Clinical Case Study Series: Case Study #3

NICU Nutrition: Transitioning from TPN to EN

Featuring:

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TRANSCRIPT

Narrator: Case studies are an excellent way to learn concepts to apply in clinical practice. Welcome to Abbott Nutrition Health Institute's Clinical Case Study Series, helping expand the knowledge of nutrition management in clinical practice through case study presentations.

Today's case study will highlight nutrition management strategies for the preterm infant in the neonatal intensive care unit during transition from parenteral to enteral nutrition.

This case study is presented by Stephanie Merlino Barr, a neonatal registered dietitian nutritionist with MetroHealth Medical Center in Cleveland, Ohio.

Stephanie Merlino Barr: The transition from parenteral to enteral nutrition is a period of high nutrition risk. Without careful attention and planning, infants can easily not meet estimated nutrition goals, with insufficient energy, protein, and micronutrients potentially not provided.

Utilization of a standardized feeding protocol with the early fortification of human milk and avoiding early discontinuation of parenteral nutrition are all important strategies to meet nutrition requirements of preterm infants during this period.

Utilization of standardized feeding guidelines improves preterm infant care, reduces the variability in care, and has been associated with improvement in growth outcomes in preterm infants. Second important strategy is early human milk fortification. Early fortification practices differ in their definition but typically mean beginning fortification prior to the discontinuation of parenteral nutrition, or prior to reaching full enteral feeds.

It's recommended that we should discontinue the practice of early discontinuation of parental nutrition support. Adequate provision of calories, and especially adequate provision of protein during this phase is associated with improvements in preterm infant growth. Both the reduction of time of the transition nutrition phase, and/or the improvement of the quality of nutrition provided during this period is needed to ensure appropriate growth goals are met.

What should we be targeting as a nutrition goal during the transition nutrition period? Listed here are the preterm infant parenteral nutrition requirements. So, when we're thinking about nutrition requirements during that transition/nutrition phase I tend to target. Just in the middle of these two parenteral and enteral nutrition requirements.

So, let's apply this information to a case study. Baby Sloan was born at 28 weeks post menstrual age at a weight of 1000g. Baby Sloan was admitted to a NICU with a standardized speed one protocol. She had one day of NPO, a couple of days of trophic feeds, and then a standard advancement of 10 ml/kg/day of enteral feeds until a total fluid goal of enteral feed volume of 150 ml/kg/day was met. Parental nutrition was discontinued when enteral feeds reached 100 ml/kg/day and was replaced with Dextrose 10% fluid. Human milk was fortified when full enteral feeds were reached at were reached at 150 ml/kg/day. While Sloan was growing, we really had suboptimal growth. Specifically, during this transition nutrition period.

Let's now look at Baby Flash. Baby flash was similarly born at 28 weeks post menstrual age, and at 1000g. But Baby Flash's NICU had some different practices in terms of what their feeding protocol entailed. Parenteral nutrition for Baby Flash was discontinued when enteral feeds reached 130 ml/kg/day. Baby Flash's human milk was fortified when enteral feed volumes reached 100 ml/kg/day, and we can see here that Baby Flash did not experience sustained growth faltering that Baby Sloan did during this transition nutrition period.

Let's look more specifically at the energy intake comparison between Baby Sloan and Baby Flash. On our x-axis, we can see our days of life and then our y-axis we can see our total energy administered in kcals/kg.

Now let's look at our protein intake comparison for Baby Sloan and Baby Flash. And right away we can see some pretty big differences between these two different infants. For Baby Flash, we are consistently pretty much within our goal range of protein administration of 3 to 4 g/kg/day,, whereas for Baby Sloan, we're really not meeting that protein goal continuously day after day after day until greater than two weeks of life when human milk fortification is finally started.

Meeting elevated energy requirements in preterm infants is challenging, but certainly not as challenging as meeting elevated protein and micronutrient requirements. The length of parenteral nutrition use also differed between these two infants, with parenteral nutrition support being discontinued for Baby Sloan

when enteral feeds reached a volume of 100 100 ml/kg/day. In contrast, our Baby Flash had prolonged utilization of parental nutrition, which helped better meet our estimated nutrition goals.

And when we're thinking about these differences, it's important to think about the cumulative nutrient deficits for preterm infants and how they impact both growth, but also other disease state outcomes. To conclude, special attention is needed to total nutrition administration rather than simply volume of enteral feed advancement. Protein and micronutrients in particular, can be insufficiently administered during this period, leading to cumulative nutrient deficits and poor growth.

I hope this case study has helped highlight the importance of paying attention to total nutrition administered during the high risk transition. Nutrition phase, as well as highlighting some important strategies to ensuring appropriate nutrition during this time period.