrition
Presence of bowel sounds and/or evidence of passage of flatus and stool are not required for initiation of enteral nutrition
Use promotility agents if needed

Total Parenteral Nutrition

TPN, developed in the 1960s, is mostly indicated when enteral or oral routes cannot provide adequate nutrients to patients. It is delivered via central vein by passing the gastrointestinal tract. The choice of whether to initiate TPN, EN or both in critical care patients had been a dilemma. However, a recent trial showed higher morbidity and mortality rate in patients receiving TPN with EN as compared to EN alone [21]. Also, TPN is associated with several complications such as catheter related infections, catheter venous thrombosis, immune suppression and gastrointestinal atrophy. It should be considered very cautiously when other route of feeding is impossible.

Conclusion

Optimal nutritional support should be given to critically ill patients early. Evidence has shown that initiating EN early will improve outcome in the critically ill patients. TPN might be considered in very few cases such as short gut syndromes, GI fistulas and prolonged inability to tolerate EN.

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