

Contact allergy due to platinum siloxane complex in elastic compression stockings for varicose veins

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Allergies to elastic compression stockings (ECS) materials, such as polyamide or nylon, have occasionally been reported. Most top bands of ECS are made of polyamide, elastane, silicone and polyester, which rarely cause allergies.¹ Here, we report the first case of allergic contact dermatitis (ACD) caused by silicone on the top band of ECS.

CASE REPORT

A 32-year-old woman presented with pattern-like erythema around both upper thighs and intense itching for four days. Symptoms developed after wearing self-purchased ECS for two days to prevent possible varicose veins she suspected because of soreness and discomfort in her lower extremities after walking. On physical examination, the erythema was circumferential and distributed symmetrically on both upper thighs without scales and blisters (Figure 1).

Patch test with Chinese baseline series (CB-1000) (Chemotechnique Diagnostics, Vellinge, Sweden) showed positive reactions to cobalt chloride 1% pet. and nickel sulfate 5% pet. on day (D) 2 (++) and D4 (++), none of which are contained in the ECS. Patch testing with the silicone and textile materials of ECS “as is” only yielded a positive reaction to silicone on D2 and D4 (Figure 2A). Because commercial allergens of silicone composition were not available, additional patch tests were performed in the patient and ten control volunteers with ingredients of silicone provided by the manufacturer, which include vinyl silicone oil, vinyl silicone resin, platinum catalyst and diamide-silane (diluted 0.5% and 1% pet.). Tests were read on D2 and D4, and only platinum catalyst elicited +/+ to 0.5% and ++/++ to 1% in the patient (Figure 2b), whereas no reactions were observed in ten controls. We thus diagnosed ACD caused by platinum catalyst. Accordingly, prevention of further contact and treatment with topical corticosteroids led to completely resolve the lesions.

DISCUSSION

With this case we confirm the sensitization potential of platinum catalyst (platinum, 1,3-diethenyl-1,1,3,3-tetramethyldisiloxane (DVTMS) complexes, CAS no. 68478-92-2), often used as a catalyst in the process of silicone synthesis. ECS are standard therapy and widely used in the treatment of chronic venous insufficiency or lymphoedema. Previously, cotton and natural rubber latex were often used to make ECS, which are generally made of elastane and polyamide now due to multiple allergens presented in latex. In this case, the patient was not allergic to the material of the ESC, but to the accessory material (platinum siloxane complex in silicone) on the top band.

Allergies caused by silicone are rare and mainly found in implants.^{2,3} Allergies caused by platinum are extremely rare and mainly found in transplants, which are primarily allergenic as platinum complex of DVTMS and not in their metallic form. As the catalyst for synthesizing silicone, platinum complex of DVTMS has inherent risks of flammability and irritating to respiratory system and skin.

Generally, irritation caused by the occlusive border as well as the additive effect of pressure and rubbing on the top band is more common. This case we report is the first ACD with ECS caused by platinum siloxane complex. Because after 4 days of not wearing the ECS, the patient's skin lesions still existed with obvious itching, and patch tests further confirmed that it was indeed contact allergy. As the use of ECS seems to gradually increase, the garment industry should strive to develop materials or textile manufacturing methods to reduce the risk of allergies and further improve the quality of ECS.

REFERENCES ((add author query to add issue numbers))

- Accepted Article
1. E. M. Valesky, R. Kaufmann, M. Meissner. Contact allergy to compression stockings: Is this possible? *Phlebologie*. 2014; 43: 140-143.
 2. Arepalli SR, Bezabeh S, Brown SL. Allergic Reaction to Platinum in Silicone Breast Implants. *J Long Term Eff Med Implants*. 2002;12:299-306.
 3. Sakuragi Y, Sawada Y, Nakamura M. Leukoderma following allergic contact dermatitis caused by the silicone component silprene-30A/B in swimming goggles. *Contact Dermatitis*. 2017;77:418-419.

Figure 1: Multiple, symmetrical and uniform erythema around both upper thighs.

Figure 2: (a) Positive patch test (++), on day (D) 4, to the silicone (from the patient) “as is”. A: textile materials; B: silicone. (b) One of four components of the silicone, platinum catalyst 1% pet., caused a ++ reaction on D4. A: platinum catalyst; B: vinyl silicone resin; C: vinyl silicone oil; D: diamide-silane.



