Patch Testing the Atopic Dermatitis Patient

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Allergic Contact Dermatitis (ACD) and Atopic Dermatitis (AD)

- Important to identify ACD: cause and treatment options often differ
- ACD is common in AD patients
  - In metanalysis, a third of children w/ AD who were patch tested had at least one positive
- ACD is likely underdiagnosed in AD patients
  - Flexural dermatitis is not always AD
  - Flares in AD pts are not all due to AD

Factors Determining Risk for ACD in AD Pts

- Th2 skewing appears protective for at least some allergens
- Often outweighed by many risk factors for ACD
  - Barrier dysfunction
    - ~ 2-fold increase in absorption of irritants/allergens
  - Frequent use of emollients and topical meds
  - Immune dysregulation (shared cytokine pathways for AD, ACD, ICD, bacterial colonization)

What does this translate to in clinical practice?

- Increased allergy to personal care products and topical meds, high rate of relevance
- Polysensitization more common in pts with AD

Common Allergens in AD Patients

- Fragrance markers (Fragrance mix I/II, Myroxylon pereirae, Cinnamic aldehyde, lyral)
- Preservatives (Formaldehyde, MI, MCI)
- Neomycin, Bacitracin
- Lanolin
- Cocamidopropyl betaine
- Topical antiseptics (chlorhexidine)

Common Allergens in AD Patients

- Other botanical (Compositae mix, Sesquiterpene lactone mix, Colophonium)
- Metals (Nickel, Potassium dichromate, Cobalt)
- Rubber (Carba mix, Mercaptobenzothiazole and mercaptans)
- Dyes (PPD, Disperse blue dye 106)
- Plastics/Glues (Para-tertiary butylphenol formaldehyde resin, Epoxy resin)
When to Consider Patch Testing the AD Pt

- Adult/adolescent onset of AD
- Therapy resistant or worsening dermatitis
- Atypical dermatitis distribution or pattern suggestive of ACD
- Recalcitrant hand eczema in the working population
- Prior to initiating systemic therapy


When Patch Testing Is Less Helpful

- Stable dermatitis
- Current dermatitis flare at the patch test site
- Inadequate patch test battery, e.g. excluding frequent allergens or topical ingredients
- UV therapy or excessive solar radiation w/in 2-3 wks
- Topical steroids applied to patch test site w/in 3-7 d
- Current/recent use of systemic immunosuppressant


Approach to Patch Testing on Systemic Immunosuppressants

- Avoid systemic immunosuppression for 5 half-lives of the drug in question (usually 1 month acceptable)
- When unavoidable, use the minimum dose required
- Stronger reactions are more likely to still appear, although more weakly than would have otherwise appeared: carefully consider weak +, ? reactions
- Consider retesting when off immunosuppression

Patch Testing on Systemic Medications

**AD meds less likely to impact patch testing**

- Methotrexate (ideally < 0.25 mg/kg/wk)
- Prednisone < 10 mg/day
- Intramuscular triamcinolone (avoid for 4 wks)
- Low dose cyclosporine (< 2 mg/kg)
- Azathioprine (dose dependent)
- Mycophenolate mofetil (dose dependent)
- Systemic tacrolimus (dose dependent)

Patch Testing on Systemic Medications

**Other AD medications**

- Antihistamines should not interfere
- Positive patch test reactions have been described on:
  - Apremilast
  - Dupilumab

Patch Testing on Dupilumab

Allergen-dependent differences in ACD immune response

- Molecular profiling of patch test +’s (24 pts)
  - Nickel: innate immunity, TH1/TH17, TH22 >TH2
  - Fragrance > rubber: TH 2, some TH 22, and smaller TH1/TH17 contributions
  - IL-4 knockout mice preserved ability to elicit contact allergy to oxazolone but not 2,4,6-trinitrochlorobenzene (a TH2 allergen)

Current Summary for Patch Testing On Dupilumab

- Dupilumab may have an allergen-dependent effect on ACD and patch test positivity that varies depending on severity of contact allergy.
- Refractory regional dermatoses on dupilumab may be due to ACD; these pts may benefit from comprehensive patch testing on dupilumab.
- Ideally, patch test before start dupilumab to r/o ACD and address a potential cause of tx failure.

Potential Pitfalls in Patch Testing the AD Pt

- Irritant reactions common (metals, fragrance, lanolin).
- ‘Crescendo’ pattern not observed to the same degree.
- Some common allergens are late reactors (i.e. day 7+).
- Variations in climate may affect the skin barrier and the rate of positive and irritant reactions.
- Patch testing at the time of an AD flare may decrease contact allergy (false -) and increase irritancy (false +).
- Concomitant systemic immunosuppressive therapy may result in false negatives.

Take Home Points

- ACD is common in AD patients.
- Failure to patch test may result in overlooking an important and potentially curable driver of disease.
- Patch test AD pts when: recalcitrant dermatitis, high yield distribution, adult/adolescent onset AD, hand eczema in the working population, prior to starting systemic therapy, and when pts develop new regional dermatoses on dupilumab.
- Consider performing a delayed read, i.e. Day 7+.