

Key words: allergic contact dermatitis; Dermabond®; 2-octylcyanoacrylate; orthopaedic joint replacement.

Three cases of allergic contact dermatitis to Dermabond® following orthopaedic surgery in paediatric patients have been published (1). We report a case of an adult patient who developed allergic contact dermatitis to the same adhesive. The previously described patients all presented within 1–2 weeks of use of Dermabond®. Our patient presented significantly later, with onset of the dermatitis 4 weeks after first use and no previous history of acrylate exposure. This suggests that active sensitization occurred.

Case Report

A 66-year-old woman with a history of atopic eczema underwent a left patello-femoral joint replacement for treatment of osteoarthritis. The wound was closed in layers with undyed vicryl subcuticular sutures and Dermabond® (Ethicon® UK, PO Box 408, Edinburgh EH11 4EH, United Kingdom) high-viscosity topical skin adhesive. She was treated for an eczematous rash over both legs immediately post-operatively but there was no reported problem with wound healing at that time. Four weeks later, she noticed itching and erythema that developed primarily around the wound site and progressed to form vesicles and blisters (Fig. 1). She was seen by her general practitioner who found that the Dermabond® adhesive was still present on the skin. This was gently removed and she was treated with topical fluticasone propionate 0.005% ointment and emollients, following which the rash gradually resolved. Pet.-based products are reported to dissolve the Dermabond® (2).

She had no previous known contact allergies. She had not undergone any previous operations. There was no history of previous contact with acrylate glues including 'Superglue' or artificial nail adhesives, nor had she had relevant dental treatment.

Allergic contact dermatitis to Dermabond® after orthopaedic joint replacement

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Fig. 1. Erythema and scaling around the wound four weeks post-operatively. Dermabond adhesive can be seen still on the skin.



Fig. 2. Positive reaction to Dermabond (D4).

She underwent patch testing to the British Contact Dermatitis baseline series, a medicaments and acrylate

series (including ethyl cyanoacrylate 10% pet.), as well as Dermabond® tested 'as is'. The patch tests were

applied to the patient's upper back using Finn Chambers® on Scanpor™ tape with a Hypafix retention sheet. Readings were performed at D2 and D4, according to International Contact Dermatitis Research Group (ICDRG) recommendations. There were positive results to ethyl cyanoacrylate D2+/D4++ and Dermabond® D2++/D4+++ (Fig. 2). There were concomitant positive results to fragrance mixes 1 and 2, *Evernia prunastri*, *p*-phenylenediamine and wool alcohols.

Discussion

Reported cases of allergic contact dermatitis to cyanoacrylates are rare. We are aware of two previous reports of allergic contact dermatitis occurring in adult patients (2, 3) and three paediatric patients (1). All these cases developed rash within 2 weeks of application of the Dermabond®. One patient had previously been treated with Dermabond®, reported to have been applied 'haphazardly' (2). The other adult patient was stated not to have any known allergies but no comment was made as to whether she had previous contact with Dermabond® or the other quoted cyanoacrylate adhesives that are quoted (3). The three paediatric patients (1) had all undergone at least two orthopaedic operations, but there was no mention of whether Dermabond® had previously been used prior to initial allergic contact dermatitis. It was suggested in the last report that the allergic contact dermatitis may have resulted from active sensitization due to the conditions of use.

Once polymerized, cyanoacrylate adhesives degrade into substances such as cyanoacetate and formaldehyde, which potentially have the ability to produce skin inflammation due to accumulation in surrounding tissues. The longer chained cyanoacrylates, such as octyl cyanoacrylate in Dermabond®, degrade more slowly than the short chained ones, (e.g. ethyl cyanoacrylate), thereby releasing less degradation products over the same skin contact time (4). This should produce less potential histotoxicity, providing contact time with the adhesive was not prolonged. Once polymerized, Dermabond® is reported to slough off naturally with the desquamating epidermis in 7–14 days (4). However, with our patient it was noted that the adhesive was still present on the scar line 4 weeks after application. In Perry

and Sosin's case (2), the 'haphazardly' applied Dermabond® was reported to have been present in a chronically discharging wound for 4 months before eventual excision. Such prolonged skin contact may well have contributed to the development of allergic contact dermatitis. Application technique (2), together with quantity of adhesive used, appears to be of major importance to the risk of developing allergic contact dermatitis from Dermabond®.

Our case again shows that a positive patch-test result to Dermabond® (containing octyl cyanoacrylate) is not associated with positive reactions to the other (meth)acrylates that were tested. However, a positive patch-test result to ethyl cyanoacrylate was found. Co-sensitization may occur as previously suggested (1); however, our patient gave no history of any previous relevant skin contact. The individual components of Dermabond® were not available for patch testing but we assume, given the case reports to date, that octyl cyanoacrylate was the cause of our patient's allergic contact dermatitis. Testing to the individual components of the adhesive, particularly octyl cyanoacrylate, is therefore indicated, in order to confirm the assumptions that have been made.

In conclusion, we report a case of allergic contact dermatitis to Dermabond® occurring in an adult patient with a history of atopic eczema. Active sensitization to this product may occur during first exposure, particularly if there is prolonged duration of skin contact and/or when the application site of the adhesive becomes inflamed or infected. Dermabond® is generally considered to be a well-tolerated tissue adhesive. However, as its use in a number of different clinical situations is growing, clinicians who use cyanoacrylate tissue adhesives should be mindful of this potential complication. In order to reduce the chance of development of allergic contact dermatitis to Dermabond®, particularly when there is evidence of wound infection or inflammation, we suggest that removal of any residual adhesive from the skin should be considered if still present after 2 weeks of application.

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