Antiseptic Treatment of Povidone-Iodine Solution as a Countermeasure against Staphylococcus Aureus in Atopic Dermatitis

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ABSTRACT
Many patients with atopic dermatitis have not only skin but also multiple organ disorders such as intestinal tract and cervical spine. As the cause, the involvement of a toxin (called superantigen) produced by Staphylococcus aureus, which is detected from the skin of atopic dermatitis, is presumed. As a measure against Staphylococcus aureus, the use of Povidone-iodine was listed as adjuvant therapy in the Japanese Guidelines for Atopic Dermatitis Treatment 2018. In the future, we would like to treat atopic dermatitis as a superantigen disease and propose that Povidone-iodine solution be used in combination with general treatment as a measure against Staphylococcus aureus.

Keywords
Atopic dermatitis, Staphylococcus aureus, Superantigen, Disinfectant, Povidone-iodine.

Introduction
Patients with atopic dermatitis have a lower ability to protect against bacterial infections than healthy people [1-3]. Among them, Staphylococcus aureus easily adheres to the rash area, and Staphylococcus aureus is detected in most cases of patients with moderate to severe atopic dermatitis. By the way, the American Academy of Dermatology in 2014 announced that it would recommend bleach bath therapy as a treatment option for cases with possible involvement of infection in moderate to severe atopic dermatitis [4].

Also, according to the Japanese Guidelines for Atopic Dermatitis Treatment 2018, Povidone-iodine should not be easily used for atopic dermatitis but the use of Povidone-iodine should be considered for cases where infection may be involved. It was stated that the use of Povidone-iodine solution may be considered as adjuvant therapy [5].

Discussion
It is known that Staphylococcus aureus is separated more frequently in the skin of the affected part of atopic dermatitis patients than in the skin of healthy people, and it has been considered as an exacerbating factor since ancient times [6]. In Japan, Povidone-iodine solution is often used as a disinfectant, and in some cases, its usefulness has been reported (Figure 1 and Table 1) [7]. However, there has been no comparative test with a control so far, and its usefulness remains empirical. The use of povidone-iodine solution may have adverse effects such as exacerbation of dermatitis due to irritation on the sore surface, allergic contact dermatitis, anaphylaxis, and effects on thyroid function [8,9].

In addition, the use of Povidone-iodine is also poorly understood
on the basis of medical recommendations and may be considered as adjuvant therapy for cases considered to be associated with infection.

Figure 1: The exposure time was strictly prescribed to be 2 min for the face and 3 min or more for the rest of the body. At the end of the exposure time, povidone-iodine is to be thoroughly rinsed off. Disinfection using povidone-iodine is done twice to 4 times a day. Afterwards, steroid ointment or moisturizing ointment is finally applied.

Table 1: Practical notes of Staphylococcal Disinfection Skin Care Method [7] for atopic dermatitis.

<table>
<thead>
<tr>
<th>Method</th>
<th>Staphylococcal Disinfection Skin Care Method</th>
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<tbody>
<tr>
<td>(1) Disinfection of skin lesions using 10% Povidone-iodine solution</td>
<td>2-4 times/ d exposure time: 2-3 min</td>
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<tr>
<td>(2) Continuous application of moisturizing Vaseline ointment</td>
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<tr>
<td>(3) Topical steroid ointment application: once a day</td>
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Table 1: Staphylococcal Disinfection Skin Care Method

- Elevation of transepidermal water loss
- Destruction of skin barrier mechanism
- About 20 min for binary division of S. aureus
- Worsening of skin lesions by scratching
- High detection rate of bacterial toxins

Conclusion

When it is considered that atopic dermatitis is superantigen disease, measures against _Staphylococcus aureus_ are important. There has been a large number of reports that if a treatment that uses Povidone-iodine solution that can also kill MRSA in combination with general treatment is used, rapidly and remarkable improvement of rashes and laboratory data in patients with atopic dermatitis can be obtained. The Japanese Guidelines for Atopic Dermatitis Treatment 2018 also stated that the use of Povidone-iodine solution can be recommended in cases where general treatment is not effective enough as one of the treatments for atopic dermatitis.

Thus, _Staphylococcus aureus_ control in patients with atopic dermatitis is important, and bleach bath therapy has already been incorporated into the treatment guidelines in the United States. Povidone-iodine can also kill MRSA, and we have already reported that MRSA can be eradicated in all patients with atopic dermatitis in which MRSA [11] is involved. When it is considered that atopic dermatitis is a superantigen disease, _Staphylococcus aureus_ control in atopic dermatitis is important. Although this Povidone-iodine solution contains iodine, it has already been reported that the thyroid disorder is not recognized even in the examination of the injury to the thyroid of iodine absorbed from the skin by the treatment of flushing the Povidone-iodine solution [7,11].

References


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