The many aspects of food allergy
Adverse reactions to food make a substantial part of the daily practice of paediatricians, ranging from the banal (e.g., a restless postprandial infant) to life threatening situations.
The **Paediatric allergologist** is the professional that usually makes the definitive diagnosis and marks the borders of care and treatment.

The **primary paediatric caretaker** is usually the professional that deals and interacts with the allergic child and his family, and educates them in the intricacies of anergic diets and the measures and steps to take if and when adverse reaction to food occurs.
Many people complain of adverse reactions to foods but only a few are in fact allergic.

In the UK, about 20% of 20,000 people thought they had adverse reactions to food, but in fact a study showed that only 1.4% had a food allergy.

Other European studies suggest that 0.3 to 7.5% of children have a food allergy, 2% of European adults are thought to have a food allergy and the prevalence of food allergy amongst people with an atopic constitution is 10%.

‘Position paper on adverse reactions to food’, 1995
The Subcommittee on Adverse Reactions to Food
The European Academy of Allergy and Clinical Immunology
Death caused by food anaphylaxis

- 32 deaths in 2001
- 31 deaths between 2001 and 2006

- 5 to 50 years (younger than the first group)
- 19 boys (61%)
- Peanut 17, tree nuts 8, milk 4 (more frequent 4 vs. 1), shrimp 2
- Asthma for all
- Epinephrine correct used 4
- School 3, home 12, restaurant 8, work 4, camp 2

What is an adverse reaction to food?
In its simplistic form: any sign, complaint or symptoms caused by or occurring near the intake of food.
ADVERSE REACTION TO FOOD

Definition and classification of adverse reaction to food as proposed by the European Academy of Allergy and Clinical Immunology (EAACI) in its Position Paper on Adverse Reactions to Food
In this presentation we will confine ourselves to two subjects:

- **Food Allergy in Older Children**
- **Adverse Food Reactions in Infants**
Lactose Intolerance

The inability to metabolize lactose due to a lack of the required enzyme Lactase (a.k.a. Lactose Maldigestion, Malabsorption, Low Lactose Digestion Capacity, Lactase Deficiency, Alactasia, etc.)

Primary lactose deficiency
Congenital lactose malabsorption
With/Without lactosuria

Delayed Lactase disappearance
(Adult-Onset, Late Onset), AR in all mammals. 75% of adults worldwide, from as little as 5% in northern Europe, 71% for Sicily and more than 90% in Africa and Asia

Secondary deficiency (2ary Lactose Intolerance) can be caused by any GI Disease including CMPA

CMPA
Case report 1

Caroline, 4 months

Until today has been exclusively breastfed, has had today her first ingestion of formula milk. After 50 ml she refused further intake and started vomiting.

About 15 minutes later she developed a skin eruption constituted by numerous widespread and confluent hives. She also had diarrhea two hours later.
What is your diagnostic hypothesis for Caroline?

a) Cow's milk intolerance

b) Atopic Eczema

c) Cow's milk allergic reaction

d) Toxic Cutaneous Vasculitis

e) Auto immune reaction
Case report 2

Peter, 6 months

Has been exclusively breastfed until two weeks ago, when his mother returned to work.

Since then has been receiving two feedings of supplementary (follow on) infant formula.

He presents with the following signs and symptoms:

- At the end of some of the bottle feed he has a facial flushing spreading to the chest
- Sometimes he vomits
- Eczema on the face and creases
What is your diagnostic hypothesis for Peter?

a) Cow's milk intolerance
b) Atopic Eczema

c) Cow's milk allergic reaction
d) Toxic Cutaneous Vasculitis
e) Auto immune reaction
Old nomenclature:

Cow’s milk allergy, Cow’s milk intolerance, Cell mediated milk allergy, Immune complex mediated milk allergy, etc.

