



CARDIOLOGY

Case Study Booklet



This case study booklet is intended for Healthcare Professionals only

The Infatrini range are Foods for Special Medical Purposes for the dietary management of disease related malnutrition and growth failure in infants and young children. It must be used under medical supervision after consideration of all feeding options, including breastfeeding.





Overview of Case Studies

| | CASE STUDY | PRODUCT | AGE | DIAGNOSIS | SYMPTOMS | SUMMARY |
|----|-------------------------------------------------------------------------------------------------------------|-----------------------------------|----------|--------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01 | A case of non-specific poor tolerance to a whole protein nutrient dense formula in congenital heart disease | Infatrini and Infatrini Peptisorb | 3 weeks | Large inlet muscular ventricular septal defect, posterior deviation of the outlet septum and a small aortic valve (5 mm) | Tiring when feeding, poor volume intake and noticeable tachypnoea | Infatrini was commenced at 3 weeks of age as a top-up via nasogastric tube (NGT) to supplement breastfeeding due to a uncoordinated and weak suck. She was changed to Infatrini Peptisorb at 2 months due to feed intolerance and poor weight gain. At 11 months, Infatrini Peptisorb was discontinued as she has caught up to the 50th centile and her intake of solid foods had increased. |
| 02 | A case of feeding difficulties in a cardiology infant | Infatrini | 7 weeks | Ventricular Septal Defects (VSD) | Poor tolerance to volume due to tiring on feeding | At 7 weeks, Infatrini and NGT feeding was introduced due to a poor feeding pattern and low volumes. After 3 weeks on Infatrini, weight gain velocity trend had stabilised and weight gain was steadily tracking between 2nd-9th centile. At 39 weeks, centiles had improved and Infatrini was therefore phased out and a standard infant formula was introduced. |
| 03 | A case of faltering growth due to multiple severe congenital issues | Infatrini Peptisorb | 6 months | Congenital heart, respiratory and gastrointestinal (GI) problems | Intolerance of high volumes of feed, and reflux with some loose bowel actions of 2-3 per day | At 6 months, baby W's weight was 3.44kg and length was 51.5cm, both below 0.4th centile. Infatrini Peptisorb was introduced as it was a ready to feed, nutrient dense alternative to baby W's powered eHF prescription. At week 2 post Infatrini Peptisorb feed initiation, his weight had increased by 0.3kg and at week 4 his weight was 3.94kg (+0.50kg). |





A case of non-specific poor tolerance to a whole protein nutrient dense formula in congenital heart disease

Birth–diagnosis

Baby D was born at term by emergency caesarean section secondary to foetal distress. She had undergone normal ultrasound imaging at 20 weeks with no abnormality detected. Her birth weight was good (3.48kg, 50th centile), there were no immediate concerns and she was discharged on exclusive breastfeeding.

Baby D was admitted to hospital age 3 weeks with concerns related to feeding, including tiredness with feeds, poor volumes taken and noticeable tachypnoea. She struggled with breastfeeding and weight gain had been poor (3.49kg, 25th centile). She underwent investigation which identified a large inlet muscular ventricular septal defect, posterior deviation of the outlet septum and a small aortic valve (5 mm). The ventricles were balanced, but there was increased pulmonary blood flow with dilated main and branch pulmonary arteries.

Baby D remained in hospital for a week of observation and once daily diuretics. Infatrini was introduced as a top-up via nasogastric tube (NGT) to supplement breastfeeding. A breastfeeding specialist confirmed an uncoordinated and weak suck. Advice was given to the mother to optimise feeding, particularly surrounding positioning. She was discharged with a small weight gain, but weight overall had fallen to the 9th centile.

Age 2 months

Since starting Infatrini, Baby D's mum had noticed a slightly increased stool frequency (additional 1-2 stools/day) and the stools were noticeably looser. Volumes of feed taken were inconsistent, but on average were <110mls/kg/day. Feeding times were prolonged (in excess of 60mins) and breastfeeding had been stopped. Mild reflux symptoms were reported, with inconsistent frequency. Baby D's weight had continued to drop and she was now on the 2nd centile. The decision was made to swap to Infatrini Peptisorb in view of lower than expected weight gain for volume, changes in stool pattern and parental concerns of non-specific "poor tolerance". In the following weeks, her weight gain pattern stabilised on the 2nd centile, but did not significantly improve. However, the family reported more successful feeding times and her stools were firmer. Her surgery was planned for 1 month later.

Age 3 months

Surgery was undertaken at 3 months. Her weight was now tracking the 2nd centile, but she remained underweight in proportion to her head circumference and length (50th centile). Surgery was unremarkable and successful. Discharge weight was 200g below admission weight and Baby D was discharged with her NGT in place as she had failed to re-establish oral feeds.



