INFANT ALLERGY UPDATE

1

OVERVIEW

Allergy testing

New allergen introduction

Food protein induced allergic proctocolitis/enteropathy

2

ALLERGY TESTING

- Food challenge is the gold standard – but access is limited!
- Skin and blood tests detect **sensitisation** with varying degrees of sensitivity and specificity
- The magnitude of wheal/serum IgE correlates to likelihood of a clinical reaction, but not likely severity
- These tests are most useful to **confirm** a suspected IgE-mediated allergy but should generally not be used to **screen** for allergies

3

COMMON SCENARIO

A child has a positive skin prick test or serum IgE for an allergen they have never tried

What do we do next?

4

- Ideally, a supervised food challenge would be carried out to detect clinical allergy, however access is limited
- Alternatives
  - Cautious challenge at home
  - Avoid the food & repeat the test later → risk of conversion from sensitisation to clinical allergy
- Factors to consider
  - PMHx
  - Family preference
  - Parent capacity to detect and manage an allergic reaction

To avoid this scenario, we should try to avoid testing allergens that a child has not consumed (with some exceptions)

5

SKIN PRICK TESTING

- No 'lower age limit' if convincing signs of IgE-mediated allergic reaction; but lower sensitivity in young infants
- Detects IgE bound to cutaneous mast cells
  - May be more sensitive & specific
  - But also influenced by mast cell responsiveness
- Defer for ~4 weeks after anaphylaxis (mast cell anergy)
- Size of wheal correlates to likelihood of a reaction but not to likely severity
- Avoid antihistamines and topical steroids for several days before the test – oral steroids are OK

6

SERUM IGE TESTING

- Useful if SPT not available or unfeasible
- Component testing not widely used in paediatrics yet but promising
  - E.g. Ara h2, a peanut component
  - More sensitive than testing IgE to whole antigen

Allergen	Component	Notes
Cow's milk	Bos d 8	= casein, which accounts for ~80% of milk proteins and is the major allergen '*Bos domesticus*' Associated with more persistent milk allergy and more severe reactions
	Bos d 5	= beta-lactoglobulin, 25% of whey fraction and 5% of milk protein
	Bos d 6	Serum albumin
	Bos d lactoferrin	Transferrin
Egg	Gal d 1	*Gallus domesticus* Ovomucoid. As with CM, most egg allergy is to conformational epitopes. Good predictor of egg allergy
	Gal d 2	Ovalbumin
	Gal d 3	Ovotransferrin

7

Immunoassay predictive value cutoffs

*Multiple sources

Allergen	Age	ssIgE (ku/L)	SPT (mm)
		95% PPV	95% PPV
Cow's milk (raw)		15-32	≥ 8
	≤ 2 years	5	≥ 6
Egg (raw)		7	≥ 7
	≤ 2 years	2	≥ 4-5
Peanut		15-34	≥ 8
	≤ 2 years		≥ 4
Fish		20	
Tree nuts		20	≥ 8 for walnut ≥ 12 for cashew
Sesame		50 (86% PPV)	≥ 8

8

Serum specific IgE test	Skin test
Favour serum IgE testing:	
▪ Widely available in any medical setting	▪ Available only where equipment, reagents and trained staff are on hand
▪ Minor pain - venesection	▪ Minor discomfort, itching
▪ Little patient effort or cooperation required	▪ Requires patient cooperation
▪ No risk to patient; may be first line with certain high-risk allergens	▪ Slight risk of systemic allergic reaction, more so in some situations
▪ Can be done where there is extensive skin disease	▪ Require areas of normal skin for testing
▪ Can be done where the patient has taken antihistamines or is unable to stop certain medications which might interfere with SPT	▪ Must stop antihistamines and some antidepressants and other drugs several days before test (see appendix 2)
▪ Many allergens available, including some which are not available for skin testing or not routinely carried in skin test settings. Some laboratories may send away samples for rarer allergens	▪ Many allergens available, but some low-demand allergens will not be carried by individual practices
▪ Laboratory test, subject to quality control and standardization	▪ Methodology and result quality variable, no standardization or formal quality control at the current time

https://www.allergy.org.au/images/stories/pospapers/ASCIA_SPT_Manual_March_2016.pdf