Current definition:

- **Immune-Mediated adverse reactions to food**
- **Non immune Mediated adverse reactions to food**
ADVERSE REACTION TO FOOD

Toxic food reactions

Non Toxic

Non immune Mediated
(Food Intolerance)

Enzymatic

Pharmacological

Undefined

Immune Mediated
(Food Allergy)

IgE

Non IgE

Psychosomatic food adverse reactions

Related to primary mental disorder, may mimic allergic or food intolerance symptoms.
Immediate symptoms of CMPA

Usually appear within 2 h (maximum 4 h) following ingestion

**Immediate symptoms** → **IgE mediated**

**Cutaneous symptoms** (urticaria, angio-oedema) 50-60%

**Respiratory symptoms** (rhinitis, conjunctivitis, bronchospasm or asthma) 20-30%

**Digestive symptoms** (nausea, vomiting and/or diarrhoea) 50-60%

**Systemic symptoms** (defined as anaphylaxis if 2 organs involved)

Cow's milk protein allergy (CMPA)

common in infants

1st food allergy to appear

8 to 12% of food allergies

0.1 to 7.5% in the general population

2.5% < 3 years

1.1% from 2 to 14 years

0.3% in adults

Adapted from:
Cow's milk contains more than 30 proteins all of which are potentially allergenic.

<table>
<thead>
<tr>
<th>Protein Type</th>
<th>Molecular weight (kDa)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caseins (Bos d8)</td>
<td>20 - 30</td>
<td>81</td>
</tr>
<tr>
<td>(αs1, αs2, β, κ 1-3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lactoserum proteins</td>
<td></td>
<td></td>
</tr>
<tr>
<td>α-lactalbumin Bos d4</td>
<td>14.2</td>
<td>3</td>
</tr>
<tr>
<td>β-lactoglobulin Bos d5</td>
<td>18.3</td>
<td>9</td>
</tr>
<tr>
<td>Serum albumin Bos d6</td>
<td>67</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Bos d7 immunoglobulins</td>
<td>160</td>
<td>2</td>
</tr>
</tbody>
</table>

Caseins, α-lactalbumin and β-lactoglobulin are the most important.

Which test of the following options would you choose to confirm CMPA in these cases?

a) Oral provocation test
b) Skin prick test
c) Specific IgE levels
d) Atopy patch test
e) b + c
f) c + d
Diagnostic tests for CMPA diagnosis must be adapted to the disease mechanisms

- IgE dependent:
  - Skin prick tests
  - Specific IgE
  - Provocation test

- Non-IgE dependent:
  - Atopy Patch Tests
  - Digestive endoscopy
  - Provocation test
Caroline’s Exams

CBC

Hb: 13.8 g/l  
Htc: 38%  
RBC: 4,1200,00/mm³  
WBC: 6,700/mm³  
Eosinophiles: 5.6%

Total IgE  
107 U/ml

Specific IgE (CAP)  
Whole Milk  
7 KU/ml  
α-lactalbulmin  
1.3 KU/l  
β-lactoglobulin  
3.7 KU/l  
Casein  
2.4 KU/l

Skin Prick test  
Whole Milk  
> 3 mm  
α-lactalbulmin  
> 3 mm  
β-lactoglobulin  
> 3 mm  
Casein  
> 3 mm

1. Skin tests and specific IgE levels are sometimes negative when the first symptoms appear

>>> Remember to repeat them.

2. Results do not correlate with symptom severity

3. Cut-off values for s-IgE to diagnose CMPA are controversial

• No cut-off (Sopo SM & al Ped Allergy Immunol 2007 18: 575-82)
• 3.5 kU/L (Saarinen & al Clin Exp Allergy 2001; 31 : 423-9)
• 5 kU/L (Garcia-Ara & al JACI 2001 107:185-90)
• 32 kU/L and 15 kU/L (Sampson & al JACI 1997 100:444-51)
• 50 kU/L (Roehr et al. JACI 2001 107:548-53)
• 88.8 kU/L (Celik-Bilgili & al Clin Exp Allergy 2005 ; 35 : 268-73.)
Diagnostic value of skin-prick and patch tests and serum eosinophil cationic protein and cow's milk-specific IgE in infants with cow's milk allergy