Age 4 months

On review, the family reported good re-establishment of regular feeding pattern, but some feed avoidance behaviours remained. Weight had increased to pre-surgery admission weight and centile position (2nd centile). The NGT was repeatedly dislodging, but replacement was becoming distressing for Baby D and despite alternating nostrils the skin around her nose was breaking down. The decision was made to trial oral feeds only. At this stage the volume of Infatrini Peptisorb tolerated was 90-120mls/kg/day.

Age 5 months

Weaning began around 5 months. This was the family's first child, so the process was discussed by the Dietetic team. In view of her history of bottle aversive behaviours (feeds were still taking over an hour), a joint dietetic and speech and language therapist appointment was arranged. Feeding strategies to promote oral progress were recommended, including messy play and education for the family on positive mealtime outcomes.

Baby D was also seen for routine cardiac review. Echocardiography confirmed a stable VSD patch with no residual shunt, no outflow tract obstruction, normal left ventricular size and function, and a patent aortic arch. The cardiology conclusion was that she had done very well following her surgery and now had a functionally normal circulation. Diuretics were stopped and follow up review was arranged for 6 months' time.

Age 6 months

Weaning was slow to progress. However, it was identified that mum's expectation of a portion of food was quite unrealistic. Further education for the family on weaning foods and expectations was provided. Feed intake was stable and feeding times, reflux symptoms and stool output were all acceptable. These factors combined successfully contributed to an improved weight, now on the 9th centile.

Age 9 months

Baby D had made some progress and was more accepting of bottle feeds and textures. She remained behind with some feeding skills for age (however, this was consistent with a child with early medical intervention), but positive steps with growth were evident. Family anxiety levels were settling coinciding with her weight pattern improvements. Fortification of weaning foods (advised around 7 months) appeared to be associated with a slight increase in weight gain velocity and weight was now >25th centile. This was close to other anthropometric markers on the 50th centile.

Age 11 months

Review showed Baby D's weight gain was very good and she had caught up to her proportional centile (50th). She remained in the early stages of texture acceptance, but variety of foods within her range was very good. The decision was made to discontinue Infatrini Peptisorb and introduce standard infant formula. A telephone review and community weight was organised for 6 weeks later to ensure her growth pattern was maintained.

Learning Points

- 1 Non-specific poor tolerance of a high energy formula in very young children can present an issue in conditions where promotion of weight gain and growth is a priority. Using formulas with characteristics that may have some theoretical tolerance benefits (i.e. hydrolysed proteins, high MCT content) represent another option for Dietitians to support vulnerable groups.
- 2 Weaning can be a stressful time for new parents and supporting families of cardiac infants is important, especially since these infants are widely recognised to have difficulty feeding. However, weaning is a vital part of ongoing nutritional management. It is therefore essential to communicate with families on topics such as expectations of growth, recovery times and sufficient oral intake.
- 3 Catch-up growth following early under nutrition and subsequently evolving feeding difficulties can be challenging to manage, and delays in growth recovery are not uncommon. Ongoing support and monitoring is vital especially when using nutrient dense formulas where care is required not to cease too soon or continue feeding for too long.



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A case of feeding difficulties in a cardiology infant



Patient B was born term as a home delivery and established breast feeding. The family noticed within a few weeks that she was struggling with feeds and although support was provided the mother felt breastfeeding was unsuccessful and changed to exclusive standard infant formula feeds. The local health visitor observed difficulty with feeding and gave standard advice. At 4 weeks of age, she was admitted with a viral illness and during the admission the medical team observed her to be tachypneic. On further investigation the diagnosis was made of Ventricular Septal Defects (VSD).

At this stage her feeding pattern and volumes were sporadic and her weight had not increased significantly from birth. Her intakes were on average 110mls/kg/day providing 75kcal/kg/day. At 7 weeks, after consistently unsuccessfully achieving adequate volumes to meet her target requirement of 120kcal/kg/day, a specialised formula designed for catch-up growth was introduced. This was built up over 3 days with decreasing the frequency of standard infant formula and replacing bottles with Infatrini.

