The use of peptide feeds to resolve feeding intolerances in a complex paediatric case.

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Introduction.

This case study presents a child with severe neurodisabilities and gastrointestinal disease.

Many children with cerebral palsy require enteral feeding to ensure adequate nutritional intake to meet nutritional requirements for growth and development, due to aspiration risk with oral intake due to dysphagia and/or gastro-oesophageal reflux disease.\(^1\)

Hirschsprung’s disease is an anomaly where there is a total absence of ganglion cells in the affected part of the large intestine resulting in loss of peristalsis.\(^2\)
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Background.

Child A was first reviewed by his local community dietitian in February 2010, aged 5 yrs 5 months. Previous to this he had received dietetic input from acute hospital teams across England, as due to a complex social situation Child A and his family had moved on a number of occasions during the last 5 years.

Child A presented with a complex medical history:

- Hydrocephalus secondary to L1CAM mutation (X linked).
- VP shunt in situ (September 2004).
- Four limb cerebral palsy (wheelchair-bound).
- Bowel obstruction secondary to adhesions, underwent laparotomy 2006.
- History urinary tract infection on prophylactic Trimethoprim®.
- Very low vision.
- Persistent loose stool.
- Fixed equinus deformity at both ankles.

Child A's daily medication regime:

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dosage</th>
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<tbody>
<tr>
<td>Lactulose</td>
<td>5mls once daily</td>
</tr>
<tr>
<td>Trimethoprim®</td>
<td>5mls at night</td>
</tr>
<tr>
<td>Gaviscon®</td>
<td>With feeds</td>
</tr>
<tr>
<td>Domperidone</td>
<td>1.4mls three times a day</td>
</tr>
<tr>
<td>Ranitidine</td>
<td>4mls three times a day</td>
</tr>
</tbody>
</table>

Relevant data/diagnostic tests.

Child A had been weighed on 22/1/2010 at school: 22.6kg (91st centile plotted on Child Growth Foundation centile charts). His supine length had been measured on 6/11/09: 122.3cm (98th centile plotted on Child Growth Foundation centile charts).

For the last year his weight had been tracking the 91st centile and there had been no concerns about his weight gain. It was difficult to obtain further records of weights and heights due to the various dietetic teams Child A had been seen by across the country. Previous supine length measurements would have been helpful, however these are difficult to measure accurately in wheelchair-bound children. Body mass index is not recommended to be used as part of the nutritional assessment for children with neurodisabilities.
Medical and nutritional problems identified: nutritional assessment.

Using Child A’s age and most recent weight (22.6kg) his nutritional requirements were estimated using Great Ormond Street Hospital’s (GOSH) nutritional requirements for children in health and disease. There is no consensus on the energy requirements for children with cerebral palsy, many children require less than the estimated requirements. Wheelchair-bound children are unlikely to need more than 75% of the estimated average requirement (EAR) of energy for height age and some will require considerably less. Child A’s energy requirements based on 90kcal/kg/day were calculated as 2034kcal/day, his EAR 1715kcal/day and 75% EAR as 1286kcal/day.

• His protein requirement based on GOSH guidance, 1.1g/kg/day was calculated as 24.9g and EAR 19.7g/day.
• His fluid requirement based on GOSH guidance, was 1565mls/day.
• His fibre requirement based on US guidelines, was estimated at 10-15g/day.

At assessment Child A was having 1000mls Nutrini® Peptisorb/day providing 1000kcal/day (44kcal/kg/day), 28g of protein/day and 0g fibre/day. This was lower than Child A’s estimated requirements, yet Child A had been gaining weight well, indicating his very low energy expenditure. Child A presented with persistent loose stools (opening 5–6 times/day) which had been ongoing for the last 3 years.

Nutritional goals/recommendations.

The goals of dietetic intervention were to meet all nutritional requirements (macro and micronutrients) and provide adequate hydration by enteral feeding for optimum growth and development and to ensure regular bowel movements.

Administration route.

Child A had been assessed as unsafe for oral intake from birth and had subsequently been nasogastric fed. A gastrostomy was inserted in December 2009 (aged 5 years).

Volume administered.

Child A was receiving 4 boluses of 250mls Nutrini® Peptisorb during the day via his feeding pump at 250mls/hr.

Additional fluid was provided by water flushes pre and post feeding and medication, and 500mls of water was given overnight via the feeding pump.

