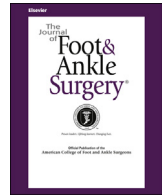




Contents lists available at ScienceDirect

The Journal of Foot & Ankle Surgery

journal homepage: www.jfas.org

Case Reports and Series

Liquid Adhesive Contact Dermatitis After Bunionectomy:
A Case Report and Literature ReviewChristopher R. Hood Jr., DPM¹, Rhonda S. Cornell, DPM², Bruce Greenfield, DPM²¹ Chief Resident, Department of Foot and Ankle Surgery, Crozer Keystone Health System, Chester, PA² Podiatric Surgeon, Private Practice, Foot Care Center, Havertown, PA

ARTICLE INFO

Level of Clinical Evidence: 4

Keywords:

allergy
balsam of Peru
compound tincture of benzoin
colophony
corticosteroid
liquid adhesive
Mastisol®

ABSTRACT

Hypersensitivity reactions to the skin adherents used in postoperative dressings are an uncommon but unfavorable complication that can result in poor wound healing, increased scarring, and surgical wound infections. This unexpected and unforeseen complication is not well documented in the current published data. We present the case of a 39-year-old female who had undergone a bunionectomy procedure and developed allergic contact dermatitis postoperatively. We discuss the clinical findings and treatments administered after application of a commonly used liquid skin adhesive applied intraoperatively. Through the use of topical and oral steroids and foot soaks in astringent solutions, over the course of several months, the patient's skin returned to the expected postoperative appearance. With the increased consciousness to minimize surgical scarring to improve cosmesis, one of these causes of the reaction might have been the liquid adhesive used in the surgical closure and dressing application. Therefore, we additionally reviewed the adhesive compound's chemical makeup and any potential cross-reactivity to help surgeons make an informed decision of whether to use a liquid adhesive. The various ingredients in liquid adhesives contain known allergen compounds that can cause a reaction, such as balsam of Peru and colophony or rosin, both of which are reviewed in our report. We also present a treatment algorithm developed from the compiled data in the case of a patient developing an allergic reaction. From our literature review and considering the percentage of incidence, if a surgeon desires to use a liquid adhesive product, Mastisol® should be chosen because of its lower reactivity and greater adhesive properties compared with the compound tincture of benzoin.

© 2015 by the American College of Foot and Ankle Surgeons. All rights reserved.

Postoperative surgical dressings often consist of a skin adhesive plus Steri-Strips® (Steri-Strips™; 3M Health Care, London, Ontario, Canada), a nonadherent dressing, and a dry sterile dressing. The choice in the use of these skin adhesives is often an afterthought and mainly determined by surgeon preference or hospital availability. Two of the main adhesives on the market commonly used are Mastisol® (Ferndale Laboratories Inc, Ferndale, MI) and compound tincture of benzoin (CTB) USP. These products are used to enhance the application of other dressings such as Steri-Strips® (1,2).

Benzoin tincture is a botanical product derived from the family of Styraceae plants and trees that grow in tropical Asia. The drug itself has its origins in the 15th to 16th century for the treatment of wounds, ulcers, and fissures on the body. Currently, in the medical

field, it is used to prevent the formation of blisters on areas of friction, to support wound closure dressings, and as an antiseptic (3). CTB is a preparation of benzoin, aloë, styrax (also called storax), and tolu balsam in an alcohol solvent (2). Mastisol® liquid adhesive, a preparation of ethanol, acetone, methyl salicylate, gum mastic (resin), styrax/storax, and water, is another example (2). Both gum mastic and storax, the ingredients in each product that give the adhesives their tackiness properties, contain the similar benzoic and cinnamic acids. Their associated allergen risks are described later in our report.

