Case Report

Allergic contact dermatitis to Dermabond Prineo after abdominal wound closure for anterior lumbar interbody fusion: case report

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Background: Dermabond Prineo is popular for wound closure due to its anti-microbial attribute, ease of application, and patient comfort. Reports of allergic contact dermatitis have increased, likely due to increased usage, mostly in breast augmentations and joint replacements. To the authors' knowledge, this is the first report of allergic contact dermatitis following spine surgery.

Case Description: This case involved a 47-year-old male with a history of two posterior L5-S1 lumbar microdiscectomies. Dermabond Prineo was used in the revision microdiscectomy with no skin complications noted. Six weeks after revision microdiscectomy, the patient underwent discectomy and anterior lumbar interbody fusion of L5-S1, again closed with Dermabond Prineo. One week later, the patient presented with allergic contact dermatitis around his incision, which was treated with topical hydrocortisone and diphenhydramine. Around the same time, he was diagnosed with post-operative pneumonia.

Conclusions: Previous studies have suggested that repeated usage and duplicate coverage with 2-octyl cyanoacrylate (Dermabond Prineo) correlate with an increased risk of allergic reaction. Type IV hypersensitivity reactions require an initial sensitization to the allergen and subsequent re-exposure for reaction. In this case, the revision microdiscectomy closed with Dermabond Prineo functioned as the sensitization and repeated usage in a subsequent discectomy caused an allergic reaction. Providers should be aware of the increased risk of allergic reaction when using Dermabond Prineo for repeat surgeries.

Keywords: Case report; spine; dermatitis; allergy; Dermabond

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Introduction

Allergic contact dermatitis related to Dermabond Prineo (Ethicon, Somerville, NJ, USA) and its counterparts (i.e., 2-octyl cyanoacrylate and n-butyl cyanoacrylate tissue adhesives) is rarely observed in the literature. However, reports of the reaction have grown increasingly common in the past decade (1-6). This rise in reports is likely due to the increased use of cyanoacrylate tissue adhesives for wound closure in surgery (3,7). No reports in the present literature described an allergic contact dermatitis to cyanoacrylates when used in a non-surgical setting. The majority of reported cases are after reconstructive closure related to breast augmentation and orthopedic joint replacements (2,3,8,9). Although no cases have been reported to date in

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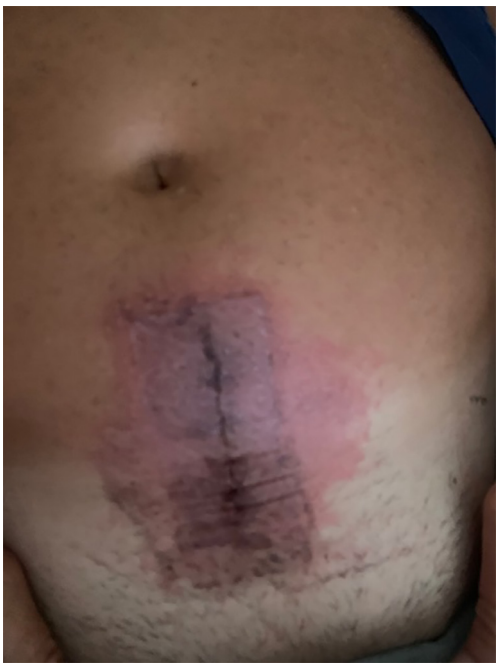

Figure 1 Erythema surrounding the patient's abdominal incision closed with Dermabond Prineo.

orthopaedic spine surgery, a case of allergic contact dermatitis to Dermabond following spinal cord stimulator placement has been reported (2). This case presented here involves an episode of allergic contact dermatitis to Dermabond Prineo after anterior lumbar interbody fusion of L5-S1. This case is presented in accordance with the CARE reporting checklist (available at https://jss.amegroups.com/article/view/10.21037/jss-22-93/rc).

Highlight box

Key findings

- Repeated exposure to Dermabond Prineo, a cyanoacrylate tissue adhesive, can illicit allergic contact dermatitis.

What is known and what is new?

- It is well known that type IV hypersensitivity reactions require an initial sensitization and elicit a T-cell mediated reaction upon subsequent exposure.
- This case study shows that cyanoacrylates can act as an allergen. Delayed and repeated exposure to Dermabond Prineo can cause allergic contact dermatitis.

What is the implication, and what should change now?

- Patients that undergo revision surgeries or have multiple exposures to tissue adhesives with cyanoacrylates are at risk of allergic contact dermatitis. In post-operative visits, providers should monitor patients for reactions.

