Latex Allergy: Is the Epidemic over?

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Was there an epidemic?

- First case report of reaction to latex 1927
- 1979 first report of NRL allergy confirmed with prick testing and challenge
- Late 1980s to early 2000 – dramatic increase in latex sensitisation and allergy in healthcare workers
- Increase in latex allergy in children with spina-bifida
Natural Rubber Latex

• Milky fluid harvested from bark of Hevea Brasiliensis rubber tree
• Main component cis-1,4-polyisoprene (benign organic polymer) adds strength and elasticity to manufactured rubber products
• Also sugars, lipids and highly allergenic proteins (2-3%)
Latex allergy

- 3 clinical types
  - Irritant dermatitis
  - Type IV hypersensitivity
  - Type I hypersensitivity

- Incidence in
  - General population 1-5% (USA)
  - Health care workers 2-17%
  - Spina bifida 20-68%
  - Intraoperative anaphylaxis 17% (France 1999)
The latex allergy ‘epidemic’

- Latex rubber introduced to Europe from South America in late 18th century
- First latex surgical glove 1834
- Charles Goodyear discovered vulcanising process 1844
- Rapid developments in commercial use of latex
- Plantations in SE Asia
The latex allergy ‘epidemic’

- Latex gloves first used for surgery in 1890s
- Thinner, stronger reusable latex surgical gloves from 1920s
- Single use latex gloves from 1960s
- Widely used in other health care products
- 1980s and 1990s dramatic increase in type I latex allergy. Why??
• Harvesting
• Ammonia to stabilise
• Treated with accelerators eg thiurams
• Dipped
• Vulcanised
• washed
• Cornstarch powder
• 1987: CDC ‘Universal precautions’ in face of HIV epidemic
• Rapid increase in worldwide demand for latex gloves
• Poor quality gloves
• Increased use and allergenicity
Risk for Latex allergy

- Health care workers – reduction in latex sensitisation from 14.1% to 4.5% in theatre workers after discontinuation of powdered latex gloves
- Atopy
- Spina bifida
- 12-22% of intra-operative anaphylaxis
- 27% of intra operative anaphylaxis in children (Karila et al Allergy 2005)
Clinical picture

• Irritant dermatitis
  – Mechanical disruption of skin due to rubbing

• Contact dermatitis
  – Type IV (delayed) hypersensitivity
  – Primary allergens accelerants eg thiurams from vulcanisation process
  – More common in atopic individuals
  – May predispose to Type I hypersensitivity
  – Soles of trainers common source of sensitisation in children
Clinical picture

Type I (immediate) hypersensitivity
• Urticaria, angioedema
• Rhinitis, conjunctivitis
• Asthma
• Anaphylaxis – especially intra-operative
• More common in atopic individuals
Latex fruit syndrome

- 30-50% of latex allergic individuals
- Banana, avocado, chestnut, sweet pepper (Hev b 6.02)
- Kiwi (Hev b 5)
- Potato, tomato (Hev b 7)
- May be plant defence related proteins
Latex components

<table>
<thead>
<tr>
<th>Component</th>
<th>Clinical relevance</th>
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<tbody>
<tr>
<td>Hev b 1 and 3</td>
<td>Main allergen in spina bifida</td>
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<tr>
<td>Hev b 5 and 6</td>
<td>Main allergen in HCW</td>
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<tr>
<td>Hev b 2,4,7 and 13</td>
<td>Secondary, but relevant allergens in HCW</td>
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<tr>
<td>Hev b 6.02 and 7</td>
<td>Latex-fruit cross-reactivity in vivo</td>
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<tr>
<td>Hev b 8, 11 and 12</td>
<td>Pan allergens. In vitro cross-reactivity. unknown clinical relevance</td>
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Latex allergy and Spina Bifida

• 159 patients with SB
  – Sensitisation 55.3%
  – Allergy 34.6% (of total); 62.5% (of sensitised)

• Risk of latex sensitisation and allergy increases with
  – No of operations
  – VP shunt
  – atopy