K. M. Saarinen, H. Suomalainen and E. Savilahti. Clinical and Experimental Allergy, 2001

<table>
<thead>
<tr>
<th>Test</th>
<th>Positive Challenge</th>
<th>Negative Challenge</th>
</tr>
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<tbody>
<tr>
<td>Prick ST</td>
<td>61</td>
<td>24</td>
</tr>
<tr>
<td>Sp IgE</td>
<td>45</td>
<td>13</td>
</tr>
<tr>
<td>Patch Test</td>
<td>26</td>
<td>8</td>
</tr>
<tr>
<td>ECP</td>
<td>21</td>
<td>13</td>
</tr>
</tbody>
</table>
The oral food challenge is the test of reference whatever the immunological mechanism.
Oral food challenge in CMPA diagnosis

Should always be performed in a protected hospital environment

- Open provocation usually preferred in infants

- Not indicated during the first year if:
  - Allergic study was positive and the clinical picture was very suggestive of an IgE mediated reaction (anaphylaxis or other)
  - Clinical episode occurred less than three months previously
Of the following options which formula would you suggest for Caroline, since her mother quickly ceased to have milk?

a) Partially hydrolysed formula
b) “Soya milk”

**c) Extensively hydrolysed formula**

d) Goat or sheep milk
e) Amino-acid formula
<table>
<thead>
<tr>
<th>EHF Extensively Hydrolyzed Formulae</th>
<th>True Hypoallergenic formulas</th>
<th>Bovine Casein</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Bovine Whey</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soy &amp; Bovine Collagen</td>
</tr>
<tr>
<td>PHF = Partially hydrolyzed Formulae (So called HA)</td>
<td>Immunoreactivity:&lt;br&gt;(&lt;1%) of total Nitrogen</td>
<td></td>
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<tr>
<td>--------------------------------------------------</td>
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</tr>
</tbody>
</table>

Reduction in the incidence of atopic dermatitis, when compared to standard intact protein formulas (between 32\% and 88\%).

No increase in allergic risk.

100\% Whey PHF, taste comparable to standard intact protein formulas, leading to better acceptance than other hydrolysates.

100\% Whey PHF commercialized as routine infant formulas, at comparable prices.
Special foods for allergic babies

AA = Amino Acids
Non allergenic
Amino Acid Mixture

- Neocate® (SHS International)
- Nutramigen AA -New (Mead Johnson)
- EleCare (Abbott)
- L-Emental (Hormel)
- Vivonex (Nestle)
Synthetic amino acids

Unnecessary in most cases

Useful in selected situations

- When symptoms persist with hydrolysates
- When other hydrolysates have failed
- In the case of multiple food allergies
Are there other possible substitutes?

Goat’s milk, sheep’s milk: not recommended due to:
1. Cross allergy due to homology between caseins contained in these milks and those of cow’s milk
2. Nutritional risks (specific deficiencies in folic acid and vitamin B12, and too much chlorine).

Other Milks?

Cross Sensitization between Milk Proteins: Reactivity to a “Kosher” Epitope?


Patients allergic to cow’s milk tested positive by skin-prick test for cross-reactivity to other ruminants (Kosher animals) like deer, Ibex and buffalo. In contrast, only a minority tested positive to pig milk and camel’s milk.

Conclusions: A significant cross-sensitization to milk proteins derived from kosher animals exists in patients allergic to cow’s milk protein, but far less so compared to the milk proteins from non-kosher animals tested. Patients with proven IgE-mediated allergy to cow’s milk can utilize the above findings to predict suitable alternative sources of milk.

Soya-based preparations

Not recommended (ESPGHAN committee on nutrition).
Besides CMP would you also recommend Caroline’s parents to avoid egg and fish during the first 12 months?

a) This is an unnecessary precaution, since there is not any evidence indicating that it prevents allergy to those foods.

b) Yes, there is ample evidence that it should be done, in order to lower the probability of sensitization to those frequent allergens.

c) Yes, this is a wise precautionary measure recommended by many experts, although sufficient evidence to support it is still lacking.

d) Yes, and even longer: there is some evidence that eggs should be avoided until 24 months and fish until 36 months.
What will you tell Caroline’s parents about the possibility of later tolerance to CMP?

a) As specific IgE levels to Whole Milk are low, early tolerance is probable

b) As specific IgE levels to casein are low, this is likely a transient condition

c) We do not have reliable prognostic indicators do predict evolution

d) Later tolerance to CMP is very unlikely
PROGNOSIS

Most infants will heal spontaneously
50% up to the age of 1y
66% to 75% up to the age of 2y
80% up to the age of 3y

