Question:

In preterm low-birth weight infants (P) how does preterm formula (I) compared with donor breast milk (C) affect growth and development (O)?

Summary:

Donor breast milk and preterm formula present their own sets of advantages and disadvantages involving infants gut health and growth. According to research conducted by *Cochrane Database of Systematic Reviews* preterm infants often find artificial formula more difficult to digest than human milk, and concerns exist that formula could increase the risk of severe bowel problems. Donor breast milk, however, is more expensive than many formulas, and may not contain enough key nutrients to ensure optimal growth for preterm or low birth weight infants (Quigley et al., 2019). Necrotizing enterocolitis (NEC) and sepsis are significant concerns for preterm infants receiving formula-based milk as opposed to human milk. In the article titled *Potential Effects of Human Milk on Morbidity in Very-Low-Birth Weight Preterm Infants*, an analysis was completed showing that infants who received donor human milk had a decreased incidence of NEC compared to formula-fed infants, especially among the group of infants born at a gestational age between 28 and 32. Specifically, the risk of NEC or death decreased by 13% for every 100 mL/kg of human milk consumed in the first 14 days of life (Roggero et al., 2020). According to *The Optimizing Nutrition in Preterm Low Birth Weight Infants Consensus Summary* article, given the high nutrient needs of preterm infants, human milk alone may not be able to comprehensively provide the preterm infants' requirement of proteins, energy, minerals, vitamins, and trace elements. Whereas formula milk contains all essential nutrients and is specifically designed to meet the requirements of LBW infants (Kumar et al., 2017). In the *Human Milk Feeding and Preterm Infant's Growth and Body Composition* article, a study was conducted concluding that the group of infants fed >75% human milk demonstrated a broader reduction in the weight z-score from birth to discharge compared to infants receiving < 75%. When analyzing the type of human milk (maternal, donor, or mixed maternal and donor milk), a trend emerged towards higher rates of growth-retarded infants at discharge in those receiving donor milk compared to those fed with >75% donor milk compared to those fed with either >75% maternal and maternal and donor milk (Cerasani et al., 2020).

Conclusion:

After researching on whether donor milk or formula milk would lead to a better outcome on a preterm infant's growth and development, mixed results were found which made it difficult to come to a definitive answer. The findings led to an uncertainty on which type of nutrition is best for preterm infants, especially with low or very low birth weight. The currently available evidence suggests that feeding preterm infants with artificial formula (rather than donor breast milk when mother's own breast milk is not available) is associated with faster rates of growth, but with a near-doubling of the risk of developing necrotizing enterocolitis (Quigley et al., 2019). Donor breast milk contains non-nutrient factors including immunoglobulins and lactoferrin that may promote intestinal adaptation and maturation (Quigley et al., 2019). There are also concerns of

donor milk losing some of its benefit during the purification process and less benefit for the infant to receive. The milk is routinely pasteurized after collection, and the commonly used pasteurization method is mild thermal sterilization, which may further cause nutrient loss in breast milk. Therefore, the additional supply of a certain number of nutritional fortifiers into the breast milk should be recommended to ensure infants get enough protein or energy supply to meet the growth needs, given that this can be tolerated (Yu et al., 2019). In conclusion, there is both a benefit and a downside to both types of nutritional options for preterm low birth weight infants and a decision on what is most beneficial should be made on a case by case basis taking into account the gestational age of the infant, other comorbidities the infant may have and the necessary weight gain needed prior to leaving the hospital.

Work Cited:

Primary Article

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Secondary Article

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Tertiary Article

Yu, F., Cao, B., Wen, Z., Li, M., Chen, H., & Xie, G. (2019). Is donated breast milk better than formula for feeding very low birth weight infants? A systematic review and meta analysis. *Worldviews on Evidence-Based Nursing, 16*(6), 485–494. https://doi.org/10.1111/wvn.12410