Brief history of 2-octyl cyanoacrylate

2-octyl cyanoacrylate (Dermabond) was Food and Drug Administration (FDA) approved and became available to the public in 1998 for surgical incisions, specifically those which could easily be approximated in a low-tension area (10) Application of Dermabond to the skin creates a watertight seal over the approximated incision by polymerization in an exothermic reaction. Multiple studies since its market approval have consistently shown significant antimicrobial prevention against gram-positive (MSSA and MRSA) and gram-negative bacteria (10,11). According to FDA recommendations, 2-octyl cyanoacrylate should not be used in actively infected, gangrenous, or decubitus injuries. It is also inappropriate for use in closure of wounds in high friction or moist areas such as the axilla, for bites both human and animal, and stab or puncture wounds. The FDA warns against its use in patients with peripheral vascular disease, clotting disorders, insulin-dependent diabetes, keloid formation or hypertrophy (10). The use of 2-octyl cyanoacrylate for wound closure has become widely popular, particularly in surgical specialties, due to its ease of application and strongly positive patient outcome data (8,11). In addition, the ability to immediately bathe without the risks of dehiscence and infection is attractive. It has also been shown to be more comfortable for patients since there is no suture or staple removal (11). Other anecdotal reports find patients appreciate the cosmetic effect of the wound healing when closed with Dermabond versus other skin closure techniques.

Case presentation

A 47-year-old male with a history of two L5-S1 microdiscectomies presented to clinic one week post L5-S1 discectomy and anterior lumbar interbody fusion with a pruritic circumferential erythematous rash around his paramedian abdominal incision (*Figure 1*). The surgical procedure had been uncomplicated and skin was closed using a 4–0 Monocryl Stratafix and Dermabond Prineo.

Prior to this surgery, he had an index posterior lumbar microdiscectomy of L5-S1 by another surgical team with a patient-reported uncomplicated post-operative course. The skin closure materials used in this case were a 3–0 Monocryl sutures and Steri-strips, Xeroform, 4×4 Kerlex, and an

abdominal dressing. Dermabond was not used during the index procedure.

Several months after the index procedure, the patient presented to us with a recurrent L5-S1 disc herniation and underwent a revision right-sided L5-S1 microdiscectomy. Skin closure materials used were a 4–0 Monocryl and Dermabond. There was no direct incisional skin complication noted at this time. Incidentally, the patient developed an infected left-sided olecranon bursa two weeks post-operatively. He was treated with oral antibiotics and had complete resolution.

The patient presented 6 weeks post-operatively from his second microdiscectomy with a recurrent right leg radiculopathy. Repeat imaging showed a recurrent disc herniation, significant intervertebral disc collapse, and a grade 1 spondylolisthesis. Surgical options were presented to the patient and the anterior approach for discectomy and anterior lumbar interbody fusion was agreed upon.

The surgery was uncomplicated. At 1 week after surgery, the patient presented with allergic contact dermatitis (*Figure 1*). At this time, the Dermabond Prineo was removed, and the patient was started on topical hydrocortisone and diphenhydramine. Also, during this visit, the patient complained of upper respiratory symptoms, general malaise, and hemoptysis. The patient was referred to their primary care practitioner, diagnosed with post-operative pneumonia, and started on levofloxacin. On day two of levofloxacin treatment the patient developed a widespread rash over all four extremities. Levofloxacin was discontinued and the patient was placed on a different antibiotic by his primary without complication. The patient was seen in the office at two weeks post-op and had slow improvement of the abdominal erythema.

The patient was referred to immunology for further allergy testing. Prior to the index surgery, the patient's only reported allergies were to Bactrim, pineapple, and milk. Intraoperative antibiotic prophylaxis for both the second microdiscectomy and anterior lumbar interbody fusion consisted of Cefazolin (Ancef), to which the patient had no intraoperative or postoperative reactions.

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for the publication of this case report and accompanying image. A copy of the written consent is available for review by the editorial office of this journal.

Discussion

Allergic contact dermatitis is a type IV hypersensitivity that emerges when the first exposure to an *allergen* (in this case 2-octyl cyanoacrylate) creates a sensitization. Once sensitized, re-exposure disseminates an allergic reaction (2,12).

The number of reported allergic contact dermatitis cases related to 2-octyl cyanoacrylate is likely to continue to increase since its use in surgical wound closure shows a multitude of benefits (3,8). However, practitioners should be aware of the potential implications of patient sensitization to cyanoacrylate wound closure products. Two separate studies have shown that repetitive usage of 2-octyl cyanoacrylate and duplicate coverage correlate with an increased risk of allergic reaction (3,13). This case suggests repetitive usage could be a plausible explanation.

The case reported here was complicated by a series of post-operative issues that may relate to an underlying immune condition. More information is needed about cyanoacrylate tissue adhesives, their ingredients, and how that may correlate with the increase in allergic contact dermatitis after surgery.

Conclusions

A patient with repeated exposure to Dermabond Prineo for abdominal incision closure developed a type IV hypersensitivity reaction one week post-operatively. The patient also developed post-operative pneumonia. He was treated with levofloxacin and subsequently experienced a drug-induced rash. This patient's prior known allergies were to Bactrim, pineapple, and milk, yet he exhibited multiple allergic reactions after his spinal surgery. Providers should be aware of the increased risk of allergic reactions when using Dermabond Prineo for repeat surgeries.

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Footnote

Reporting Checklist: The authors have completed the CARE reporting checklist. Available at https://jss.amegroups.com/article/view/10.21037/jss-22-93/rc

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying image. A copy of the written consent is available for review by the editorial office of this journal.

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