The narrower the scope of symptoms
the better the chances of healing
Overall, 80-90% of CMPAs disappear by the age of 15 years*

Adapted from:
Specific IgE level may indicate CMPA prognosis


64 children, CMPA proven before 2 years by double-blind oral food challenge

mean age at diagnosis: 1.8 years

new OPT at mean age 11.7 years

**Recovery** in 80% of children

with initial milk-specific IgE levels < 14.3 kU/L  p=0.02

**Persistent CMPA** in 75% of children

with initial casein-specific IgE levels >20.2 kU/L  p=0.04
Follow-up of children with allergy to cow’s milk

Specific IgE levels every 6 months / 1 year

Annual oral food challenge until recovery (according to clinical history and s-IgE follow-up)

Systematic screening for other respiratory or food allergies / sensitisations at least every year until the age of 6 years
Treatment of CMPA

Treat acute symptoms
Preventive treatment
Educate the family

Elimination diet for children with proven diagnosis

Not for symptomatic children older than 1 year who test positive but tolerate milk: increased risk of tolerance rupture, with secondary development of a real allergy*.

Possible option: tolerance induction (selected cases)

What foods must be avoided for confirmed cases of CMPA?

- Milk and dairy products
- Products containing:
  - Milk, milk protein, lactoprotein, whey proteins, casein,
  - caseinates, lactalbumin, lactose, animal proteins, margarine,
  - cream, butter, buttermilk
- Soya, in the absence of allergy tests, <1y
- non purified Lactose
- Shampoo, ointments and medicines containing milk proteins

The many aspects of food allergy

OTHER COMMON CLINICAL MANIFESTATIONS OF CMPA

José Manuel Lopes dos Santos
Paediatrician and Allergologist
Chairman, European Board of Paediatrics
Hospital Pedro Hispano Dep.da Mulher da Criança e do Jovem
MATOSINHOS - PORTUGAL

Shimon Barak
Primary Care Paediatrician
Chair, ECPCP Committee of Strategy
Maccabi Health Fund & Tel Aviv Med. Center
TEL AVIV - ISRAEL
Dietary Protein Induced Proctitis/Proctocolitis

- Infants look well aside from bloody streaked mucotic feces
- Blood loss is minimal therefore usually no signs of anemia
- Mean age of diagnosis 2 months
- When prolonged may evolve into diarrhea & vomiting
- When recurrent may lead to hypotension
- When prolonged may lead to FTT, dysphagia, lethargy, abdominal pain
- May appear also in infants fed with soy protein and even exclusively breastfed

Differential Diagnosis:
- Infections (Shigella, Campylobacter)
- Colorectal pathologies (Meckels', fissures)
Dietary Protein Induced Proctitis/Proctocolitis

- 2/3 of children with CMPA present with vomiting and diarrhea that evolves rapidly into FTT and malabsorption

Dietary Protein Enteropathy

- Protein enteropathy leads to oedema, anemia and abdominal distention

Differential Diagnosis:
- Infections
- Metabolic
- Lymphangiectasis
- Caeliac

Diagnosis by avoidance + challenge + biopsy

Other causes: Soy protein. Egg, cereals
OTHER COMMON CLINICAL MANIFESTATIONS OF CMPA

Dietary Protein Induced Proctitis/Proctocolitis

A severe form with involvement of both small intestine & colon. CMPA is the main cause but 50% are allergic also to soy and some to other foods including rice, cereals, semolina and even chicken.

It’s very important to rule out NEC and infections.

On prolonged intake may present as severe vomiting and diarrhea, dehydration, lethargy, acidosis and methglobulinopathy.

Infants look sick and may mimic sepsis including leukocytosis with high PMN count. After avoidance, rechallenge with the offending protein may lead in 20% of cases to a delayed hypersensitivity reaction (after 2h)

THEREFORE CHALLENGE SHOULD NOT BE PERFORMED IN AN OUTPATIENT SETUP
Dietary Protein Induced Proctitis/Proctocolitis

Dietary Protein Enteropathy

Dietary Protein Enterocolitis

G.E.R. due to CMPA

CMPA is the etiology behind 15% to 42% of GER
OTHER COMMON CLINICAL MANIFESTATIONS OF CMPA

Dietary Protein Induced Proctitis/Proctocolitis

Dietary Protein Enteropathy

Dietary Protein Enterocolitis

G.E.R. due to CMPA

Infantile Colic due to CMPA

44% of infants with CMPA show symptoms of colic that react better to hypoallergenic foods than to the avoidance of lactose or antacids.

