CASE REPORT

Eruptive furunculosis following the soak and smear regimen

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SUMMARY

The 'soak and smear' regimen is a highly effective method for localised topical therapy employed by dermatologists for widespread inflammatory skin conditions. The regimen involves application of topical medication under occlusion after soaking in water. Complications from this treatment method are rare. We present a case of multiple, generalised methicillin-resistant *Staphylococcus aureus* (MRSA)-positive furuncles arising in a patient as an unexpected consequence of therapy. The case highlights an unanticipated risk of a commonly employed treatment amid an epidemic of MRSA in the community.

BACKGROUND

Many eczematous and/or pruritic skin conditions may be satisfactorily treated with a 'soak and smear' regimen that affords a simple, cost-effective and targeted approach. 'Soak and smear' is a commonly employed method that involves soaking in water prior to immediate application of topical medication under occlusion. By optimising the absorption of the medication topically, the risks imposed by systemic medications may be avoided.^{1 2} As the utility of this method continues to be realised by clinicians managing inflammatory skin conditions refractory to standard approaches, awareness of potential adverse outcomes is crucial.

CASE PRESENTATION

A 75-year-old man with a long history of severe eczema presented with diffuse erythematous, xerotic scaly plaques over the trunk and extremities. His history was significant for diabetes, chronic renal insufficiency and hypothyroidism. He was instructed to use a commonly employed 'soak and smear' technique,¹ which involves soaking in plain lukewarm water for 20 min, followed by application of steroid ointment under occlusion with a sauna suit or moist pajamas. The patient began this regimen nightly using clobetasol 0.05% ointment, mixed with moisturising cream in 1:4 parts occluded with a jogging suit overnight. After 3 days, the patient presented with numerous lesions of the arms, legs and chest (figure 1). He denied fevers, weakness, shortness of breath or cough. He denied contact with fresh or sea water, or any exposure to fish tanks. He had not had any recent travel outside of the Los Angeles area. The sweat suit was newly purchased and on examination was not found to be too tight or occlusive.

On physical examination, the patient was generally well appearing and in no acute distress. He was

afebrile and his vital signs were within normal limits. Notably, multiple tender 1–3 cm fluctuant erythematous nodules were present on the arms, legs and chest. Purulent discharge exuded from several of the nodules.

INVESTIGATIONS

A representative lesion was biopsied and sent for tissue culture and H&E examination (figure 2). Fluid and tissue cultures were obtained from the lesions. Serum studies were obtained for HIV, syphilis, *Cryptococcus*, *Coccidioides* and *Histoplasma*.

DIFFERENTIAL DIAGNOSIS

Given the patient's acute presentation, the differential diagnosis included several infectious aetiologies, including bacterial furunculosis, chromoblastomycosis, sporotrichosis, eumycotic mycetoma, actinomycetoma, atypical mycobacterial infection, including *Mycobacterium marinum*, and mycobacterial tuberculosis.

TREATMENT

The patient was treated empirically with doxycycline 100 mg twice daily with significant improvement at 1 week follow-up. The lesions were not incised or drained initially as the differential diagnosis included atypical mycobacterial and fungal infections. The patient continued to receive doxycycline for two more weeks until the lesions were mostly resolved. He was begun on a methicillin-resistant *Staphylococcus aureus* (MRSA)-decolonisation regimen of rifampin 300 mg twice daily for 5 days, mupirocin to the nares for the first 5 days of each month and chlorhexidine baths for the first 5 days of each month, indefinitely.

OUTCOME AND FOLLOW-UP

Tissue cultures grew MRSA and pathological examination demonstrated a ruptured, inflamed follicle. Fungal and acid-fast tissue cultures were negative. HIV, syphilis, cryptococcal, *Coccidioides* and *Histoplasma* studies were negative.

The patient's furunculosis resolved completely after 3 weeks of doxycycline. He completed the rifampin, and still continues the decolonisation regimen. The patient's eczema continues to be controlled with moisturisers and topical steroids as needed.

DISCUSSION

Eruptive furunculosis after 'soak and smear' or wet-wrap therapy is unreported in the literature. 'Soak and smear' is a well-established and widely used method for treating inflammatory skin

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Figure 1 Presentation after 3 days of 'soak and smear' regimen with multiple large, fluctuant nodules of the arms, legs and chest. Images were modified in Photoshop to add a blue background.

