What do we know about the allergenic risk of adhesive vein treatments?

Tobias Hirsch,
Practice for Vascular Diseases Halle, Germany
www.gefaessmedizin-hirsch.de
Disclosure

Tobias HIRSCH

I have the following potential conflicts of interest to report:

- Consulting: Medtronic, Sigvaris
- Honoraria: Medi, L&R, Juzo, Kreussler, Bauerfeind
Implant
Acrylate adhesive: n-butyl 2-cyanoacrylate (NBCA)

On day 3          At 6 months          At 12 months

Implant
Implant n-butyl-cyanoacrylate (NBCA)

Cannot be removed

Any risk of allergy?
PubMed March 3rd 2018
Keyword “allergic reaction + cyanoacrylate”

Records identified: 93
Records with clinical relevance: 56
1977-2017 (1-5 cases)

Industry: 15
Laboratory: 2
Dental technicians: 6
Beauticians: 16
Medical treatment: 17
Eyelash extensions: 6
Dermabond: 16
Nail modeling: 10
Biobond: 1
Intravascular: NBCA: 0
PubMed March 3rd 2017
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93

Records with clinical relevance
56
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Contact eczema
Allergy types

**Type I**  Immediate hypersensitivity: IgE, mast cells, histamine
- hives, asthma, anaphylaxis

**Type II**  Tissue-specific: IgG-mediated
- transfusion incident, HIT

**Type III**  Immune complexes:
- vasculitis

**Type IV**  Delayed type: sensitized T-lymphocytes
- allergic contact eczema
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Non-histamine dependent, no anaphylaxis
No tolerance

No specific treatment other than halting exposure
Type-IV allergy

Hapten effect: carrier protein **keratin**

allergen (NBCA)

antigen presenting cell

**Dendritic cells** (Langerhans cells)

Cell proliferation
Local inflammation

Cytokine release
Inflammation

Cell proliferation
Local inflammation

Cytokine release
Inflammation
Contact dermatitis caused by acrylates:

redness, swelling, desquamation, pruritus
Contact dermatitis caused by acrylates:

- **Allergen:** Cyanoacrylate monomer
- Quick polymerisation and binding to keratin avoids penetration and contact with dendritic cells
- **Sensitisation** through intensive and repeated cutaneous contact
Contact allergies caused by i.v. acrylates with acrylate delivery using Venaseal™?
Contact allergies caused by i.v. acrylates with acrylate delivery using Venaseal™?

- No contact with keratin
- No contact with dendritic cells

animation: Max Méndez, Halle, Germany
Contact allergies caused by i.v. acrylates with acrylate delivery using Venaseal™

- No contact with keratin
- No contact with dendritic cells

Type-IV allergic reaction?
Case report 1

Female 52 yrs
- Acrylate treatment of GSV
- Redness, swelling, local pain on day 4 post OP
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<table>
<thead>
<tr>
<th>Studie</th>
<th>N</th>
<th>Follow-up Monate</th>
<th>Verschlussrate (%)</th>
<th>Phlebitis (%)</th>
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<td>38</td>
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<td>5,5</td>
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Hirsch T, Phlebologie 2017

5-20%
Case report 1

Female 52 yrs
- Acrylate treatment of GSV
- Redness, swelling, local pain on day 4 post OP

Treatment
- Cooling, pain killers (NSAR)

Complete regression after 7-14 days
Conclusion:
PLAR must be distinguished from classic phlebitis. We believe that PLAR is a type IV hypersensitivity reaction due to a foreign body, and in our experience, antihistamines or steroids are effective for the prevention and management of PLAR.
Case report 2

Male 45 yrs
- Acrylate treatment of GSV
- 45cm, 1.53ml cyanoacrylate
- Hives and severe itching on day 2 post OP
Case report 2

Male 45 yrs
- Acrylate treatment of GSV
- 45cm, 1.53ml cyanoacrylate
- Hives and severe itching on day 2 post OP

Treatment
- Antihistamine (*Desloratadin®*)

Complete regression after months
Case report 3

Gibson K, Vascular 2016, WAVES-Study
- Body hives 1 week post OP

Treatment
- Steroids (Medrol™)

Complete regression after 5 days
Case 1
Symptoms: redness, swelling, pain
Treatment: pain killing

“phlebitis-like” reaction, not allergic

Case 2 + 3
Symptoms: hives, pruritus
Treatment: antihistamines, steroids

histamine-dependent hypersensitivity

No type IV allergic reaction
Summary:

- Acrylates are known to cause type IV allergies
- “Vein” case reports with delayed histamine reactions do not correlate with published data
- More research on the mechanism is required
- **Treatment is possible without extirpation**
Conclusions:

- The risk of allergic reactions to acrylates has to be part of pre-OP information
- Ask about previous reactions to any use of acrylates
- Avoid intracutaneous displacement of the glue
Thank you for the attention!

Tobias Hirsch, MD, Halle (Saale), Germany
www.gefaessmedizin-hirsch.de
info@gefaessmedizin-hirsch.de