Cochrane suggests the use of hypoallergenic foods for treating severe infantile colic.
Case Report 3

David, 6 years old, was referred by his primary care physician for help on the clinical management of a complex situation of “multiple allergies”

Family history

Father - atopic eczema
Mother - allergic rhinitis
Paternal Grandmother - atopic asthma
Clinical history

• Persistent itchy inflamed & scaling skin rash since the age of 2 months

• For this reason, as a preventive measure, CMP was avoided during the first 8 m

• At 8 months, while having his first bottle of CMP based formula milk, he required emergency treatment for:

  • Acute respiratory distress
  • Swelling of the lips
  • Widespread hives
What was the most probable diagnosis and which would have been the best indicated immediate treatment?

1. Acute asthma attack, $O_2$ + nebulization salbutamol + ipatroprium bromide

2. Anaphylaxis, $O_2$ + adrenaline IM

3. Anaphylaxis, $O_2$ and adrenaline SC and steroids IV

4. Anaphylaxis, $O_2$ and steroids IV + antihistamines IM

5. Unknown, monitoring and further history
• Acute respiratory distress
• Swelling of the lips
• Widespread hives

Anaphylaxis

Do not forget

a free airway

& recumbent position

Oxygen
Nebulization Salbutamol
Nebulization Ipatropium
I.V. Steroids
Antihistamines
I.M. Adrenaline

INTRAMUSCULAR, not SUBCUTANEOUS Adrenaline is indicated
Clinical history (continued)

• Several further episodes of anaphylaxis after accidental low dose CMP ingestion
• One episode of mild anaphylaxis after eating two biscuits containing peanut

Measures taken

• Tolerance induction to cow’s milk at 4 years of age (takes now 50 ml daily as part of his management plan)
• Avoidance of Peanut until further notice
• An epinephrine auto-injector was prescribed
Clinical history – other information

- Persistent nasal obstruction, frequent sneezing and runny nose since the age of 2 years
- Adenoidectomy at the age of 3 years due to sleep obstructive apnoea
- Viral associated wheezing since the age of 4 (about 2 episodes each year)
- Occasional intolerance to exercise
Clinical Exam (relevant findings)

- Widespread rash
- Normal pulmonary auscultation
  - Peak Flow – 170 (77%)
  - Peak flow after Salbutamol – 210 (96%)
  - Peak flow reversibility – 24%
- Moderate Rhinitis
- Right serous otitis media (confirmed by tympanogram)
What allergic conditions can you identify in this patient (clinical history and physical exam)?

1. Food Allergy
   - Yes
   - No

2. Atopic Eczema
   - Yes
   - No

3. Allergic Rhinitis
   - Yes
   - No

4. Asthma
   - Yes
   - No
Do you identify an ATOPIC MARCH in this patient?

- Food Allergy
- Atopic Eczema
- Allergic Rhinitis
- Asthma
- Serous otitis media

[Options: YES, NO]
The “Atopic March”

• Typically, an atopic patient develops a spectrum of "atopic diseases" with age, sometimes referred to as "the atopic march"

• During the first years, gastrointestinal and eczematous skin symptoms, often caused by food allergens, predominate.

• Asthma and rhinitis to inhalant allergens develop later

The Allergic March
Progression of the Atopic Disease

Genetic Factors

Gastrointestinal Disturbances

Atopic Eczema

Recurrent otitis media

Allergic Rhinitis

Allergic Asthma
The Allergic March
Progression of the Atopic Disease

Genetic Factors → Gastrointestinal Disturbances → Atopic Eczema → Allergic Asthma → Recurrent otitis media

Allergic Rhinitis
Which of these allergic conditions that David presented are exclusively IgE mediated?

