Allergic contact dermatitis caused by vinyl gloves: a challenge for clinicians

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Summary
The use of vinyl gloves, considered “hypoallergenic”, has become more and more frequent, both among healthcare workers and among housewives. However, contact allergy to vinyl gloves is not so rare, and it is often difficult to identify the specific hapten responsible for the allergic dermatitis.

KEY WORDS: allergic contact dermatitis; patch test; latex; gloves; polyvinylchloride; vinyl; triphenyl phosphate.

Introduction
The use of vinyl gloves, considered “hypoallergenic” (1), thus safer than latex gloves, has become more and more frequent. However, contact allergy to vinyl gloves is not so rare, and it is often difficult to identify the specific hapten responsible for the dermatitis.

Case Report
A 42-year-old man was referred to us because of persistent, erythematous, scaly lesions of the hands (Figure 1 a) and the forearms (Figure 1 b). The first lesions had started on the fingertips 6 months before and had then spread proximally to the forearms. The lesions were itchy and stinging, consistent with the diagnosis of chronic contact dermatitis.

The patient was a nurse and had no atopy history. He suffered from ulcerative colitis, treated with mesalamine, and an anamnestic contact allergy to latex gloves (diagnosed with patch tests performed elsewhere many years before), which he had no longer been using for several years. The patient habitually wore vinyl gloves at work.

Figure 1 - Persistent allergic contact dermatitis localized on the hands (a) and on the forearms (b) in a healthcare worker using vinyl gloves.
Contact allergy to vinyl gloves

Figure 2 - Patch tests showed a 2+ reaction to pieces of polyvinyl chloride (PVC) gloves (both the inner and the outer surface).

The lesions improved slightly after topical steroid and emollient therapy. After a short absence from work, an improvement of the erythema, desquamation and itch was observed.

Patch tests were performed with the “Società Italiana di Dermatologia Allergologica Professionale e Ambientale (SIDAPA)” baseline series, pieces of polyvinylchloride (PVC) gloves (Dermavinyl®, Euro Hygiene, Vicenza, Italy), pieces of powder-free latex gloves (Sensiflex Plus®, Adventa Health Sdn. Bhd., Malaysia), pieces of nitrile gloves (Dermanytril®, Berica Hygiene, Vicenza, Italy), Latex LAN 960C and Latex STD Revertex hapten [Euromedical SRL – Calolziocorte (LC), Italy]. Both the inner and the outer surface of the gloves were tested, by cutting two pieces of about 2 cm² each. The patch test readings were done after 48 hours and after 72 hours, respectively.

A 2+ reaction to PVC gloves (both the inner and the outer surface, Figure 2) was observed. Further tests with a Rubber series [Euromedical SRL – Calolziocorte (LC), Italy; Chemotechnique Diagnostics, Vellinge, Sweden] (haptens shown in Table 1), a Plastics and Glues series [Euromedical SRL – Calolziocorte (LC), Italy; Chemotechnique Diagnostics, Vellinge, Sweden] (haptens shown in Table 1), a Textile series [Euromedical SRL – Calolziocorte (LC), Italy; Chemotechnique Diagnostics, Vellinge, Sweden], pieces of silk fibroin gloves (DermaSilk®, AL.PRE.TEC, Verona, Italy), Antimicrobial and Emulsifier agents (Euromedical SRL – Calolziocorte (LC), Italy; Chemotechnique Diagnostics, Vellinge, Sweden), and personal products (barrier cream for hands and liquid soap) were performed. All of these tests resulted negative.

After discontinuation of the use of vinyl gloves, the dermatitis healed.

Discussion

The use of vinyl and/or nitrile gloves instead of latex gloves, whose allergenic properties are well known, has become more and more frequent, both among healthcare workers and among housewives. These materials are considered “hypoallergenic” (1), thus safer. Few cases of contact dermatitis due to vinyl or nitrile have been reported (1-13), as well as cases of allergic contact dermatitis to latex (natural rubber)-free gloves (14-16).

As in latex gloves, the allergenic agents in vinyl gloves are often the additives used in their production, such as polymerization agents, preservatives, artificial colourings, and also antioxidants, stabilizers, biocides, formaldehyde (17). Bisphenol A, adipic polyester, mono(2-ethylhexyl) maleate in di-(n-octyl)tin-bis(2-ethylhexylmaleate), benzisothiazolinone, formaldehyde and organic pigments, are well known allergens in PVC gloves (1, 2, 18).

As in our case, it may be difficult to identify the specific allergen in contact dermatitis caused by vinyl gloves (1-3, 18). Recently, triphenyl phosphate has been identified as an allergen causing contact dermatitis in PVC gloves (1, 2). This hapten has proved not to show any cross-reactions with triphenyl phosphate (1, 2), which

| Table 1 - Haptens present in our Plastics and glues series and our Rubber series. |
|-------------------------------|-------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Plastics and glues series     |                   |                 |                 |                 |                 |                 |                 |
| Olio di trementina 10%        | Resina fenoformaldeidica 5% |
| Benzoile perossido 1%         | Di-n-butiltalato 5% |
| Resina toluensfonamidica 10% |                   |
| Bisphenolo A 1%               |                   |
| Resorcinolo 1%                |                   |
| Trienilfosfato 5%             |                   |
| N.N-Dimet-p-toluid 2%         |                   |
| Acido Abietico 10%            |                   |

Rubber series

N-ciclosilbenzothi-sulf. 1%
1,3-Difenilguanidina 1%
Esmatilenitetramina 1%
Tetrametiltiuram.mon.0,25%
Bis (dietilditiocarb.) Zn 1%
Tetrametiltiuram.dis.0,25%
N,N'-difenil-p-fen. 0,25 %
Dibenzotiaziledis. 0,25%
Mortolnimercaptob. 0,5%
Tetraetiltiur. disulf. 0,25%
Dipentamet.entiuram. 0,25%
Difenitiourea 1%
Dibunitiourea 1%
is included in our Plastics and glues series. However, in our country, triphenyl phosphite is not currently available as a hapten, so it was not possible to test it (1). Another additive in PVC gloves, tricresyl phosphate, was found as a new allergen in allergic contact dermatitis to vinyl gloves (3). This hapten was tested in our Plastics and glues series, giving a negative result. In conclusion, we were not able to isolate and identify the single hapten contained in the PVC responsible for the contact allergy. The importance of testing all types of gloves, including vinyl gloves, has already been underlined (1, 3). Our case confirms that, when an allergy to vinyl is suspected, it is recommended to test the glove itself, due to the difficulty to identify the specific hapten involved in the genesis of the disease.

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References