Allergic contact dermatitis (ACD) is considered a delayed type IV hypersensitivity reaction, with signs and symptoms ranging from mild erythema and pruritus to large plaques (vesicular, bullous, or indurated), with intense pruritus experienced by the patient (2). The cause for such symptoms is the body's immune system reacting to a substance it considers foreign and is sensitive to (the allergen) and triggering an immune reaction in the skin. The contact dermatitis seen with the use of skin adhesives often manifests in phases, the initial being erythematous skin changes with or without papules that begins to resolve 4 to 5 days once treatment has begun. This is

Financial Disclosure: None reported.**Conflict of Interest:** None reported.

Address correspondence to: Christopher R. Hood Jr., DPM, Department of Foot and Ankle Surgery, Crozer Keystone Health System, 1 Medical Center Boulevard, Chester, PA 19013.

E-mail address: crhoodjr12@gmail.com (C.R. Hood Jr.).



Fig. 1. (A) Clinical photograph from postoperative day 6 showing the beginning of a diffuse forefoot dermatitis corresponding to the application site of Mastisol[®], with linear spread across the forefoot laterally. (B) Clinical photograph from postoperative day 7 showing continued hyperpigmentation with vesiculobullous eruption. (C) Clinical photograph from postoperative day 14 showing additional erythematous hyperpigmentation of the skin with new vesicle formation proximally.

followed by a second phase of hyperpigmented, discolored skin that resolves over the subsequent weeks (4).

In the present report, we describe a case study of a patient who developed an ACD reaction to Mastisol[®] use in the postoperative dressing. In the days after the surgery, the patient began experiencing urticaria. By her first follow-up visit, a well-circumscribed vesicular dermatitis with hyperpigmentation was noted in the region of the Mastisol[®] application. We sought to determine the cause of the reaction by examining more closely the patient's history and the items used during the surgery. Because of the common ingredients in CTB and Mastisol[®] and the documented cross-reactions with other chemicals listed by Sasseville et al (3), we sought to determine whether any factor in our patient's history would be pertinent and could help future clinicians make an informed decision in their use of surgical adhesives during surgery to prevent an ACD reaction postoperatively.

We also reviewed the published data for other examples of liquid adhesive use that have caused ACD, with the purpose of creating a list of treatment options or a treatment protocol. Furthermore, because

ACD can potentially represent alternative pathologic entities, the differential diagnosis is discussed to help surgeons determine the most accurate diagnosis.

Case Report

The present patient gave permission for print and electronic publication and the international review board approved the study. A 39-year-old white female underwent Austin bunionectomy by the attending physician (B.G.). Mastisol[®] and Steri-Strips[®] were applied as the postoperative dressing after a subcuticular closure using Monocryl[®] suture (Ethicon, Somerville, NJ). This was followed by sterile gauze, Kerlix[™] (Covidien, Jersey City, NJ), and an ACE[™] bandage (3M Health Care) from the toes to the ankle. No tape products or other adhesives came in contact with the skin.

On the first follow-up visit 6 days after surgery, the physical examination revealed a faint vesicular dermatitis corresponding to the area of Mastisol[®] application, with an area of dermatitis projecting across the lateral forefoot. It was presumed that some of the Mastisol[®]



Fig. 2. Clinical photographs from postoperative day 20 showing the patient's foot before (A) and after (B) superficial skin debridement by the surgeon, with resolution of all vesicles.