9

Favour skin prick testing:	
▪ Venesection may be painful or anxiety-provoking particularly in children	▪ Minor scratch, itch if positive
▪ Results may take days or weeks	▪ Results in half an hour
▪ Results are not directly meaningful to patients	▪ Results are visible and compelling to patients; may have value in ensuring compliance with allergen avoidance measures
▪ Reasonably good sensitivity	▪ In most cases, shown to have better sensitivity for clinically valid allergies
▪ Some food allergens, drugs, rarer pollens not available for testing	▪ Can extemporaneously prepare allergens (with appropriate considerations; specialist practice)
▪ Some allergens particularly foods may show low sensitivity in certain clinical situations	▪ Freshly prepared food allergens may show more sensitivity in certain circumstances (caution- risk of anaphylaxis)
▪ False positives possible with high total IgE levels	▪ No interference from high total IgE
▪ Numerical results obtained on different types of equipment are not directly comparable	▪ Numerical measurements may vary by different operators

https://www.allergy.org.au/images/stories/pospapers/ASCIA_SPT_Manual_March_2016.pdf

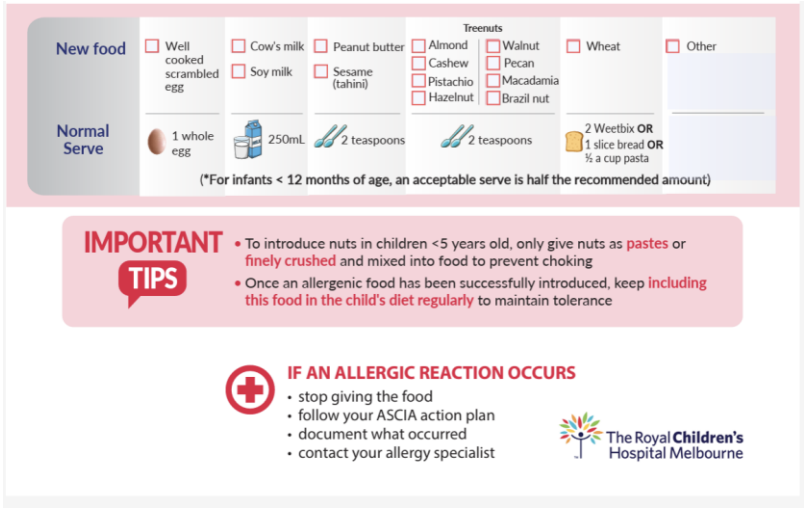
10

NEW ALLERGEN INTRODUCTION

11

https://www.rch.org.au/uploadedFiles/Main/Content/allergy/RCH%20003%20Home%20Intro%20of%20New%20Food%20handout%20EDITABLE%20GO%20LIVE%20.pdf

12



https://www.rch.org.au/uploadedFiles/Main/Content/allergy/RCH%20003%20Home%20Intro%20of%20New%20Food%20handout%20EDITABLE%20GO%20LIVE%20.pdf