Figure 2 Biopsy of one nodule demonstrating a diffuse neutrophilic inflammatory infiltrate in the dermis, consistent with ruptured folliculitis. Image taken at $\times 20$ magnification.

conditions using topical medication under occlusion for optimal penetration. In addition to generalised eczema, it is also employed commonly for psoriasis, hand dermatitis, erythroderma and cutaneous T-cell lymphoma. The 'soak and smear' regimen consists of whole-body bathing in plain water for 20 min followed immediately by smearing of a steroid ointment over the affected area without drying the skin. The patient usually then wears a sauna suit or sweat suit over the ointment to optimise absorption. Wet dressings may alternatively be applied over the steroid ointment. The applied ointment is usually triamcinolone acetonide 0.1% ointment. Patients typically soak from 4 days to 2 weeks. Soaking serves the important purpose of removing crust and scale while also hydrating a damaged stratum corneum, which can absorb as much as 5–6 times its own weight when soaked in water. Smearing then traps the moisture in the stratum corneum and delivers the topical medication effectively. Compared with a dehydrated cutis, topical medication penetrates moist stratum corneum 10–100 times more effectively. The technique is extremely effective in

rapidly controlling inflammation as an alternative to systemic steroids.^{1 2}

Adverse reactions to 'soak and smear' are rare, and usually mild and transient.^{1 3–5} In one study, the only adverse effect seen was purpura representing steroid atrophy at sites of application. Systemic effects of steroids such as moon facies, fat redistribution, glucose intolerance or infection were not seen.¹ In a study of paediatric patients treated with wet wraps, folliculitis was noted in 12 patients and furunculosis in 1 patient.^{4 5} Induction of folliculitis is due to the occlusive effect of the treatment and may be reduced by using creams instead of ointments, and application of the topical product in the direction of hair growth.^{1 2} Awareness of potential complications in these patients is important as this method for treating patients with extensive eczema or other inflammatory conditions is widely used.^{1 2}

Eruptive furunculosis is the term used to describe the sudden appearance of multiple diffuse furuncles. It has been described in association with particular strains of community-acquired MRSA.^{6 7} A virulent strain of *S aureus* is one expressing the gene, Panton-Valentine leukocidin (PVL), which has been isolated especially from deep skin infections including abscesses and furuncles.⁸ It is thought that those PVL-positive strains may be especially apt at penetrating the follicle to invade intact skin.^{9 10} As the incidence of MRSA continues to increase in the community,¹¹ potential triggers must be understood.

Learning points

- ▶ The 'soak and smear' method is an effective treatment regimen for multiple inflammatory dermatoses.
- ▶ Complications of the 'soak and smear' method are rare; however, an infection affecting the hair follicles is a possible adverse outcome.
- ▶ As the prevalence of methicillin-resistant *Staphylococcus aureus* increases in the community, potential triggers must be understood.

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Competing interests None.

Patient consent Obtained.

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REFERENCES

- 1 Gutman AB, Kligman AM, Sciacca J, *et al.* Soak and smear: a standard technique revisited. *Arch Dermatol* 2005;141:1556–9.
- 2 Bingham LG, Noble JW, Davis MD. Wet dressings used with topical corticosteroids for pruritic dermatoses: a retrospective study. *J Am Acad Dermatol* 2009;60:792–800.
- 3 Dabade TS, Davis DM, Wetter DA, *et al.* Wet dressing therapy in conjunction with topical corticosteroids is effective for rapid control of severe pediatric atopic dermatitis: experience with 218 patients over 30 years at Mayo Clinic. *J Am Acad Dermatol* 2012;67:100–6.
- 4 Oranje AP, Devillers AC, Kunz B, *et al.* Treatment of patients with atopic dermatitis using wet-wrap dressings with diluted steroids and/or emollients. An expert panel's opinion and review of the literature. *J Eur Acad Dermatol Venerol* 2006;20:1277–86.
- 5 Wolkerstorfer A, Visser RL, De Waard van der Spek FB, *et al.* Efficacy and safety of wet-wrap dressings in children with severe atopic dermatitis: influence of corticosteroid dilution. *Br J Dermatol* 2000;143:999–1004.
- 6 Dominguez TJ. It's not a spider bite, it's community-acquired methicillin-resistant *Staphylococcus aureus*. *J Am Board Fam Pract* 2004;17:220–6.
- 7 Mine Y, Higuchi W, Taira K, *et al.* Nosocomial outbreak of multidrug-resistant USA300 methicillin-resistant *Staphylococcus aureus* causing severe furuncles and carbuncles in Japan. *J Dermatol* 2011;38:1167–71.
- 8 Masiuk H, Kopron K, Grumann D, *et al.* Association of recurrent furunculosis with Panton-Valentine leukocidin and the genetic background of *Staphylococcus aureus*. *J Clin Microbiol* 2010;48:1527–35.
- 9 Del Giudice P, Bes M, Hubiche T, *et al.* Panton-Valentine leukocidin-positive *Staphylococcus aureus* strains are associated with follicular skin infections. *Dermatology* 2011;222:167–70.
- 10 Yamasaki O, Kaneko J, Morizane S, *et al.* The association between *Staphylococcus aureus* strains carrying Panton-Valentine leukocidin genes and the development of deep-seated follicular infection. *Clin Infect Dis* 2005;40:381–5.
- 11 Kleven RM, Morrison MA, Nadle J, *et al.* Invasive methicillin-resistant *Staphylococcus aureus* infections in the United States. *JAMA* 2007;298:1763–71.

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