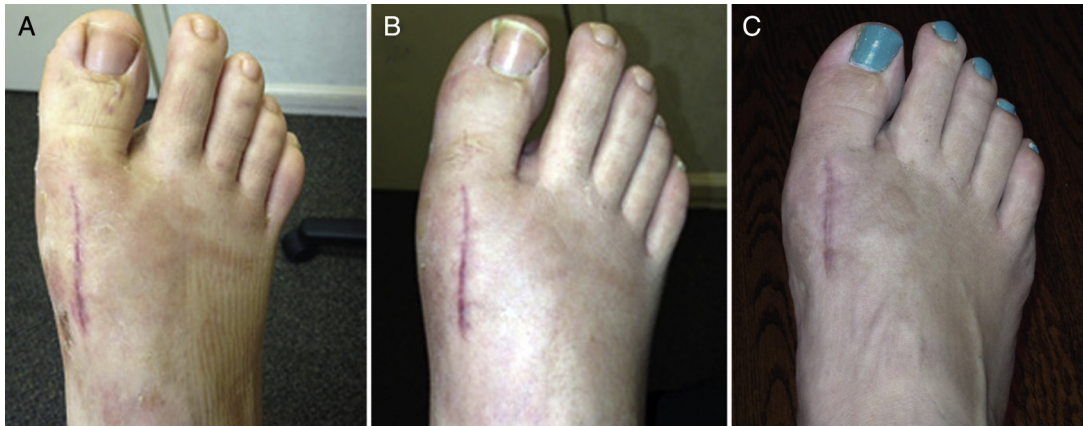


Fig. 3. (A) Clinical photograph from postoperative day 28 showing a faint demarcation of the previously hyperpigmented skin. Clinical photographs from postoperative (B) day 56 and (C) day 90 showing complete resolution of the hyperpigmentation to the skin.

had spread during its application (Fig. 1A). The patient stated that she had experienced mild pruritus in the days before her visit but had attributed it to the dressing. She denied any other dermatologic markings on her body or allergic manifestations in her respiration. The area was cleansed with alcohol and the patient given a prescription for diflorasone diacetate USP 0.05% topical steroid cream to be applied twice daily until the itching had ceased. The patient was also instructed to change the dressing daily.

Reviewing the patient's history and physical examination findings revealed a medical history of seasonal asthma, hypercholesterolemia, and tongue cancer. Her medications included atorvastatin, omeprazole, and fluticasone/azelastine, with no known drug-related allergies. She had no history of foot surgery. She had undergone a cesarean section, bilateral hip arthroscopy, tonsillectomy, and removal of the tongue cancer mass. On further questioning of the patient, she stated that she had used Steri-Strips® for the cesarean section in August 2006. However, it was unknown to her whether any skin adhesive had been used during the application, and the records were unavailable. No reaction had occurred during that period according to the patient. Additionally, she stated that neither she nor any family members had a food, chemical, tape, or fragrance allergic reaction history. She also denied the occurrence of any previous skin irritations from chemicals or detergents, plants, animals, or weather (i.e., heat rash). She had had a patch test performed previously, which she stated was vaguely positive for mushrooms. However, she could eat mushrooms without incident. During the present reaction, all allergy signs and symptoms remained localized to the foot, with no other reactions on her body or any respiratory or esophageal manifestations.

That evening, the patient noticed vesicular blistering to the skin with serous drainage. She denied any pain, extreme erythema, or streaking up the extremity. A prescription of cephalexin USP (Keflex®; Eli Lilly and Co, New York, NY) 500 mg orally for 10 days was given. She returned the next day, and the bulla was drained under sterile conditions and the fluid sent for microbiologic culture (Fig. 1B). She had no clinical signs of infection at that time. She was given a new prescription for a methylprednisolone taper from 60 mg to 10 mg over the next 6 days.

The patient continued with daily application of a dry sterile dressing to cover the foot. On postoperative day 14, new bullae at the base of the hyperpigmented region were drained in the office under sterile conditions (Fig. 1C). On postoperative day 20, all superficial skin was lightly debrided from the area (Fig. 2). By 1 month postoperatively, additional healing of the skin was noted, with no further

bullae formation (Fig. 3A). Complete resolution of the symptoms to the normal, preoperative skin appearance was seen at approximately 3 months postoperatively (Fig. 3B,C). The patient refused any additional patch testing to confirm the reaction to the Mastisol® or CTB-related products. The course of the actual bunionectomy surgery was uneventful, but the skin healing from the skin reaction required nearly 3 months to resolve fully.

Discussion

Tilbury Fox in 1874 recorded the first benzoin sensitivity, which resulted from a patient inhaling a benzoin-containing vapor (5). Few cases have been noted in published studies describing reactions to either CTB or Mastisol®, with the more uncommon occurring with Mastisol® (3,5–8). Both CTB and Mastisol® have the potential for cross-reactions to similar allergens, such as fragrances, balsam of Peru, colophony, and tea tree oil (3,9). These products share a common constituent that can trigger an ACD reaction in patients, especially a previously sensitized patient.

