Eczema and Allergies

- Dr Claudia Gray, Paediatrician, Red Cross Hospital Allergy Clinic
Eczema and Allergies

- Complex, conflicting and confusing!
Triggers of atopic eczema

Specific Immunological responses

Inhalable respiratory allergens → Food allergens → Microbial agents → Cells and mediators in skin immune system → ATOPIC DERMATITIS

Non-specific responses

IRRITANTS → HEAT → HUMIDITY → STRESS → SKIN BARRIER DYSFUNCTION
Focus on food allergies and eczema

Relationship between eczema and food allergies is complex and multifaceted

Prevalence of both atopic dermatitis and food allergies is increasing; rate too fast to be explained by genetic drift
Increasing evidence of role of food allergies in the pathogenesis of eczema in a subset of patients

More important in children
Background

- Diagnosis of food allergies important:
  - Food allergies can lead to dangerous reactions
  - Food allergies may be a trigger for persistent eczema
  - Unnecessary diets not based on proper diagnosis can lead to nutritional compromise
Eczema and Food Allergy

- Topics to be Discussed:
  - Association between food allergies and eczema (3 perspectives)
  - Diagnosis of food allergy in eczema
  - Elimination diets
1. The co-existence of food allergies in patients with eczema
Association between food allergies and eczema:

2. The role of food allergies in the pathogenesis of eczema
Association between food allergies and eczema:

- 3. The role of eczema in the pathogenesis of food allergies
Association between food allergies and eczema:

1. The co-existence of food allergies in patients with eczema
Eczema and food sensitisation

Sensitisation
(+ve SPT/food specific IgE)

Vs

Allergy
(clinically significant reaction upon ingestion of the food)
Eczema and food sensitisation

- Sensitisation to foods in children with atopic eczema = 50-60%
- A high % of children with eczema have high total IgE’s
- The process of food sensitisation seems to be completed by the first birthday
Eczema and food sensitisation

- EPAAC™ (Early Prevention of Asthma in Atopic Children): sensitisation patterns in 2200 infants with eczema globally:
  - Any food: 48.6%
  - Egg white 41.9% (SA 47.1%)
  - Cow’s milk 27.4% (SA 28.4%)
  - Peanut 24.4% (SA 26.8%)

Eczema and proven Food Allergies

- 30-40% of children with eczemas have at least one food allergy
- 5-8 X more prevalent than in the general population
- “food allergy” = positive food challenge or recent history of significant reaction in a sensitised patient
## Eczema and proven Food Allergies

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<td>Aiming for 100 (so far 72)</td>
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Milk, egg, peanut, wheat, soy account for 90% of allergenic foods in children with eczema.

- Typically outgrown (despite persistently+ SPT) apart from peanut.
1. **Non-eczematous reactions (usually immediate)**:
   - cutaneous (pruritis, rashes, urticaria)/gastrointestinal (vomiting, diarrhoea) /respiratory symptoms/ anaphylaxis.
   - 50% of cases
   - usually occur within 2 hours of food ingestion.

2. **Isolated eczematous reactions**:
   - 10% of reactions
   - usually delayed > 6 hours after food ingestion

3. **Combination of non- and eczematous reactions**:
   - occurs in 40% of cases
Patterns of Clinical Reactivity to Foods in AD patients

- Non-eczematous reactions
- Isolated eczematous reactions
- Combination
Patterns of Clinical Reactivity to Foods in AD patients

- 75% of reactions occur within 2 hours of food ingestion
- Up to 25% of reactions immediate/late:
  - Pruritis
  - GIT
  - Eczema
Patterns of Clinical Reactivity to Foods in AD patients

- Up to 95% of reactions involve cutaneous reactions:
  - Morbilliform and macular rashes
  - Pruritis
  - Urticaria
  - Eczematous reactions

- Cutaneous reactions=eruptions at sites affected by/predisposed to eczema
90% of cases of food allergy in eczema patients = IgE-mediated

i.e. by far the majority of food allergies will be picked up during SPT/sIgE testing
10% of food reactions in eczema patients are non-IgE mediated:

- No food-specific IgE
- Food specific T cells

- Generally more difficult to diagnose
- More commonly with wheat as compared with cow’s milk/egg
The role of food allergies in the pathogenesis of eczema
Eczema can be exacerbated in 2 ways:

