Gastrostomy feeding in cerebral palsy: too much of a good thing?

Commentary

The study by Sullivan et al. (p 877) aimed to measure energy balance and body composition in children with severe cerebral palsy (CP) who were fed either orally or by gastrostomy tube. The authors show that feeding by gastrostomy tube, using a commercial formula, may lead to disproportionate (excess) fat deposition in these children. They note that while caloric supplementation of children with eating impairments is associated with weight gain,[1,3,4,7] the nutritional composition of a diet for this group of children has yet to be determined.

Studies of this nature pose many challenges. The prevalence of severe CP is low.[5] Thus, to meet sample size requirements authors often extend the age range of their sample. In the study by Sullivan et al. the sample ranged from 1 year 4 months to 18 years 11 months. We would expect different caloric as well as nutritional needs for typically developing children and children with CP in this wide age range. Hence, the caloric and nutrient composition of the diet for this group of children may not be uniform. However, availability of different commercial formulae to meet these needs is limited and only one formula was used for the gastrostomy-fed children. Although there is mention that orally-fed children were also supplemented with commercial products, we do not know the details of the diets of the orally-fed children. The duration of tube feeding prior to entry into this study ranged from 4 to 60 months. Thus, fat deposition cannot solely be attributed to the 12-month period of this study.

The most difficult points in this area of study are the standard measures to be used for comparison. The fat mass index (fat mass/height^2) and fat-free mass index from a normal reference population were used for comparison of the groups with CP. Although we note that the fat-mass indices are significantly higher for both experimental groups and the fat-free mass indices significantly lower, we have no baseline from a sample of children with CP that would be the criterion standard for this comparison. The authors suggest that 'in children with cerebral palsy, whose level of physical activity is relatively low, excess fat deposition could become a problem when the natural limitation on nutrient intake is overcome by gastrostomy feeding.' However, as stated, these children move very little and may be vulnerable to being cold due to inactivity. Could the extra fat then have a thermo-protective function? Patrick et al.[1] were one of the first investigators to show that eating-impaired children with moderate to severe CP gain weight given a calorically adequate diet and described that the limbs of these children felt warm and were pink in colour for the first time. Whether children with severe CP should have the same fat mass and fat-free mass indices as typically developing children, given their markedly different activity levels, is still unknown.

The timing of nutritional intervention may also play a critical role in the nutritional rehabilitation of children with CP. Reilly et al.[2] showed that marked weight lag can be documented by three months of age, and Sanders et al.[4] elegantly showed that nutritional rehabilitation is more effective in early childhood (birth to 8y; weight and length) than in children older than 8 years (weight only). Of course, we do not know the body composition of the children from these studies. Sullivan et al. propose that a nutritionally adequate diet is needed for children with severe CP and eating impairments, stating that 'the optimal composition of such a feed would be low-fat, low-calorie, high fibre, and micronutrient replete.' Whether such a diet would lead to the desired results remains to be determined, keeping in mind that other problems such as seizures, cognitive deficits, and different hormonal metabolism[6] in children with severe CP may contribute to the variation in growth. Whether such a diet would prepare infants (birth to 2y) and children during their adolescent growth spurt to meet the enormous caloric demands on the body is not addressed by the authors of the present study.

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