ACD is a type of cell-mediated hypersensitivity immune reaction at the molecular level between cytokines and T-lymphocytes with keratinocyte apoptosis. ACD has 2 stages, the induction phase (sensitizes the immune system for an allergic reaction) and elicitation phase (response to the allergen triggered) (10). The duration of these 2 phases depends on the history of sensitization to the allergen. The insult can be seen in a patient either with a history of sensitization (clinical manifestations 12 to 48 hours after exposure) or, less commonly, as a primary sensitization (clinical manifestations 7 to 10 days after exposure) to the allergen (5). These manifestations include skin erythema and hyperpigmentation, edema, and serous fluid blistering of the affected area that can burst and scale.

Because of this reactivity and potential cross-reactivity between the adhesives and other compounds listed in Tables 1 and 2 that could

Table 1
Products containing balsam of Peru

Product	Example
Sweets	Candy, gum, soda, ice cream
Condiments	Ketchup, pickles, relish
Liquors	Vermouth
Drinks	Liquors, citric products/juice, teas
Personal care	Cough medicine, lozenges, mouthwash, toothpaste
Tobacco	Cigarettes/E-cigarettes, chewing/smokeless tobacco, cigars, hookah

Table 2
Products containing colophony

Product
At work
Wood/sawdust
Wood fillers
Coated or glossy paper
Printing inks
Lacquers, varnishes
Paints, stains, polishes, waxes
Linoleum
Asphalt products
Solvents
Greases, oils
Polyethylene
Neoprene rubber
Waterproofing products
Driver belts
At home
Spices (nutmeg, paprika, cloves)
Diapers, menstrual pads
Furniture polishes
Medicated ointments, band aids
Glues, tapes, adhesives, stamps
Pine oil cleaners
Match tips, fireworks
Colored pencils
Wart treatment gels
Cosmetics, foundations, sunscreen
Eyeliner, mascaras
Lipstick
Chewing gum
Pine forests, Christmas trees (pine, evergreen)

be the primary sensitizer (3,8), it has been recommended that if the attending physician wishes to use a dermal adhesive with either a patient with a possible allergy to the items described or no known drug allergy, Mastisol® should be the adhesive of choice. This is because of its superior adhesive properties (reported to be 7 to 8 times more adhesive), it is a less potent sensitizer to reaction, and it has a lower incidence of complications (1,2,4,5,7,9,11). It was postulated that primary sensitization with concomitant later cross-reactivity is rare with Mastisol®. This was demonstrated by James et al (8), who reported no primary ACD after primary exposure of patients to Mastisol®.

Balsam of Peru (tolu balsam) is a substance obtained from the bark of balsam trees, with >200 components grouped into 4 major chemical headings: vanilla, rose oil (benzoates), cinnamon, and clove. Benzoates and cinnamons include their corresponding acids and alcohols (benzoic acid/cinnamic acid, benzyl alcohol/cinnamic alcohol)

(12), which are contained in many common products (Table 1). Balsam of Peru has an 11.8% cutaneous allergen rate by patch test, causing an ACD in North American subjects (2). A patient's stated allergy to these compounds should alert the physician to avoid using these products because they might exhibit cross-reactivity (5,8).

Colophony, also known as rosin (gum resin/rosin, pine), also found in these adhesive products, is a natural substance from coniferous trees created during the manufacture of turpentine and has been found to have a 2% cutaneous allergen ACD reaction rate with patch testing (1,13,14). Colophony can be found in many sources at work and in the home (Table 2). Skin contact allergy symptoms include erythema, edema, pruritus, and vesicular formation, often manifesting several days after the initial exposure (13). An allergy to colophony might be associated with an allergy to perfumes, flavors and spices, topical dressings, first aid ointments, and various wood products (13,14). This knowledge could be important in the preoperative setting, especially when determining whether a liquid adhesive should be used during application of the perioperative dressing.