Latex allergy and Spina Bifida

• Comparison of latex sensitisation in
  – 35 patients with spina bifida (SB)
  – 20 patients with gastroschisis/omphalocele (GO)
  – 45 patients with post haemorrhagic/congenital hydrocephalus and VP shunt (PH)

• Spina bifida had significantly increased risk of sensitisation (46%) vs 5% (GO) and 8.9% (PH)

• Independent of no of operations, age at surgery, gender or atopy

Eiwegger Clin Exp All 2006
Oct;36(10):1242-6
Case presentation

- 8 year old girl referred with recurrent unexplained urticaria and itchy eyes
- Mother suspected nuts because first episode occurred at a birthday party where there were nuts and one episode occurred after an ice-cream containing hazel nuts
- History of eczema in infancy recently flaring again
- Mild hayfever and mild asthma
Case presentation

- Doing building work at home which coincided with onset of symptoms
- Had previously eaten several types of nuts without reaction
- Skin tests to peanuts, tree nuts, sesame and common inhalants all negative
- Skin test to latex 8x7mm
- Latex glove challenge positive
Case presentation

- Rhinoconjunctivitis settled with loratadine and resolved after building work finished.
- Subsequent contact reaction to latex when she cut her knee at school and teacher did not have latex free gloves.
- Has medic alert bracelet.
- Epipen?
Diagnosis of latex allergy

• History
  – Medical/dental exposure
  – Household exposure, balloons etc

• Skin prick test
  – Commercial SPT solution
  – Prick through natural rubber latex glove
  – fruits
Diagnosis of latex allergy

• Specific IgE
  – Main allergens Hev b1, Hev b3 (spina bifida), Hev b 6.02 (HCWs and atopic individuals), Hev b 5 (kiwi)
  – Generally more sensitive than SPT
  – False positives due to cross reactivity with fruits, nuts, pollens eg Hev b8 (profilin)
  – ISAC

• Patch testing (contact dermatitis)

• Provocation tests
  – Latex glove test
  – Nasal provocation
Management of latex allergy

• Avoidance
• Treat reactions
  – Adrenaline injector
  – Antihistamines
  – Topical for contact dermatitis
• Medic alert disc
• Desensitise
Avoidance of latex

• Latex is ubiquitous – give patient lists of medical and household objects likely to contain latex and alternatives

• Career advice
Avoidance of latex

• Latex safe health care
  – General environment eg no powdered latex gloves, good quality latex
  – Latex free gloves, dental dams etc
  – Latex free theatres
SLIT and Latex allergy

- Randomised controlled trial in 26 children (4-15yr) with symptomatic latex allergy
- SLIT (n =12) with commercial latex extract
- 8 Placebo/ 6 untreated controls
- Significant decrease in symptoms in treated group
- safe

So where are we now?

• Intraoperative anaphylaxis – UK 2014 multicentre study showed only 1 case of latex induced anaphylaxis – 0.6% (Krishna Clin exp all 2014)

• Prevalence in latex IgE sensitisation in patients attending allergy clinic in Denmark decreased from 6.1% in 2002-2005 to 1.9% 2006-2009 and 1.2% 2010-2013 (p<0.0001) (Blaajberg Contact Dermatitis 2015)
So where are we now?

- Spina bifida:
  - 120 patients born with spina bifida after introduction of latex free protocols
  - Sensitisation decreased from 55% to 5% (p < 0.001)
  - Allergy decreased from 37% to 0.8% (p < 0.001)
  - Significant reduction in aeroallergen sensitisation and allergic disease to levels comparable to general population

- Blumchen Allergy 2010
The allergy epidemic is over

- At least in countries where occupational and intraoperative latex exposure has been reduced
- But still an issue in developing countries – South African prevalence of symptomatic latex allergy in HCW 9.2% 2001 and 8.3% in 2013
Further reading

Latex allergy. A position paper of the British Society of Allergy and Clinical Immunology
Clin Exp Allergy 2003; 33:1484–1499

Latex allergy support group: www.lasg.co.uk