There was little scope for altering feeding times and rates due to time constraints of school staff, physiotherapy sessions and carers.
Nutrini® Peptisorb (Nutricia) is a nutritionally complete tube feed for children aged 1–6 years or up to 20kg in body weight. Child A’s weight was above these criteria. In addition, despite being on a peptide-based feed he was still experiencing ongoing frequent and loose stools.

Child A was weighed on 10/3/2010, he was 21.4kg (50-75th centile). This was a 1.2kg weight loss since 22/1/2010. This weight loss indicated Child A’s nutritional requirements for energy were no longer being met by the current volume of feed and needed to be changed to meet his requirements. As Child A’s bowels had not improved by trialling a peptide feed, his mother was keen to trial a polymeric, whole protein feed. Unfortunately, over the next 5 months Child A started to suffer from constipation and it was a difficult time for the family (social issues). Subsequently Child A’s feed was not changed. His lactulose dose was increased to 10mls twice/day. In August 2010, Child A weighed 20.6kg; this was a further 0.8kg weight loss in 5 months.

It was agreed with his mum that as his current feed was not meeting his energy requirements (1000mls Nutrini® Peptisorb was continuing to meet his nutritional requirement for protein and micronutrients) to trial and increase his calorie intake by adding Calogen® (Nutricia) 30mls x 3 boluses/day to his feeding plan.

Child A was able to tolerate Calogen® 20mls x 3 boluses/day, providing an additional 270kcals/day. An energy supplement (Calogen®) was used as there was no ready-to-hang 1.5kcals/mls feed that was ACBS approved for children available.

Due to feeding regime time constraints Child A was not able to manage a large volume of Nutrini® Peptisorb.

Child A’s constipation was investigated by a bowel x-ray which showed his bowel was clear, and the problem seemed to be just as the stool was being pushed out, indicating a problem with his reflexes, his body not getting rid of the stools often enough, letting them build up and become hard and enlarged. To help resolve this his lactulose dose was increased to 15mls twice/day and his total fluid intake 1520mls/day.

Child A was weighed at school at the end of September 2010, he weighed 21.1kg (50th centile), a 0.5kg weight gain. Calogen® boluses were increased by 10mls (i.e. 30mls three times/day) an increase in his calorie intake by 135kcals/day. His total energy intake was 1405kcals/day.

At this stage Peptamen® Junior Advance had been launched and discussions were held with Child A’s mum about the benefits of trying this new feed. As Child A was no longer gaining weight on a standard 1kcals/mls feed, Peptamen® Junior Advance, a high energy density feed (1.5kcals/mls), would ensure Child A met his increased energy requirements. The use of Peptamen® Junior Advance would also provide an easier feeding regime for carers as there would be no need for Calogen® to be administered and the total volume of feed/day (1000mls) would not have to be increased.

1000mls of Peptamen® Junior Advance would also provide 5.4g of fibre/day which has been shown to have beneficial effects on the prevention of both diarrhoea and constipation in children. The low-molecular formula of Peptamen® Junior Advance has also been indicated to be advantageous in children with gastrointestinal disorders (i.e. Hirschsprung’s disease). On 10/1/2011 Child A started his new feed, 1000mls Peptamen® Junior Advance/day. 500mls Peptamen® Junior Advance was given during the day via 3 boluses (150mls, 150mls and 200mls) and 500mls Peptamen® Junior overnight at 50mls/hr. From day one this was tolerated extremely well with no vomiting and his bowels were opening (loose) 1-2 times/day.

Child A was weighed at school a month after starting Peptamen® Junior Advance and was 22.3kg (50th–75th centile) an increase of 1.2kg since September 2010.
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Outcomes/results achieved with Peptamen® Junior Advance:

- Child A is meeting all his nutritional requirements for macronutrients and micronutrients in 1000mls of feed.
- Child A is gaining weight at an appropriate rate (last weight 13/9/2011: 24.4kg (50–75th centile)).
- Constipation and diarrhoea resolved. Bowels opening 1–2 times/day.
- A practical feeding regime that does not require any modification (e.g. addition of extra supplements) and fits in with Child A and his family’s lifestyle.

Conclusion.

This case study demonstrates the effectiveness of a peptide, 1.5kcal/ml ready–to–hang, fibre–containing feed, Peptamen® Junior Advance, in providing sole nutrition for a child with complex neurodiabilities and gastrointestinal problems.

References.