



# Case Study: Baby N

## 6-month old girl with persistent allergic GI and skin symptoms on an extensively hydrolysed formula

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### Background

Baby N was born at full term via a C-section. Whilst in hospital breastfeeding was commenced and she continued to be exclusively breastfed for 1 month. A top-up standard infant formula was then introduced and following this gastrointestinal symptoms developed as well as some atopic dermatitis. The presenting symptoms included colicky abdominal pain, constipation, back-arching and screaming after feeds and progressively she developed both breast and bottle aversion. A series of feed changes occurred, including anti-regurgitation formula and addition of Gaviscon into her formula, which had no impact but made her constipation worse. As time progressed, her feeding aversions deteriorated to such an extent, that feeds would take up to 2 hours (both breast and bottle) and she would only take dream feeds.

In her family history it was noted that both parents had hay fever. At birth her weight was on the 25<sup>th</sup> centile, there was no length measured at birth, but at 6 weeks she was on the 50<sup>th</sup> centile. She continued to track on these centiles and at the time of the appointment was on the 50<sup>th</sup> centile for weight.

### Management

At the first appointment, Baby N was 5 months of age and a non-IgE mediated allergy was suspected. As such, it was recommended that Mum commence on a milk and soya elimination diet and Baby N start on an extensively hydrolysed whey formula as top-up formula. This suggestion was in line with current iMAP and BSACI recommendations<sup>1,2</sup>. Soya elimination was suggested in addition to the elimination of cow's milk due to the evidence that around 50% of children with non-IgE mediated allergies to cow's milk also have a soya milk allergy and because she was <6 months of age, which was in line with current recommendations<sup>1-3</sup>.

Mum verbalised at this appointment, that she was too tired to continue breastfeeding and go on an elimination diet and Baby N was therefore fully switched onto the extensively hydrolysed whey formula.

The aim was that she consumes at least 600ml of the

formula during the day and she remained on a milk and soya elimination diet for 4 weeks, to establish symptom improvement.

No skin prick test or specific IgE tests were performed as she was exhibiting symptoms associated with a non-IgE mediated allergy and eczema was very mild<sup>4</sup>.

Advice was given at that appointment also regarding milk and soya free complementary food, including advice on when to introduce other allergens outside of milk and soya.

After 4 weeks, Mum returned to clinic and reported that although eczema was much improved and there were some improvements in her gastrointestinal symptoms (less pain), her constipation and aversive feeding remained and her night-times were very disrupted due to abdominal discomfort / pain. Reassuringly, her growth continued along the same centiles for both weight and length, which is a common phenomenon in children with food allergies<sup>5</sup>.

An amino acid formula was recommended following this consultation due to ongoing symptoms, which was in line with current guidelines<sup>1,2,6</sup>. Within 48 hours of the appointment, a message was received that Baby N was doing much better and she was starting to show interest also in taking a bottle outside of sleep time. However, her constipation remained, as she continued to strain for hours before producing a loose stool. It was advised that she continue with this amino acid formula and milk and soya free complimentary foods for another 3 weeks and then a reintroduction of cow's milk based formula was recommended using the iMAP protocol<sup>1</sup>. Within 24 hours of the re-introduction of cow's milk based formula, her symptoms returned, confirming a non-IgE mediated cow's milk allergy.

As the constipation continued a decision was made to change her amino acid formula to one containing a synbiotic blend in the hope of improving her stooling pattern (1 stool every 4 days). She was switched over 1 week (each day increasing the ratio by 1 fl oz) to

ensure tolerance and using this approach no gastrointestinal side effects were reported. Although she remained constipated her frequency improved to 1 stool every 3 days following the switch and the parents were advised to keep her on this formula, whilst expanding her complementary foods.

## Discussion

The role of pre- and probiotics have been studied extensively in food allergies and it is known that gut microbiota play an important role in prevention and tolerance development<sup>7,8</sup>. In addition, it is known that breast milk, a rich source of both pre and probiotics contribute significantly towards the development of the immune system, the development of tolerance and also impacts on stool frequency and consistency<sup>9</sup>. In this case, breast milk was no longer available and Baby N had ongoing symptoms of constipation on the standard amino acid blend. Safety data was recently published on an amino acid formula with synbiotics indicating good growth and tolerance<sup>10,11</sup>. In addition the study by Candy et al<sup>12</sup>. on non-IgE mediated cow's milk allergy indicated improved Bifidobacteria levels and ratio of Eubacterium rectales/Clostridium coccoides, which was a good motivation to change the formula. Although only a mild improvement

in constipation was seen, it was thought that the evidence on improved bacterial flora was worth continuing on this formula.

