Diagnosing Protein contact dermatitis

vera.mahler@uk-erlangen.de

Erlangen, 27.7.2013

Universitätsklinikum Erlangen
Definition

- chronic recurrent dermatitis following skin contact to specific proteins
  +/- wheals or vesicules shortly after contact
  +/- atopic skin diathesis

Hjorth N & Roed-Petersen J: Contact Dermatitis 1976; 2: 28-42
Synonymes

- protein contact dermatitis  
  Hjorth N & Roed-Petersen J: CD 1976
- atopic contact eczema  
  Hjorth N & Roed-Petersen J: CD 1976
- hybrid eczema  
  Malten KE 1967: Dermatologica 1968
- long lasting contact urticaria  
  Hannukesela M: CD 1980
- Type I-contact eczema  
  Hornstein O: Dermis
- IgE-mediated contact eczema  
## Elicitating allergen sources

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Group 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant-derived proteins</td>
<td>Animal-derived proteins</td>
<td>Grains</td>
<td>Enzymes</td>
</tr>
<tr>
<td>fruits, vegetables, spices, plants, timber</td>
<td>epithelia, meat, entrails, body fluids, seafood, fish etc.</td>
<td>flour</td>
<td>α-amylase, glucoamylase, cellulase, xylanase, protease, papain</td>
</tr>
</tbody>
</table>
Occurrence of protein contact dermatitis
IVDK (1994-2008)

- patch tested population: n=140,840
- protein contact dermatitis: n=249 = 0.2%

- occupations with >1%: bakers and confectioners 4%
  frequencies veterinarians 3%
  meat and fish processing 2%
  cooks and food handlers 1.5%

- MOAHLF (PCD):
  atopy ↑
  occupational ↑
  hand eczema ↑
  facial eczema ↑
  age ↓

Mahler V. Chefs and Food handlers. In: Johansen JD, Frosch PJ, Lepoittevin JP (EDs): Contact Dermatitis. Springer, 5th edition; 2010
characteristics

- **location**: hands (back of hand and fingers > flexural and lateral side of fingers > palms) > lower arms > face

- **lesions**: rapidly occurring eczematous lesions at contact site, sometimes beginning with a contact urticaria, rarely hematogenous spreading

- **Etiopathogenesis**: (most likely) IgE-mediated binding of protein allergens to Langerhans-cells, which process and present to T-lymphocytes → cellular inflammation (resembling a Type IV reaction)
characteristics

- **predisposing factors**: atopic/irritant impairment of skin barrier (enhanced penetration)

- **sensitization**: frequently (not always) demonstrated by skin prick testing, intracutaneous testing, rub test or *in vitro* IgE detection

- **rarely**: positive patch tests (native fresh material).
Reported test reactions

n=79 (cases, small case series): evaluable

n=39 (50%): positive immediate type test reactions, negative patch test reaction
n=12 (15%): positive immediate type test reactions, positive patch test reaction
n=28 (35%): no positive test reactions (neither immediate, nor delayed type) (confirmation by avoidance/reexposure)
Improvement of test modalities?

- So far, no standardized diagnostic tool
- SPT, specific IgE *in vitro* and history of exposure positive
- Most often no delayed (eczematous) reaction following SPT
- Patch test most often negative
- Allergen-dose to low?
- Penetration to low?
- Often preexisting atopic or irritant impairment at site of occurrence
- Status quo: no systematic standardization

→ DKG-working group Protein contact dermatitis*

*Berlin, Bochum, Dresden, Erlangen, Essen, Freudenberg, Halle, Hannover, Hamburg (BUK), Hamburg (Dermatologikum), Heidelberg (AKS), Osnabrück*
DKG-PCD-Study
(multicenter prospective study)

1.) standardized basis history-taking:
   (12 questions: occupation, localization, duration and
   work-association of eczema, atopy, diagnosis)

2.) standardized parallel testing of 6 methods

3.) data transfer (IVDK-PKD-Modul)
   and data management IVDK Göttingen
Conclusion

• PCD is rare in the general population
• in food handling industries, PCD contributes to 20% of hand eczema
• PCD is more frequent than allergic CD in this field
• Diagnosis can be based on:
  • positive SPT (native food, early reading) and/or
  • positive specific IgE
  • patch test: only 50% positive, however, in 16 % sole positive test
  • avoidance and reexposure of allergen source

→ PCD is an entity between type I- and type IV-allergy and will be underdiagnosed if based on patch test results alone.