James et al (8) performed one of the largest investigational studies comparing the 2 products and revealed a 0.3% incidence (16 of 4500) of ACD with CTB and a 0% incidence with Mastisol®. Kline (7) reported a reaction rate of 0.167% to Mastisol® (2 of 1200 surgical cases). In another comparison study (4) of >300 patients of varied sex, age, and race, who had undergone various types and anatomic locations of plastic surgery, the use of Mastisol® resulted in superior adhesive quality, a lower incidence of contact dermatitis (1 versus 57 episodes), and a lower incidence of skin discoloration compared with the use of CTB. In addition to the lower likelihood of an ACD reaction using Mastisol®, it has been shown to be a stronger adhesive, reported to be 7 to 8 times stronger than CTB (5). In a head-to-head power comparison of CTB and Mastisol®, the latter was far superior in the reinforcement of strip adhesion on human skin when various size weights were suspended from a reinforced strip on skin to measure the pull-off duration (11).

Although the list of ingredients and their cross-reaction compounds might seem extensive and random, it is better to err on the side of caution versus applying an adhesive with potential reaction to a patient's skin. Furthermore, if the patient has an ambiguous history or a new primary or postsensitization reaction and has not been examined by an internist or a dermatologist for an allergy workup, an allergy evaluation should be recommended to the patient at that time. Sending a patient to a dermatologist for a T.R.U.E. Test® (Thin-Layer Rapid Used Epicutaneous Patch Test; Smart Practice, Phoenix, AZ) is warranted to determine what other substances might elicit an ACD reaction (13,14). Both colophony and balsam of Peru, in addition to 33 other substances known to cause ACD, are included on the T.R.U.E. Test® panel.

Table 3
Treatment options for allergic contact dermatitis

Treatment	Reason	Example
Antihistamine	Reduce or block histamine release, which decreases pruritus and vasodilation	OTC: diphenhydramine, loratadine, cetirizine Rx: hydroxyzine, fexofenadine, desloratadine
Topical steroid	Local delivery; anti-inflammatory, antipruritic, and vasoconstrictive properties	Hydrocortisone valerate 0.2% cream (group 5) Triamcinolone acetonide 0.1% cream (group 5) Clobetasol propionate 0.05% cream (group 1)
Oral steroid	Systemic delivery	Methylprednisolone taper
Soaks	Anti-inflammatory, antipruritic, and vasoconstrictive properties	Burow tablet solution Domeboro® solution Saline
Antibiotics	Vesicular eruption, potential for infection Coverage for skin flora, gram-positive bacteria MRSA coverage if history of colonization present	Mupirocin topical Silver sulfadiazine topical Cephalexin Clindamycin (if penicillin allergy) TMP-SMX DS, clindamycin, doxycycline, linezolid (if history of MRSA present)

Abbreviations: MRSA, methicillin-resistant *Staphylococcus aureus*; OTC, over the counter; Rx, prescription; TMP-SMX DS, trimethoprim-sulfamethoxazole double strength.