## References

1. Venter C, Brown T, Meyer R, et al. Better recognition, diagnosis and management of non-IgE-mediated cow's milk allergy in infancy: iMAP-an international interpretation of the MAP (Milk Allergy in Primary Care) guideline. *Clin Transl Allergy* 2017;7:26.
2. Luyt D, Ball H, Makwana N, et al. BSACI guideline for the diagnosis and management of cow's milk allergy. *Clin.Exp.Allergy* 2014;44:642-672.
3. Agostoni C, Axelsson I, Goulet O, et al. Soy protein infant formulae and follow-on formulae: a commentary by the ESPGHAN Committee on Nutrition. *J Pediatr Gastroenterol Nutr* 2006;42:352-361.
4. Muraro A, Werfel T, Hoffmann-Sommergruber K, et al. EAACI food allergy and anaphylaxis guidelines: diagnosis and management of food allergy. *Allergy* 2014;69:1008-1025.
5. Meyer R, De Koker C, Dzubiak R, et al. The Impact of the Elimination Diet on Growth and Nutrient intake in Children with Food Protein Induced Gastrointestinal Allergies. *Clinical and Translational Allergy* 2016;In Press.
6. Koletzko S, Niggemann B, Arato A, et al. Diagnostic Approach and Management of Cow's-Milk Protein Allergy in Infants and Children: ESPGHAN GI Committee Practical Guidelines. *J Pediatr Gastroenterol Nutr* 2012;55:221-229.
7. Fiocchi A, Pawankar R, Cuello-Garcia C, et al. World Allergy Organization-McMaster University Guidelines for Allergic Disease Prevention (GLAD-P): Probiotics. *World Allergy Organ J* 2015;8:4.
8. Arslanoglu S, Moro GE, Boehm G, et al. Early neutral prebiotic oligosaccharide supplementation reduces the incidence of some allergic manifestations in the first 5 years of life. *J Biol.Regul.Homeost.Agents* 2012;26:49-59.
9. Milani C, Duranti S, Bottacini F, et al. The First Microbial Colonizers of the Human Gut: Composition, Activities, and Health Implications of the Infant Gut Microbiota. *Microbiol Mol Biol Rev* 2017;81.
10. Burks AW, Harthoorn LF, Van Ampting MT, et al. Synbiotics-supplemented amino acid-based formula supports adequate growth in cow's milk allergic infants. *Pediatr Allergy Immunol* 2015;26:316-22.
11. Harvey BM, Langford JE, Harthoorn LF, et al. Effects on growth and tolerance and hypoallergenicity of an amino acid-based formula with synbiotics. *Pediatr Res* 2014;75:343-51.
12. Candy DCA, Van Ampting MTJ, Oude Nijhuis MM, et al. A synbiotic-containing amino-acid-based formula improves gut microbiota in non-IgE-mediated allergic infants. *Pediatr Res* 2018;83:677-686.

## Conclusion:

- When symptoms continue on an extensively hydrolysed formula it is important to trial an amino acid formula for 4 weeks followed by reintroduction of cow's milk in the child's diet.
- The amino acid formula with synbiotics (Neocate Syneo) was well tolerated in a child with non-IgE mediated allergies.
- The amino acid formula with synbiotics (Neocate Syneo) has a positive impact on the bacterial flora in children with non-IgE mediated allergies.

### Product Usage

- ORAL NUTRITIONAL SUPPLEMENT
- TUBE FEED
- SOLE SOURCE OF NUTRITION
- SUPPLEMENT TO AN ELIMINATION DIET

CALORIE DENSITY: 0.68 KCAL/ML  
(STANDARD CONCENTRATION)

### Patient Profile

- ANAPHYLAXIS
- ATOPIC DERMATITIS (AD)
- FALTERING GROWTH
- MULTIPLE FOOD ALLERGIES (MFA)
- GI SYMPTOMS
- SYMPTOMATIC ON BREAST MILK
- SYMPTOMATIC ON AN EHF