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Editorial Open Access

Impact of Early and High Doses of Amino Acid Supplement on the Growth and Development of Preterm and Low Birth Weight Neonates

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Editorial

Introduction

Postnatal growth failure is extremely common in the very low birth weight (VLBW) - Birth weight <1,500 g- and extremely low birth weight infant (ELBW) - < or = 1,000 g-, and that growth failure is related with the higher risk of poor neurodevelopment outcome. Furthermore, inadequate nutrition at postnatal stage remains as major responsible reason for growth failure, it has been observed that majority of ELBW infants lack energy and protein during the neonatal intensive care unit (NICU) hospitalization [1]. The risk for infant death for those who have LBW (1500 to 2499 g) is six times higher than for infants who weight more than 2500 g, and for weight less than 1500 g the risk is 100 times higher [2]. Early administration of parenteral amino acids (AAs) to infants with ELBW has been encouraged to foster growth [3].

ELBW infants in general shows poor growth at postnatal stage and remains far behind the rate of in utero growth, several studies indicated that protein deficiency at early stage may be responsible for poor growth. Gestational age is inversely associated with the amount of protein loss. ELBW infants are not able to replenish the deposited body proteins of 1-2% while surviving on glucose alone. Numerous important studies provided the evidence that intravenous amino acid supplement to the premature infant in early post natal stage shows positive effect for maintaining the protein balance and accretion. This is useful even during intake of low calories. Reports are available regarding the appropriate dosage of amino acids. Maintenance of net protein balance without any loss or gain could be achieved with 1 g/kg/day of amino acids whereas 3 g/kg/day delivery will aid in accretion [4]. Moreover, amino acid infusion after birth with a rate of 2.5-3.0 g/kg/day for a VLBW infant has been found to provide temporary safety to the infant, proved by randomized controlled trials. No strong and permanent evidence is available so far to support this aspect. Recent study suggest that maintaining 4.0 g/kg/day of amino acids during the early neonatal stage along with retaining nitrogen to energy ratio more than 1:100 may provide some benefit to the infant during their hospital stay. Any evidence on far reaching consequences of this practice is not available till now [5].

Research hypothesis

It has been observed that at the time of early hospitalization, occasionally, VLBW infants remain underfed and therefore have growth restriction comparative to the fetus of similar gestational age. To overcome the early nutritional insufficiency and maintain a proper postnatal growth later on is necessary, thus, medical treatment trend of supplementing nutritional deficiencies in VLBW infants are on the rise. In turn this strategy is improving long-term neurodevelopmental outcomes. However, excessive intravenous intake of AAs may cause metabolic acidosis and uremia in ELBW infants [5].

The Null hypothesis H0 for this study is that starting parental nutrition as early as possible (shortly after birth) for VLBW and ELBW neonates with high amino acids dose (2 g/kg/day of IV AA and advanced by 1 g/kg every day to 4 g/kg/day for seven days) will not have any positive impact on growth, overall health, and neurodevelopment of VLBW and ELBW infants during their first 2 years of life.

The Alternative hypothesis HA for this study is starting parental nutrition as early as possible (shortly after birth) for VLBW and ELBW neonates with high amino acids dose (2 g/kg/day of IV AA and advanced by 1 g/kg every day to 4 g/kg/day for seven days) will have a positive impact on growth, overall health, and neurodevelopment of VLBW and ELBW infants during their first 2 years of life.

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