Short Commentary

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Controversies on Protein Supplementation in Neonates

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Premature neonates have greater nutritional needs in early neonatal period. They often have high requirements due to medical illness that increase their energy requirements. Vigorous nutritional support is needed to correct growth restriction and promote growth which is almost twice that of a term infant. However, it is also important to avoid rapid advances in feeding, which may result in feeding intolerance or Necrotizing Enterocolitis (NEC). Parenteral Nutrition (TPN) is necessary for neonates whose immaturity or medical condition precludes enteral feeding. TPN includes protein as amino acids, fats as lipids, carbohydrate as glucose, electrolytes–sodium, potassium, chloride, calcium and magnesium, Metals/Trace elements–Zinc, copper, manganese, chromium and selenium. All fat and water soluble vitamins like A, C, D, E, K, thiamine, riboflavin, niacin, pantothenic acid, pyridoxine, biotin; choline and folic acid are also included.

Protein is the most important for growth and development. Preterm neonates require more protein to achieve normal intrauterine growth rate. It is utilised mainly for tissue growth instead a fuel source. The recommendation of an estimated protein intake of 3.5-4 g/kg/day required for growth [1]. Preterm neonates tolerate amino acid supplementation from day 1 of life and positive effects on protein metabolism are seen [2-6]. Positive nitrogen balance is achieved at AA administration of 2.3-2.65 g/kg/day [4,6]. Preterm infants without AA supplement excrete around 0.6-1.1 g/kg/day of protein [7,8]. AA can be initiated on first or second day of life in preterm. The ideal quantity of dietary protein is still a matter of controversy for low birth weight infants. Risk benefit ratio of high (>3 g/kg/day) versus lower protein (<3 g/kg /day) intake still have to be evaluated, especially in hospitalised preterm infants. Higher protein leads to raised blood urea and amino acids (phenylalanine) which may affect the neurodevelopmental outcome of the child whereas too low protein intake may limit the growth. Some studies are available to add to our knowledge regarding same study by Fenton et al. [9] suggests high protein intake (≥3.0 g/kg/day, but <4.0 g/kg/day) accelerates weight gain but it's impact on long-term outcomes such as neurodevelopmental abnormalities is still questionable due to limited studies. Study by Bhatia et al. [10-12] reported high blood urea nitrogen level in infants with high protein intake as compared to those with low protein intake but no significant differences in phenylalanine levels was observed between low and high protein intake groups. High protein intake have resulted in normal acid-base status in the Kashyap et al., study but metabolic acidosis have been reported by Gaull et al. [13] in infants receiving very high protein intake (4.5 g/kg/day) that resolved once the infants were removed from the study and fed breast milk raising concern about safe level of protein intake.

Conclusion

In view of the available evidence we recommend a high protein intake of ≥3 g/kg/day, but <4 g/kg/day. As available evidence is not adequate to permit specific recommendations regarding the provision of very high protein intake (>4.0 g/kg/day) during the initial hospital stay or after discharge.

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