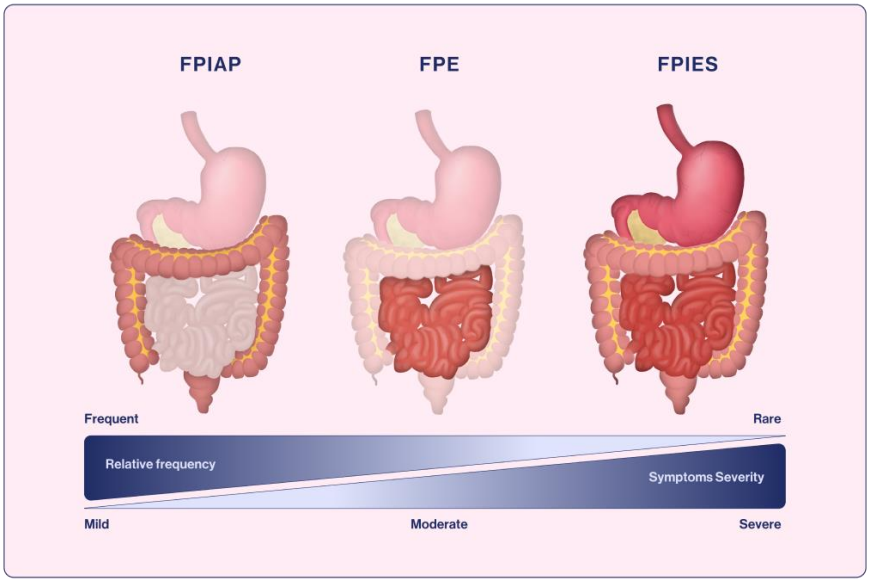
13

ALLERGEN INTRODUCTION PRACTICE POINTS

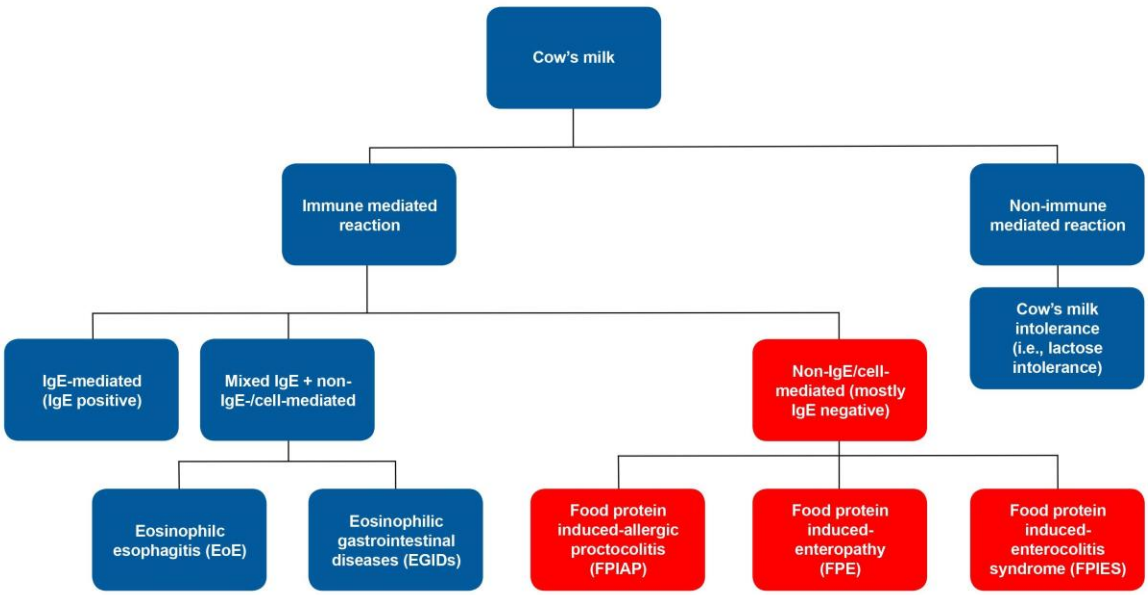
- Sesame seeds – crush them
- Nuts – introduce one at a time initially, then can combine for regular 'maintenance' exposure (e.g. mixed nut butter)
- For high risk infants (e.g. eczema) – find ways to integrate allergens into regular diet
- Egg – well cooked at first
- **Whole food sources preferred**
  - ?Processing could influence allergenicity
  - E.g. Roasted nut butters
  - If families are using e.g. nut powder packs, suggest that they follow with crushed nut

14

NON-IGE FOOD ALLERGIES



15



16

Summary of conditions

	Proctocolitis	Enteropathy	FPIES
Average age	<6 months	<6 months	<12 months
Vomit	Usually not prominent	May be present	Profuse +++
Stools	Blood, mucous usually present	Mucous +/- blood may be present	May have loose stools
Lethargy	No	Can be present	Common
Pallor	No	Possible	Common
Hives	No	No	No
Weight gain	Not affected	Can be affected	Rarely affected
Timing of reaction after ingestion	>few hours-days	>few hours -days	Average 2-4 hours
Improvement of symptoms	Over few days to weeks after eliminating trigger food	Over few days to weeks after eliminating trigger food	Once vomiting ceases and fluids tolerated, improvement seen after few hours
Unsettled behaviours	Usually not present	May be present	Not a prominent feature
Common food triggers	Cow milk, soy	Cow milk, soy	Rice, oats, cow milk, soy, eggs
Less common food triggers	Others not common	Others not common	Avocado, chicken, sweet potato, legumes (many others possible)

https://www.rch.org.au/clinicalguide/guideline_index/Non-IgE_mediated_food_allergy/