- Allergic Rhinitis: YES  NO
- Asthma: YES  NO
- Atopic Eczema: YES  NO
Definition of Atopic Dermatitis or Atopic Eczema

A skin disease characterized by areas of severe itching, redness, scaling, and loss of the surface of the skin (excoriation).

When the eruption has been present for a prolonged time, chronic changes occur due to the constant scratching and rubbing known as lichenification (thickening of the skin with accentuation of the skin lines to form a crisscross pattern).
Atopic Eczema/Dermatitis Syndrome (AEDS) (EAACI Nomenclature Task Force)

- **Allergic AEDS**
  - IgE associated
  - Non IgE-associated (T cell Associated)
    - Positive atopy patch tests to aero and food allergens
    - Allergen-specific T cells (peripheral blood or skin biopsies)

  *Mixed mechanism?*

- **Non allergic AEDS** (previous “intrinsic” dermatitis)

When should a Paediatric Allergologist be consulted in a case of Atopic Eczema/Dermatitis Syndrome?

• < 3 years of age
  - If food allergy is suspected

• > 3 years of age
  - In presence of respiratory symptoms
  - In ill-controlled cases
Haemoglobin – 13.6 g/dl
Leucocytes – 9,880/mm³
Eosinophiles – 10.6% (1,047/mm³)

SPECIFIC IgE

Dermat Pteron – Cl 6 (> 100 KU)
Dermat Farinae – Cl 6 (> 100 KU)
Whole Milk – Cl 3 (9.94 KU)
\(\alpha\) lactalbum – Cl 2 (2.61 KU)
\(\beta\) lactoglob – Cl 3 (3.98 KU)
Casein – Cl 3 (13.6 KU)
Whole Egg – Cl 0 (> 0.35 KU)

Total IgE – 441 IU/ml

Beef – Cl 1 (0.61 KU)
Pork – Cl 2 (1.65 KU)
Peanut – Cl 3 (5.49 KU)
Wheat – Cl 1 (0.42)
Walnut – Cl 3 (4.87)
Soy – Cl 2 (1.11)
Tomato – Cl 3 (5.06)
Pityrospor. orbicul – Cl 0
Is multiple food allergy a common situation?

Number of foods:

<table>
<thead>
<tr>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>79.2%</td>
</tr>
<tr>
<td>Two</td>
<td>12.6%</td>
</tr>
<tr>
<td>Three</td>
<td>2.7%</td>
</tr>
<tr>
<td>Four</td>
<td>3.8%</td>
</tr>
<tr>
<td>Six</td>
<td>0.5%</td>
</tr>
<tr>
<td>Seven</td>
<td>0.5%</td>
</tr>
</tbody>
</table>

Case 3 - New Therapy

Hydroxyzine - 10 mg X 3
Desloratadine - 5 mg X 1
Emolient cream
Dermatocorticoid or Tacrolimus on demand
Cow’s milk 50 ml/day
No peanut intake until further notice
Emergency Epinephrine auto-injector (Anapen)

Budesonide 200 mcgs X 1
Oral Dissodium Cromoglycate 100 mcgs X 3
Mite avoidance measures
Case 3 – Two months later

Symptoms and “on demand” medication

- Itch markedly relieved
- Consumption of Dermatocorticoids and Tacrolimus very decreased
- Better tolerance to exercise

Clinical findings

- Marked improvement of eczema lesions
- Normal pulmonary auscultation
- Peak Flow – 220 (100%)
- Apparently improved Allergic Rhinitis
- Tympanogram much improved
Case 3 - Two months later

Before

After
Case 3 - Two months later

Before

After
Oral Cromolyn Sodium in AEDS

• Highly controversial therapy

• Conflicting results in medical literature

• No evidence for a positive recommendation

• Anecdotal evidence that it may be effective in occasional cases (like this one)
Case 3 - New Therapy

**Hydroxyzine** - 10 mg X 3

Desloratadine - 5 mg X 1

Emolient cream

Dermatocorticoid or Tacrolimus on demand

Cow’s milk 50 ml/day

No peanut intake until further notice

Emergency Epinephrine auto-injector (Anapen)

**Budesonide** 200 mcgs X 1

**Oral Dissodium Cromoglycate** 100 mcgs X 3

Mite avoidance measures
Case 3 - Five months later

Five months later, David went to a birthday party and ate a slice of chocolate cake supposedly containing no milk.
Case 3 - Five months later

Five months later, David went to a birthday party and ate a slice of chocolate cake supposedly containing no milk.