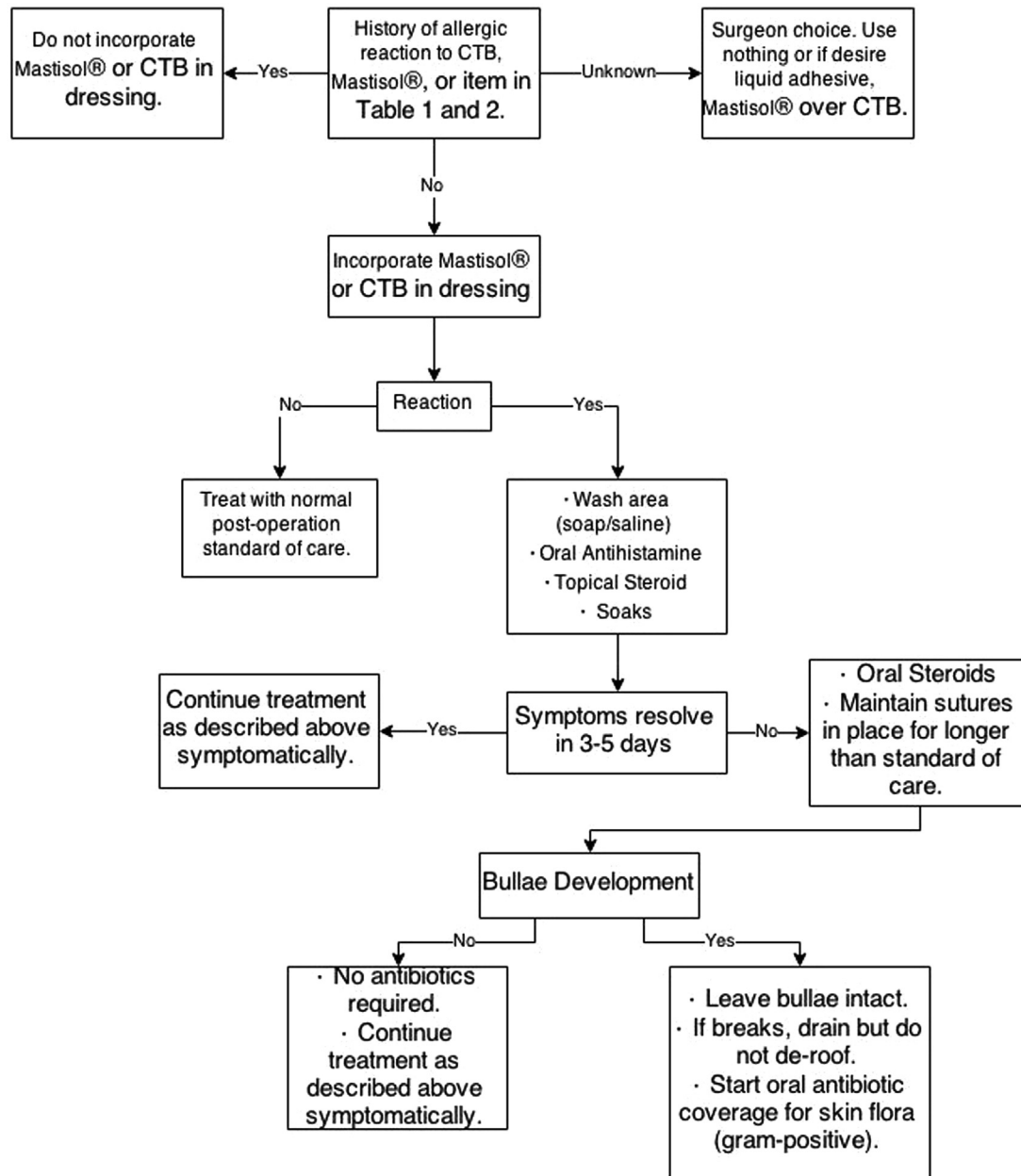


Fig. 4. Treatment algorithm for liquid adhesive-induced dermatitis. CTB, compound tincture of benzoin.

In encountering such a reaction, the differential diagnosis can consist of contact dermatitis from an allergen (ACD) versus from an irritant (irritant contact dermatitis), cellulitis, abscess, or bacterial infection, fungal infection, drug-induced reaction, psoriasis (palmo-plantar), eczema, and scabies (15). Additionally, in deducing the reaction between ACD and irritant contact dermatitis, many differential diagnoses exist in determining the exact culprit allergen or irritant substance. Typically, the diagnosis is primarily based on the physical examination findings and medical history. In the present case, the patient had no previous known allergies to common ACD or irritant contact dermatitis substances. She denied any occupational exposures. The bullae that developed were sterile, with no signs of infection or systemic manifestations. The only other chemical used during the surgery was a chlorhexidine gluconate sterile scrub applied globally to the entire lower extremity from the tibial tuberosity to the

digits. Mastisol® was the single product used directly on the skin in the exact same, well-circumscribed area in which the reaction had been seen, even with streaking hyperpigmentation laterally across the foot, mirroring the running of the solution before it dried (Fig. 1). By examining all the variables, we realized that primary sensitization to Mastisol® exposure was the offending agent.

