Allergic Contact Dermatitis after Prineo: Case Report and Review of Literature

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ABSTRACT

This manuscript presents the rare complication of allergic contact dermatitis caused by using liquid adhesives during the closure of long incisions. Octyl-2-cyanoacrylate is one example of a liquid adhesive used to close long wounds. Allergic contact dermatitis generally results upon second exposure to this adhesive. Patients who have had prior surgery that was sealed with a liquid adhesive should be monitored and counseled appropriately if they present with an erythematous rash around the incision sites. In this case, a patient presented with erythema and pruritus around her incisions after a tissue expander to implant exchange of the left breast. She previously had a mastopexy for breast cancer. A review of reported allergies to medications and medications used during surgery did not reveal a possible cause for the rash other than the octyl-2-cyanoacrylate. All medications used in the second procedure were the same as those used in the first procedure. The patient experienced mild relief with diphenhydramine. Complete abatement of her symptoms occurred only after removal of the octyl-2-cyanoacrylate. Today’s surgeon must be aware of the possibility of adverse immunologic reactions when using liquid adhesives. Although the long chain structure of current liquid adhesives makes them less likely to cause an allergic reaction as less formaldehyde results upon breakdown, allergic reactions must still be included in the differential diagnosis. This possibility should be discussed with patients who have been previously exposed to octyl-2-cyanoacrylate.

INTRODUCTION

The increasing popularity and use of chemical adhesives or surgical glue to close long incisions after surgery has increased the frequency of contact dermatitis after primary or secondary exposure. One such liquid adhesive, octyl-2-cyanoacrylate, functions as a monomer in liquid that can polymerize upon application to tissue. Approved by the FDA in 2010, Prineo™, is a new product that combines octyl-2-cyanoacrylate with a self-adhesive polyester mesh to ease the work of wound approximation in long incisions (Ethicon Products, Somerville, NJ, USA). This product reduces the time necessary for wound closure, better approximates edges, and effectively distributes wound tension.¹ There have been several reports of allergic contact dermatitis after use of octyl-2-cyanoacrylate²⁻¹⁰ and two reports of a reaction after use of octyl-2-cyanoacrylate with mesh¹¹. We report our expe
A 56-year-old woman with left breast cancer underwent mastectomy and presented for delayed breast reconstruction after chemotherapy and radiation. She underwent left breast reconstruction with a left latissimus dorsi flap and tissue expander without complication. Octyl-2-cyanoacrylate with mesh was used to seal all incisions on chest and back during initial reconstruction with no reaction. The expansion of tissue expander proceeded without complication over the following 6 weeks. Three months later, the patient underwent left tissue expander to implant exchange with right augmentation and mastopexy; wound closure was once again done with octyl-2-cyanoacrylate with mesh. Within 1 hour of transfer to the recovery room, a diffuse, erythematous, pruritic rash appeared on both breasts and spread to the left back around the latissimus dorsi donor site incision (Figures 1-4). A systematic approach was used to determine the nature of the skin changes; infection was ruled out based on normal white blood count and acuteness of the reaction. Pre- and post-op erative complete blood counts with differential did not reveal any abnormal eosinophil counts. The patient complained of intense itching of the areas affected which suggested a drug/product allergy. The only medication given periop eratively was vancomycin, which had been administered intravenously an hour prior to both surgeries. The patient had reported a history of multiple vancomycin treatments without adverse reactions. She reported an allergy to claforan (rash), iodine (anaphylaxis), and reglan (rash), none of which were used. Diphenhydramine 50 mg orally every 4-6 hours was recommended. Less than 24 hours later, she returned to the office with worsening erythema and itching around the incisions that was only mildly alleviated by the diphenhydramine. On physical exam, erythema and faint blisters were concentrated around the incisions, suggesting a possible reaction to the octyl-2-cyanoacrylate with mesh.

The octyl-2-cyanoacrylate with mesh was removed completely, the skin was washed, and the patient was instructed to continue diphenhydramine and daily showers. After 24 hours, the
itching was dramatically reduced, and after 60 hours the rash had completely resolved without itching (Figure 5). The patient now lists octyl-2-cyanoacrylate among her allergies.

### DISCUSSION

In the literature there have only been 5 reported patients who suffered from a post-operative allergic reaction to octyl-2-cyanoacrylate with mesh.\(^1,11\) Of these patients, 4 had confirmed previous exposure to octyl-2-cyanoacrylate with mesh that could have sensitized them for reaction in subsequent encounters. Three randomized control trials of 222 patients have not reported any allergic reactions after using octyl-2-cyanoacrylate with mesh.\(^12-14\) The low rate of allergic reaction may be attributed to the biologically inert nature of its two components: octyl-2-cyanoacrylate and mesh. It has been hypothesized that octyl-2-cyanoacrylate’s low rate of allergic reaction is due to the rapid polymerization of the cyano group on contact with keratin or enclosure of the hapten within keratinocytes, making it difficult to elicit an immune response.\(^9\) Upon polymerization, cyanoacrylates release formaldehyde which could also be the cause of allergic reaction in some patients and can only be determined through patch testing.\(^9\) Formaldehyde is one of the most common causes of allergic contact dermatitis within the United States.\(^15\)

Contact dermatitis is an umbrella term for both irritant and allergic reactions. The irritant type occurs after chemical, physical, or mechanical irritation of the skin barrier. Irritant contact dermatitis is not immune mediated.\(^16\) Allergic contact dermatitis is a type 4 hypersensitivity reaction mediated by Th1 CD4+ cells that accumulate in the dermis during re-sensitization. The first exposure to the antigen does not cause a reaction, but subsequent exposure leads to a vesicular rash with inflammation.\(^16\) The allergic reaction generally resolves with topical steroids and removal of the offending agent, but there have been reported reactions that were refractory to steroid treatment after using octyl-2-cyanoacrylate.\(^7\) Allergic patch testing is consid
2. Liquid adhesives such as the ones used in surgical closure can lead to allergic contact dermatitis.

3. It is important to consider allergic contact dermatitis when formulating a differential diagnosis for patients presenting with erythema, swelling, rash, and pruritus near a surgical incision.

**REFERENCES**


**LEARNING POINTS**

1. Allergic contact dermatitis is a delayed type hypersensitivity reaction that requires previous sensitization to an antigen.