- either directly with development of new eczematous reactions which tend to occur as late reactions, or
- indirectly with early morbilliform rash/pruritis leading to itch-scratch cycle and secondary exacerbation of AD.
The role of food allergies in the pathogenesis of eczema

- Co-existence of eczema and food allergies is high.
- Relationship is complex and not always causal.
- Evidence of a role of food allergy in eczema causation:
  - Clinical
  - Histological
1. Common association: 30-40% of children will have proven food allergies

2. At least 50% of the children with AD who react to certain foods will react with a worsening if eczema
Clinical evidence of causality

3. Oral food challenges can reproduce skin symptoms.

4. Appropriate dietary elimination results in improvement of atopic dermatitis in selected patients.
Clinical evidence of causality

5. The presence of IgE to food and aeroallergens is associated with earlier onset and more severe AD

6. The greater the level of IgE and the earlier it is elevated, the more severe and persistent AD is likely to be

7. The strength of association between eczema and IgE mediated food allergy increases with increasing severity of AD
Clinical evidence of causality

- Wolkerstorfer A, Wahn U, Kjellman NI et al. Natural course of sensitization to cow’s milk and hen’s egg in childhood atopic dermatitis: ETAC study group. *Clin Exp Allergy* 2002; 32:70-73

Histological evidence of causality

- The histology of lesions in chronic eczema suggests classical type 4 cell mediated immunity.

- Patterns of cytokine expression found on lymphocytes infiltrating acute AD lesions are predominantly of the Th2 type → role of the IgE antibody+ TH2 cytokine milieu.

- Th2 cytokines promote eosinophil influx into legional skin lesions and upregulate high affinity IgE receptors on APC including Langerhans cells.
The Role of Eczema in the Pathogenesis of Food Allergies
The Role of Eczema in the Pathogenesis of Food Allergies

- EPAAC™ study:
  - Early onset eczema < 3 months → significantly greater risk of acquiring food allergies
  - In < 12 mths: food allergies increased with ↑ disease severity
The Role of Eczema in the Pathogenesis of Food Allergies

- Skin barrier defect → earlier sensitisation to food allergens by non-dietary route → evasion of oral tolerance → development of food allergies

- Filaggrin gene defects → risk of severe eczema + food sensitisation
Consider Evaluation for Food Allergy:
1. Cases of moderate to severe AD in an infant/child
2. History of acute reactions to food
3. Convincing history of AD exacerbated by foods
4. In severe AD in teens/adults
Diagnosis of Food Allergy in Eczema Patients

- Aims of food allergy evaluation in AD:
  1. Proving that food allergies result in non-eczematous type reactions which may be of immediate danger to the patient

  versus

  2. Proving that food allergies result in delayed eczematous reaction that directly exacerbates AD.
Aims of food allergy evaluation in AD:

1. *Proving that food allergies result in non-eczematous type reactions which may be of immediate danger to the patient*

   *versus*

2. Proving that food allergies result in delayed eczematous reaction that directly exacerbates AD.
Proving that food allergies result in non-eczematous type reaction

- IgE-mediated reactions in > 90%
- History
- SPT
- Specific IgE
- (Atopy Patch Test)
- Food Challenge
Proving that food allergies result in non-eczematous type reaction

- **SPT:**
  - Negative predictive value > 95%
  - Positive predictive Value 30-50%
  - Results do not correlate with loss of clinical reactivity
Proving that food allergies result in non-eczematous type reaction

- **Specific IgE:**
  - Negative predictive value 75%
  - Positive predictive value 20-60%

- **APT:**
  - May reflect delayed phase clinical reactions
  - Thus far limited additional value
Proving that food allergies result in non-eczematous type reaction

- **Food Challenge:**
  - Gold standard - other tests have poor PPV
  - If any discrepancy between history and SPT/sIgE
  - E.g. sensitised but “not sure if reacts”, “doesn’t like”, “told not to eat”, “never eaten it”, “used to react”
  - DBPCFC vs open
  - Ideally observe 6 hours after max dose
  - Follow up 24 hours later for worsening of eczema
Diagnosis of Food Allergy in Eczema Patients

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Proving that Food allergy results in delayed eczematous reaction

**Scenarios:**
- Sensitised (especially high values/monosensitised) but clear tolerance for immediate non-eczematous reactions
- No sensitisation but high suspicion eczema exacerbation

_Elimination-reintroduction diet_
Principles of elimination-reintroduction:

- Eliminate food (s) from diet for 4-6 weeks under dietetic advice

- Perform standard OFC with a single food in incremental doses. If there is no immediate reaction, then give the food for 3 days in a row and monitor eczema scores daily.