When the clinician first sees an edematous, erythematous reaction, the differential diagnosis of cellulitis and ACD should be considered first. However, clinical indicators such as the timing of symptom onset, delineation of the adhesive application and erythematous area, the presence of pruritus, the lack of tenderness, and evaluation of a coapted surgical scar should help in distinguishing one entity from the other (6).

In reviewing the published data, only a few cases of tincture of benzoin and even fewer Mastisol® ACD type reactions have been

reported. No clear treatment algorithm has been cited; however, treatment appears to be multifaceted.

According to the published data, when beginning treatment of an ACD, initially, the skin should be washed with saline and alcohol to remove all the solvents used during the operation (Betadine, Dura-Prep™ [3M Health Care], CTB, Mastisol®). Second, antihistamine therapy (diphenhydramine 50 mg orally every 4 hours to a maximum of 400 mg daily) can be prescribed acutely until the resolution of pruritus and erythema. Also, a topical corticosteroid cream can be prescribed to be applied as directed for more local control of the reaction (16). Concomitant cool saline, Burow tablet solution, or Domeboro® solution (Bayer, Elkhart, IN) soaks or compresses have also anecdotally been shown to provide relief, with the Burow and Domeboro® solutions having an added antibacterial effect (7). If the symptoms do not resolve in the days after initiating such treatment or for more aggressive initial management, oral corticosteroid implementation has been recommended (i.e., methylprednisolone taper) (5) (Table 3). Once corticosteroid usage in its various forms has been implemented, it is recommended to keep any nonabsorbable suture used in the incision closure for a longer than normal period owing to the negative effect of corticosteroids on wound healing (17). The subsidence of the acute signs and symptoms of erythema, pruritus, and blistering should occur within 3 to 5 days of starting treatment (7).

One cited regimen (18) to treat a reported Mastisol® reaction after rhinoplasty consisted of a 1-week tapering of oral methylprednisolone and a 2-week course of topical 1% hydrocortisone, resulting in 80% resolution by 3 weeks and complete resolution of the symptoms, discoloration, and edema at 6 weeks postoperatively. In 2014, Han (16) reported on an episode of ACD due to benzoin spray 2 days after rhinoplasty. Suspecting ACD because of an erythematous lesion with blistering underlying the benzoin-treated area, the patient received a combination of oral and topical steroids (prednisolone 12.5 mg/day and clobetasol propionate 0.05% ointment). The timeline to complete healing was not noted.

In more severe situations of ACD, bullae can develop, resulting in secondary bacterial infection. Topical or oral antibiotics can be used singly or together, depending on the specific circumstances of the infection. This is especially important in surgical situations in which the incision could be compromised and internal hardware was used. Normal coverage is for skin flora and gram-positive bacteria. Methicillin-resistant *Staphylococcus aureus* coverage could be warranted for a patient with a history of colonization (Table 3). We created an algorithm based on the treatments described in the present report (Fig. 4).

In conclusion, it is often second nature for surgeons to use a liquid adhesive during intraoperative Steri-Strip® application. If the patient admits to no allergy history or no known reaction to the products listed in Table 1 and 2 or has a history of any dermatitis of an allergic nature, the development of dermatitis has often been rare. Because of the potential severity of the reaction (and ultimate disfiguring and/or pigmentation changes to the skin), some surgeons might decide to not use any adhesive at all. From the published data, if the surgeon