17

FPIAP

- Presents later and is milder in EBF infants
- Typically presents at 2-6 weeks but can present from day 1
  - Usually prolonged latent period after first introduction
  - For very early cases - ?possible in utero sensitisation
  - Very rarely presents with acute symptoms <12h
- Resolution
  - 50% by 6 months
  - 95% by 9 months
  - Rarely persists up to 3 years
- Rarely can present in older children and adults
  - Chronic relapsing course & more severe symptoms
  - Diarrhoea, abdominal pain, weight loss
  - Not linked to IgE mediated food allergy

18

FPIAP WITHOUT HAEMATOCHEZIA OR FPIE

- Symptoms are non-specific with many other possible causes
  - Another medical cause
  - Typical infant behaviour
  - Over-feeding or under-feeding
  - Parenting anxiety
  - GORD (not allergen-induced)
- Establish baseline severity objectively e.g. symptom diary/tracker
- Set a clear threshold for "response" (e.g. we are looking for significant reduction in crying/reflux/mucusy diarrhoea)
- Time-limited trial – e.g. 4 weeks, if no improvement reintroduce that food
- Usually eliminate foods sequentially – in rare cases (e.g. severe symptoms), eliminate multiple and re-challenge sequentially
- Reassurance that re-challenge is worthwhile to confirm that ongoing exclusion is necessary

19

FPIAP/FPIE - INVESTIGATIONS

- Exclude infection, anal fissure
- Trial elimination **& reintroduction**
  - Marked improvement in 72-96h, but may take up to 4 weeks
- FOBT if unsure about blood (FPIAP), otherwise not routinely indicated
- Other Ix not indicated but if done for other reasons **may** show:
  - FBC: peripheral eosinophilia, mild thrombocytopenia
  - Serum albumin if considering food protein enteropathy
  - Stool MCS:
    - increased eosinophils, though mucosal cytology is only performed if leukocytes detected
- SPT/sIgE are not indicated and not helpful

20

FORMULA SUBSTITUTIONS IN CMPA – ASCIA

Age	Preference	Formula type	Examples
<6 months	First line	EHF	Aptamil AllerPro/Pepti Junior
		Rice based	Alula Gold Allergy Rice Novolac Allergy
	Second line	AA	Alfamino, Neocate, Elecare
≥ 6 months	First line	Soy formula if tolerant	Karicare Soy Alula Novolac
		Rice based	Alula Gold Allergy Rice Novolac Allergy
	Second line	EHF	Aptamil AllerPro/Pepti 2 Aptamil Pepti Junior [6m+, PBS; whey based, has fish oil]
	Third line	AA	Alfamino, Neocate, Elecare

21

ELIMINATION DIET

- Eliminate one group at a time for 2-4 weeks
- Ensure to eliminate all products that contain this food
- Consider very complete food diary to identify potential allergens
- Reassurance that accidental exposure or rechallenge is not dangerous as with IgE-mediated food allergy
- Once successful, generally eliminate for at least 6 months and until at least 9-12 months of age

- Potential allergens:
  - CM [incl casein, whey, lactoglobulin]
  - Egg
  - Soy
  - Corn
  - Wheat [and gluten containing products]
  - Citrus
  - Nuts
  - Strawberries
  - Peanut
  - Fish

22

MATERNAL HEALTH ON ELIMINATION DIET

- Consider dietitian referral
- Assess intake of calcium, protein, B2 (riboflavin)
- Consider Vitamin supplement containing B2
- Choose calcium fortified CM substitute e.g. soy (unless CI), rice, almond, oat
- May need Calcium supplementation (1000mg daily)

23

EXPERIMENTAL TREATMENTS

- Creon
  - Given to mother, may denature proteins
  - 2 capsules (6000 USP lipase strength) with each meal and one with snacks, double if needed
  - Note that some enzymes are pork-derived
  - Usually in addition to elimination diet
- *Lactobacillus rhamnosus* GG

24

THANK YOU

25