In minutes, oedema appeared on his face and lips and his tongue started itching.
Case 3 - Five months later

He was not taking Desloratadine for 3 weeks because the last vial was over, and, as he was doing well, the mother was waiting for the next appointment with the doctor to decide what to do.

He had previously tolerated chocolate many times.

The adrenaline auto-injector was not available at the time.

He was taken to the hospital and symptoms regressed after treatment with anti-histamines.
Case 3 - Five months later

What went wrong?

1. Chocolate should be absolutely forbidden for this patient
   - Yes
   - No
   - Possibly

2. Adrenaline auto-injector should always be available
   - Yes
   - No
   - Possibly

3. Antihistamines should not have been discontinued
   - Yes
   - No
   - Possibly

4. Some unforeseen circumstance may have occurred
   - Yes
   - No
   - Possibly
Case 3 - Five months later

The chocolate cake had been manufactured using PEANUT BUTTER

Hidden Allergen
Can he eat other nuts?

Increased rate of simultaneous tree nut allergy (~ 25 to 50%)

Hourihane et al BMJ 1998;316:1271-5;
Skolnick et al JACI 2001;107:367-74
Sicherer SH and Sampson J Allergy Clin Immunol 2007120 491-503
Can he eat other legumes?

Most peanut allergic persons (95%) tolerate other legumes

Hourihane et al BMJ 1998;316:1271-5;
Skolnick et al JACI 2001;107:367-74
Sicherer SH and Sampson J Allergy Clin Immunol 2007120 491-503
Will David ever overcome his Peanut allergy?

May resolve in around 20% of young children (repeat evaluations)

Predictive for development tolerance:

Small level IgE peanut (<5kUA/L)
conversion pos - neg skin prick test

May recur following a passed oral food challenge (~ 8%)

Hourihane et al BMJ 1998;316:1271-5;
Skolnick et al JACI 2001;107:367-74
Sicherer SH and Sampson J Allergy Clin Immunol 2007;120:491-503
Will David need a strict peanut free diet?

He must be properly tested

Reaction can occur to trace amounts, although a more typical amount to trigger an objective reaction is about 1 peanut kernel

Most children who are allergic to peanuts can eat vegetable fats, refined peanut oil and food containing traces of peanuts.

Adapted from:
Proteins and peanut oil

<table>
<thead>
<tr>
<th>Product class</th>
<th>Description</th>
<th>Protein ng/ml ELISA</th>
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</thead>
<tbody>
<tr>
<td>Crude oils</td>
<td>crude oil</td>
<td>6470</td>
</tr>
<tr>
<td></td>
<td>crude oil</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>cold pressed oils</td>
<td>2550</td>
</tr>
<tr>
<td>Refined food oils</td>
<td>arachid oil</td>
<td>&lt;0.3</td>
</tr>
<tr>
<td>Pharmaceutical refined ingredients</td>
<td>arachid oil</td>
<td>&lt;0.3</td>
</tr>
<tr>
<td></td>
<td>arachid oil</td>
<td>&lt;0.3</td>
</tr>
<tr>
<td>Pharmaceutical vit K products</td>
<td></td>
<td>&lt;0.3</td>
</tr>
</tbody>
</table>

Reproduce with permission from:
Diet must be adapted to the reactogenic dose

Cumulative frequency of single blind OPT in allergic children: 137 peanut, 167 egg, 108 milk

Reproduce with permission from:
Final comments
Vandenplas Y, Brueton M, Dupont C et al.

Guidelines for the diagnosis and management of cow's milk protein allergy in infants.

Arch Dis Child. 2007; 92:902-8

**Cutaneous symptoms** (urticaria, angio-oedema) 50-60%

**Respiratory symptoms** (rhinitis, conjunctivitis, bronchospasm, asthma) 20-30%

**Digestive symptoms** (nausea, vomiting and/or diarrhoea) 50-60%

**Systemic symptoms** (defined as anaphylaxis if 2 organs involved)
**Food Allergy: frequency of clinical signs**


Clinical signs of the 182 schoolchildren with food allergies (244 foods).

