EDITORIAL

Towards Achieving Nutrition Goal in Critically Ill Patients: Need a Simple Yet Effective Bedside Tool

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Critically ill patients require nutrition not only to provide sufficient delivery of energy and protein but also to help in preventing oxidative cellular injury and modulate the immune response.[1] Evidence indicates that the prevalence of malnutrition in intensive care unit (ICU) patients ranges from one-third to three-fourths, and is independently associated with poor outcomes.[2] Achieving greater protein and energy intake have shown a positive influence on patient outcomes. The results of a large retrospective study (n = 4,040) in ICU patients, who were mechanically ventilated for at least 3 days, showed that achieving at least 80% of protein and energy intake was a predictor of lower mortality, shorter time to discharge alive with fewer infections and more ventilator-free days.[3] However, it is always challenging to achieve targeted nutrition in ICU patients. A recent European multinational prospective study (EuroPN) to know the adherence to targeted protein and calories, done in ICU patients with minimum 5 days length of stay, found median calorie and protein intake (<20–25 kcal/kg and <1.3 gm/kg) was clearly below the 2019 European Society of Parenteral and Enteral Nutrition (ESPEN) guideline targets.[4]

Assessing critically ill patients who are at nutrition risk with various tools like the NUTRIC score (nutrition risk in critically ill score) and clinical variables (like body mass index, and duration of illness) is very much required to identify high-risk patients and enhance the delivery of calories and protein thus preventing underfeeding. Another prospective multicentre, multi-continent study across 26 countries included 3,390 critically ill patients who received nutrition for at least 96 hours and were in the nutritionally high-risk group (on ventilator >7 days, NUTRIC score ≥5, BMI <25/>35 kg/m^2), showed a very high prevalence (74% patients) of iatrogenic underfeeding, i.e., receiving <80% of prescribed energy requirements.[5] Underfeeding in ICU is multifactorial; on one side various patient-related factors might cause a barrier to nutrition delivery like the presence of gastroparesis, hypoxemia, circulatory shock, acidosis, gastrointestinal bleeding, abdominal compartment syndrome, etc.[6] On the other side, non-patient-related factors also influence nutrition practices in the ICU, like organizational structure, availability of clinical dieticians, feeding protocols, and quality improvement activities such as audit or feedback systems.[5] Hence, along with the knowledge of the underlying deranged physiology of disease condition, close interdisciplinary and multi-professional involvement is required to deliver and achieve optimal nutrition support in ICU patients.

A nutrition support team (NST) is a multi-professional team involving physicians, nurses, and pharmacists with a dietician in the lead role.[7] The utility of NST involves the implementation of screening processes, planning to target nutrition as per recommendations, and improving monitoring of nutrition care ranging from catering to artificial nutrition.[8] A recent randomized trial (n = 2,088) from eight Swiss hospitals highlighted the importance of NST; where the patient group who received protocol-guided individualized nutritional support achieved higher energy and protein in comparison to the standard group (79% vs 54%).[9] Quality of life, functional status, and clinical outcome were also significantly improved in the intervention group.

Nutrition support team (NST) acts as core contact and takes over the management of the nutritional therapy in outpatients but for inpatients, it has only a consultative role with the authority of implementation resting on the treating clinician. Once NST makes recommendations for the individual patient, the question comes of being implemented by the clinician. A national confidential inquiry from the United Kingdom (UK), which evaluated care given to inpatients across 4 regions receiving parenteral nutrition (PN) found that 60% of responding hospitals had NST, of those only 53% of NSTs had complete autonomy in ordering/vetoing PN.[10] The authors also concluded that only half of the patients within the study had NST involved in decision-making to commence PN and the patients who had NST involved in nutritional care were twice likely to receive good nutrition care as compared to those without NST support (27.4% vs 15.2%).

Thus, in spite of the proven positive impact of NST on clinical outcomes, it has not been effectively merged with nutrition management for critically ill patients. Hence several tools have been explored to reinforce NST's evidence-based opinion to treating clinicians for decision making like nutritional protocol, computerized provider order entry program (CPOE), text message, pop-up message in the order communication system (OCS), and direct telephone communication.[11] Considering the limitation of physician's views regarding the spectrum of nutrition therapy and the discrepancy of NST implementation, a semistructured interview with 62 physicians from pediatric ICU (PICU) was conducted before

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and after the introduction of the nutrition protocol, as well as the computerized system (which included energy and protein goals, goal achievement and nutritional intake information), found that practices were more consistent and systematic with increased attention to nutrition management after the introduction of these tools. However, some physicians stated that the computerized system was not used systematically and regularly during rounds, due to time constraints.[12] The authors also concluded that nutrition protocol as a tool improves clinical practice including improved energy goal achievements, decreased gastrointestinal complications, and shorter PICU stays. Whereas computerized systems help in reducing administrative workloads for caregivers and improving drug prescriptions and patient glycaemic control.

As nutrition management in ICU is a dynamic process, daily calculations are needed for changing nutritional needs which is time-consuming with high medical errors. There is also a possibility of human error in verbal or handwritten communication between NST and clinicians. So another tool CPOE program which includes nutrition orders calculated automatically based on body weight and suggests an optimal range of nutrient amounts has been studied. This CPOE program is integrated with the hospital's information system, the pharmacy, and the kitchen. A small retrospective study (n = 91), in neonates who received PN, was done to determine if CPOE implementation impacts the time it takes for preterm neonates to reach their parenteral macronutrient goals. After the use of CPOE PN, the proportion of preterm neonates attaining the overall macronutrient goals increased compared to control group neonates (25.5% vs 4.5%, $p < 0.05$) with a lipid goal achieved faster (1.5 ± 0.8 vs 2.0 ± 1.1 days, $p = <0.05$). Computerized provider order entry program has also been shown to reduce the effects of noncompliance between NST and clinicians by facilitating the order process, lowering errors, and increasing guideline usage but various financial and technological hurdles exist.[13]

The above-mentioned tools for decision-making are mentioned in the ASPEN (American Society for Parenteral and Enteral Nutrition) safe practices guideline but they require resource availability and sufficient insight into computer technology.[11] Instead in resource-limited regions, text messages could be used as an effective mode of communication, as described in different groups of health management, yet to explore to achieve better nutrition goals through studies.[14]

In the current issue of IJCCM, Dr. Seongpyo Mun presented their study on the impact of the use of visual nutritional indicator (VNI) on nutrition therapy in ICU patients; and found VNI as a useful tool to remind clinicians to improve in achieving higher nutrition goals without affecting other clinical outcomes.[15] It seems that VNI is a simple and effective bedside tool, but needs validation, including for high-risk patients, before its widely used in clinical practice.

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