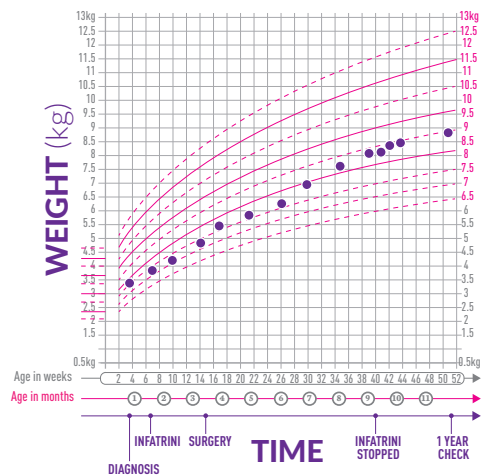
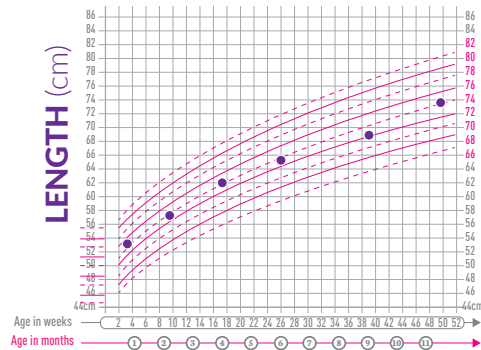
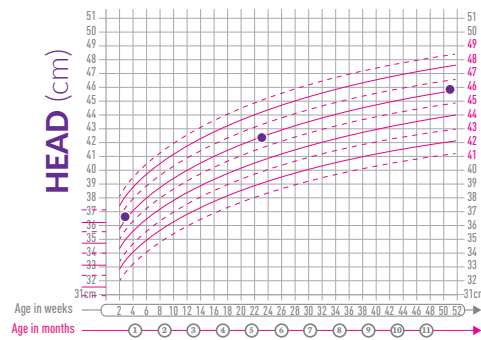
There were no signs of poor tolerance in terms of gastro symptoms or a change in frequency of stools, however her tolerance to volumes through tiring remained. Her discharge from hospital was being delayed by failure to achieve adequate milk volumes and the decision was made for nasogastric tube (NGT) placement. The family were trained and she was discharged on 3 hourly feeds offered orally first over 20 mins with the remainder given as a gravity bolus via the NGT.

After 3 weeks post discharge and establishment of the high energy formula (10 weeks of age), her weight gain velocity trend had stabilised and her weight gain was now steadily tracking between 2nd-9th centile. Overall the family reported tolerance was good and tube feeds were still required. She had weekly weights via the Health Visitor and stayed in contact with the Dietetic team via Community Nurse reviews and Consultant Outpatient reviews.

Cardiac surgery was agreed for several months later unless required sooner. At 13 weeks, she went into cardiac failure and at 14 weeks surgical repair was completed. Following surgery, she managed volumes better orally and the NG tube was removed. At 17 weeks, the weight pattern began to significantly improve. Solids were started at 18 weeks and the opportunity was taken to fortify her foods with Infatrini to maximise her intake.



Her weight gain pattern continued to improve and she gained on average 12g/kg/day crossing up the centiles to her proportional position. At 39 weeks (see WHO growth chart), Infatrini was phased out as her catch up growth was assessed to be complete and she returned to a standard infant formula. Weekly weights were taken for the following 3 weeks by her health visitor and her weight pattern and velocity were successfully maintained.



A case of faltering growth due to multiple severe congenital issues

Baby W was born at 34 weeks gestation with several congenital conditions involving the heart, respiratory and gastrointestinal systems. These meant that he suffered from tracheo-oesophageal atresia, oesophageal stricture, gastro-oesophageal reflux and a tracheostomy which required continuous positive airway pressure (CPAP). At 6 months old, he had a history of faltering growth mainly due to feeds being stopped when there was respiratory deterioration. There were also losses due to intolerance of high volumes of feed, and reflux with some loose bowel actions of 2-3 per day.

Initially he was started on 200ml expressed breast milk bolused in small amounts via his nasogastric tube (NG) during the day. In the evenings, he received 33g powdered extensively hydrolysed semi-elemental feed mixed in 260ml water as a continuous overnight feed to contribute 170kcal/day.

At 6 months old, his weight was 3.44kg and length was 51.5cm, both below 0.4th centile (UK-WHO Growth chart). At this stage, Infatrini Peptisorb was suggested in view of the fact it was a ready to use, energy dense alternative to his current prescription – a peptide based powder. His nutritional requirements were calculated at 344kcal/day (100kcal/kg) and 7.2g protein/day and the aim was to increase the caloric intake to promote weight gain and growth.

He was initially commenced on a low volume of Infatrini Peptisorb, which provided him with 68% of his total requirements which was then increased gradually over

the weeks so that by week 4 he received 406kcal/day. This was fed via NG tube overnight, as well as receiving 200ml expressed breast milk given during the day.

At week 2 post Infatrini Peptisorb feed initiation, his weight had increased by 0.3kg and at week 4 he weighed 3.94kg (+0.50kg) and his length increased to 52.5cm (+1cm) although he was still on the 0.4th centile. Initially, there was no change in GI symptoms and he continued to have tolerance issues such as vomiting, abdominal distension with 2-3 loose stools per day, but these symptoms were not unusual for him and they remained stable for 4 weeks whilst taking Infatrini Peptisorb. The Nurse and Dietitian caring for him both felt that Infatrini Peptisorb was convenient and easy to use, and the parents were satisfied with his tolerance of the feed.



Infatrini Peptisorb was suggested in view of the fact it was a ready to use, energy dense alternative to his current prescription.