chooses to use a liquid adhesive, Mastisol® should be used in preference to CTB because of the former's increased strength and lower documented reaction rate. No clear treatment protocol has been developed. However, first cleansing the skin of any remnants of the adhesive and the surgical preparation compound and then using topical and/or oral steroids appears to be an acceptable regimen and was successful in treating our patient. If additional skin breakdown occurs, with either wound dehiscence due to increased swelling or vesicular eruption, starting an antibiotic might be warranted to combat potential infection, especially if hardware had been placed during the surgical procedure. Superficial sutures should be left intact for a longer duration with single or dual steroid use. We recommend suggesting that the patient see a dermatologist to undergo patch testing, if not specifically for benzoin products then for general allergens, to elucidate whether the patient is susceptible to any other potential unknown chemicals. The findings from the present case warrant further consideration from surgeons when deciding whether to use a liquid adhesive product intraoperatively.

References

1. Sarifakioglu E, Sarifakioglu N. Dressing spray enhances the adhesive strength of surgical dressing tapes. *Indian J Dermatol Venereol Leprol* 72:353–356, 2006.
2. Cohen DE, Kaufman JM. Hypersensitivity reactions to products and devices in plastic surgery. *Facial Plast Surg Clin North Am* 11:253–265, 2003.
3. Sasseville D, Saber M, Lessard L. Allergic contact dermatitis from tincture of benzoin with multiple concomitant reactions. *Contact Dermatitis* 61:358–360, 2009.
4. Lesesne CB. The postoperative use of wound adhesives: gum mastic versus benzoin USP. *J Dermatol Surg Oncol* 18:990, 1992.
5. Filiatrault A, Camasta C. Postoperative allergic contact dermatitis to tincture of benzoin and gum mastic: podiatric case reports. Available at: http://www.podiatryinstitute.com/pdfs/update_2003/2003_03.pdf. Accessed May 1, 2014.
6. Worsnop F, Affleck A, Varma S, English J. Allergic contact dermatitis from Mastisol mistaken for cellulitis. *Contact Dermatitis* 56:357–358, 2007.
7. Kline A. Allergic contact dermatitis of the foot after use of Mastisol® skin adhesives: a case report. *Foot Ankle J* 1(2), 2008. Available at: <http://dx.doi.org/10.3827/faoj.2008.0102.0002>. Accessed May 1, 2014.
8. James WD, White SW, Yankowitz B. Allergic contact dermatitis to compound tincture of benzoin. *J Am Acad Dermatol* 11:847–850, 1984.
9. Bhatt K, Fernandes R. Contact dermatitis to compound tincture of benzoin applied under occlusion. *Indian J Dermatol Venereol Leprol* 72:62–63, 2006.
10. Becker D. Allergic contact dermatitis. *J Dtsch Dermatol Ges* 11:607–619, 2013.
11. Mikhail G, Selak L, Salo S. Reinforcement of surgical adhesive strips. *J Dermatol Surg Oncol* 12:904–906, 1986.
12. Scheman A, Katta R. Contact allergy alternatives. *Adv Dermatol* 19:113–135, 2004.
13. T.R.U.E. Test—Colophony—Patient Information, True Test website. Available at: <https://www.true-test.com/PatientPDF/Colophony-Patient-Info.pdf>. Accessed May 1, 2014.
14. *Allergy to Colophony (Rosin)*, NHS Bedford Hospital Web site. Available at: http://www.bedfordhospital.nhs.uk/upload_folder/patient%20information/allergy%20to%20colophony.pdf. Accessed May 1, 2014.
15. Ustaine RP, Riojas M. Diagnosis and management of contact dermatitis. *Am Fam Physician* 82:249–255, 2010.
16. Han JS. Benzoin spray: cause of allergic contact dermatitis due to its rosin content. *Ann Dermatol* 26:524–525, 2014.
17. Wang AS, Armstrong EJ, Armstrong AW. Corticosteroids and wound healing: clinical considerations in the perioperative period. *Am J Surg* 206:410–417, 2013.
18. Mabrie DC, Papel ID. An unexpected occurrence of acute contact dermatitis during rhinoplasty. *Arch Facial Plast Surg* 1:320–321, 1999.