- Challenge with new foods every 4-7 days (or longer if skin needs to recover from previous challenge.)
Atopic Dermatitis and Positive SPT/sIgE to Food(s)

- Clear history of recent immediate-type reaction
  - **ALLERGIC**
  - **Food Challenge**
    - Positive → **ALLERGIC**
    - Negative → **NOT ALLERGIC**

- Equivocal history
  - **Food Challenge**
  - **Elimination Rechallenge**
    - Improvement with elimination/worsening with rechallenge → **ALLERGIC**
    - No difference → **NOT ALLERGIC**

- Tolerance for immediate reactions; possible worsening of eczema
  - **Tolerance for immediate reactions; no high suspicion of worsening of eczema**

- Tolerance for immediate reactions; no high suspicion of worsening of eczema
Atopic Dermatitis and Not Sensitised to Food(s)

- No particular suspicion of food allergy; eczema controlled on medical treatment
  - TREAT AS NOT ALLERGIC
    - Positive
      - ALLERGIC (non-IgE)
    - Negative
      - NOT ALLERGIC

- History suspicious of immediate/intermediate reactions
  - FOOD CHALLENGE
    - Improvement with elimination/worsening with rechallenge
      - ALLERGIC (non-IgE)
      - NOT ALLERGIC

- No immediate reactions; -eczema difficult to control or - Suspicion of foods exacerbating eczema
  - ELIMINATION RECHALLENGE
    - No difference
      - NOT ALLERGIC
Diagnosis of food allergies in eczema patients

Elimination Diets

- No good quality evidence to support use of blanket exclusion diets (Bath-Hextall F, Delamere FM, Williams HC. Dietary exclusions for improving established atopic eczema in adults and children: systemic review. Allergy 2009; 64: 258-264)

- Evidence for targeted food avoidance resulting in improvement of skin symptoms

- ie Advise elimination of those foods which have been proven to cause symptoms (eczematous or non-eczematous)
Elimination Diets

- Should always be supervised by a dietician to ensure proper elimination and nutritional adequacy

- Should always be combined with atopic skin care and pharmacological therapy when needed
Elimination diets


- Elimination should be continued for 12-24 months in early childhood and then clinical relevance reviewed
Eczema and food allergies are the earliest manifestation of the allergic march.
Eczema and Other Allergies

- 50-80% of children with AD develop respiratory atopic disorders (asthma and/or allergic rhinitis)
- Children with AD and egg allergy: respiratory allergies develop in 90%
Eczema and other allergies


- Nickel R, Kulig M, Forster J et al. Sensitization to hen’s egg at the age of twelve months is predictive for allergic sensitization to common indoor and outdoor allergens at the age of three years. *J Allergy Clin Immunol* 1997; 99: 613-617
Eczema and Other Allergies

- Aeroallergen sensitisation is common in AD and positively correlated with occurrence of asthma.

- 40% of South African infants with AD have HDM sensitivity (EPAAC™).

- Aeroallergen sensitisation continues well beyond first year of life (cf food allergy).
Eczema and Other Allergies

“Integrated allergy management”

- Italian study with 176 AD children: early diagnosis and improved management of AD → reduction in % children evolving towards asthma (30 → 15%)

30-40% of children with AD have co-existing food allergy, mostly IgE-mediated.

In approx half of those who react to food, there will be a flare-up of eczema, usually in combination with other symptoms, sometimes in isolation.

i.e in 15-20% of children with AD, food allergies play a role in eczema pathogenesis.
Food allergies should be actively excluded in moderate to severe eczema/where there is high suspicion

- History, SPT, sIgE are sensitive but not specific:

- Crucial role for food challenges to confirm/refute allergies

- High suspicion of food allergies exacerbating eczema but no immediate symptoms/not sensitised: elimination-rechallenge diets
Early diagnosis of food allergies - better management

Blanket elimination diets ineffective and potentially dangerous

Targeted elimination diets + atopic skin care = best management
Eczema and food allergies closely associated with development of respiratory allergies

“Integrated management” of atopic patient as treatment of one atopic condition can lead to improvement in another
THANK YOU!