Hydrolyzed Proteins in Preterm Infants

Thibault Senterre

Prematurity occurs during a critical period of development with the most rapid rate of growth in lifespan. The adequacy of nutritional support, in particular protein intakes, plays an important role in many short- and long-term outcomes. Proteins are the major driving force of growth and represent the major functional and structural components of the human body. Their properties and functions depend on the structure of their amino acid (AA) polypeptide chains. Body proteins are constantly degraded and synthesized to and from AAs and protein turnover is very high in preterm infants compared to older infants, children and adults. It implies that the AA pool of the body is in constant equilibrium with potential instabilities and adverse effects of either insufficient or excessive AA concentrations.

Postnatal enteral nutrition is essential to enhance gastrointestinal maturation and postnatal development, but feeding problems are very frequent in preterm infants. These infants frequently suffer from postnatal feeding intolerance and sometimes develop severe gastrointestinal diseases such as necrotizing enterocolitis. Human milk is considered the preferred source of nutrients for preterm infants but is not always available. Thus, the industry has developed specially designed formulas for preterm infants (PTFs, preterm infant formulas).

Most infant formulas are developed from cow’s milk after several adaptations to meet the infants’ requirements. Most of them contain intact cow’s milk proteins. Extensively and partially hydrolyzed protein formulas (HPFs) have been developed to treat cow’s milk protein allergy or to prevent allergic sensitization. These formulas are also proposed and used when facing several digestive and behavioral problems in infants. Thus, for different kinds of reasons, term infants’ HPFs have also been used in preterm infants, and the industry has also developed specific PTFs with hydrolyzed proteins (HPs).

Few studies have been published evaluating the use of HPs in preterm infants. Most studies included varying sources of protein, varying degrees of protein hydrolysis and varying nutrient contents.
These studies demonstrated that the protein source plays an important role in nutritional adequacy and that adequate sources need to be used in PTFs. Protein utilization and efficiency is generally lower for HPs. When protein intake is similar, a lower weight gain is generally observed with PTFs and a 10% increase in protein content is usually necessary to compensate for this reduction in protein utilization. Mineral absorption may also be reduced, and no data exist for trace elements and vitamins.

HPFs have also been proposed in preterm infants in order to improve their feeding tolerance. Most HPFs are associated with accelerated gastrointestinal transit time and softer stools, but without clear benefit on feeding tolerance. Preterm infants seem to be at similar risk of allergic diseases than term infants, but the preventive effect of HPFs has not been sufficiently explored especially in preterm infants.

In conclusion, the quantity and the quality of protein intakes play a major role in preterm infants. Most modern HPFs designed for preterm infants are well tolerated and have adapted their nutrient content to improve nutrient absorption and retention. However, their benefits and safety have not been demonstrated and further high-quality studies are needed.