<table>
<thead>
<tr>
<th>Food</th>
<th>N</th>
<th>Cutaneous, N (%)</th>
<th>Gastrointestinal, N (%)</th>
<th>Respiratory, N (%)</th>
<th>Anaphylactic shock, N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>29</td>
<td>7 (24.1)</td>
<td>12 (41.3)</td>
<td>2 (6.9)</td>
<td>4 (13.7)</td>
</tr>
<tr>
<td>Eggs</td>
<td>23</td>
<td>14 (60.8)</td>
<td>8 (34.8)</td>
<td>2 (8.7)</td>
<td>1 (4.3)</td>
</tr>
<tr>
<td>Peanuts</td>
<td>20</td>
<td>14 (70)</td>
<td>4 (20)</td>
<td></td>
<td>4 (20)</td>
</tr>
<tr>
<td>Shellfish</td>
<td>38</td>
<td>29 (76.3)*</td>
<td>6 (15.7)**</td>
<td>2 (5.2)</td>
<td>2 (5.2)</td>
</tr>
<tr>
<td>Exotic fruit</td>
<td>29</td>
<td>13 (44.8)</td>
<td>13 (44.8)</td>
<td>1 (3.4)</td>
<td>0</td>
</tr>
<tr>
<td>Tree nuts</td>
<td>19</td>
<td>11 (57.8)</td>
<td>7 (36.8)</td>
<td>2 (10.5)</td>
<td>1 (5.2)</td>
</tr>
<tr>
<td>Other plant foods</td>
<td>69</td>
<td>42 (60.8)</td>
<td>19 (27.5)</td>
<td>4 (5.8)</td>
<td>2 (2.9)</td>
</tr>
<tr>
<td>Other animal foods</td>
<td>10</td>
<td>6 (60)</td>
<td>4 (40)</td>
<td>0</td>
<td>1 (10)</td>
</tr>
<tr>
<td>Not specified</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>244</td>
<td>153 (62.7)</td>
<td>74 (30.3)</td>
<td>17 (6.9)</td>
<td>12 (4.9)</td>
</tr>
</tbody>
</table>
PARENTAL & PATIENT EDUCATION

Learning is essential, there are multiple objectives

Know how to deal with an allergic reaction

Know about the elimination diet, and how to use it

Know to ask for the establishment of a Personalized Care Plan

Know of useful documents and addresses
Know about the elimination diet, and how to use it

1. The food allergen or allergens
2. Which foods cannot be consumed and which ones can be consumed
3. Learn to be cautious with food which is not pre-packaged (bread, cakes, pizza...depending on the food in question)
4. Know how to read lists of ingredients
5. Know that the ingredients are listed in order of decreasing weight
6. Read the list of ingredients even for a product bought regularly
7. Know the European regulations for “allergens which must be declared”
8. Know about the possibility of cross-reactions (preventive information if tests are negative)
9. For the child: Know how to say no and differentiate between a reference adult and a non-reference adult
Certain allergens and their derivatives present in the finished product, even in a modified form, must be clearly indicated in the list of ingredients, whatever the quantity in question. Preventive labelling indicating potential contamination is officially not advised.
List of 14 allergens which must be indicated on food labels

European Decree 2003/89/CE modified in 2007 (2006/142/CE)

1. Cereals containing gluten (wheat, rye, barley, oats, spelt wheat, Kamut) and products containing these cereals
2. Crustaceans and crustacean-based products
3. Eggs and egg-based products
4. Fish and fish-based products
5. Peanuts and peanut-based products
6. Soya and soya-based products
7. Milk and dairy products (including lactose)
8. Tree nuts (almonds, hazelnuts, walnuts, cashew nuts, Brazil nuts, macadamia nuts, and nut-based products)
9. Celery and celery-based products
10. Mustard and mustard-based products
11. Sesame seeds, and sesame seed-based products
12. Sulphur dioxide and sulphites > 10mg/kg (or 10mg/litre)
13. Lupin beans
14. Mollusca (clams, mussels, octopus, squids, whelks, oysters, scallops).
Thank you very much for your attention