

## *Staphylococcus aureus* vs. Atopic Dermatitis Kazuo Sugimoto

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**Keywords:** *Staphylococcus aureus*, Atopic Dermatitis, Disinfectant

**Received:** March 04, 2016; **Accepted:** April 05, 2016; **Published:** April 11, 2016

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**Citation:** Sugimoto K. *Staphylococcus aureus* vs. Atopic Dermatitis. J Pharm Microbiol. 2016, 2:1.

## Introduction

When comparing the phagocytic capacity and migration ability of white blood cells in patients with atopic dermatitis and healthy subject's former is lower than the latter, as well the former secretion of IgA in the subcutaneous tissue is small in comparison than the latter. Patients with atopic dermatitis are susceptible to infections of the skin compared to healthy subjects. Also in atopic dermatitis treatment guideline 2015 in Japan, patients with atopic dermatitis in the pathophysiology, pathogenesis in atopic dermatitis is described to be susceptible to infection in the skin. Also like *Staphylococcus aureus* is described as easily fixing the lesion site.

## Discussion

By the way, Kobayashi et al. [1] had demonstrated that *Staphylococcus aureus* is also involved in the worsening of rash and also involved in the onset of atopic dermatitis. In addition to the United States of treatment guidelines, bleach bath therapy has been introduced. In Japan Society report, from the patient's skin of moderate or more severe atopic dermatitis, it is detected almost 100% *Staphylococcus aureus*. Toxins produced by *Staphylococcus aureus* are acting on the human body as superantigens. Disinfection therapy that we have developed using the Isodine® solution against *Staphylococcus aureus*, was reported as disinfection therapy for atopic dermatitis in 'Today's Health' program of the NHK educational television in 1994. In the medical program of the 1995 short-wave broadcasting, been reported as a skin care method for atopic dermatitis, the treatment results in 1998 in the health program of commercial TBS television that will improve in a short period of time was broadcast across the country. So like many dermatologists, pediatricians, physicians have taken up this treatment for atopic dermatitis, this therapy has been popular in Japan.

We have experience in many of the cases that the improvement of the rash of atopic dermatitis is clinically early [2]. Those things we reported in Dermatology entitled New Successful Treatment with Disinfectant for Atopic Dermatitis [2]. Iodine contained in the Isodine® liquid is absorbed into the body, but the effect on the thyroid gland of the absorbed iodine we examined, we have also reported that there is no obstacle to the thyroid in this

treatment. A few minutes after the Isodine® solution was applied as the reason that from the skin, we are likely to be due to wash away the Isodine® solution.

We had reported these things in 1998 in the Japanese Society of Pediatric Dermatology magazine [3].

Yamada et al., [4] had reported the presence of colitis in patients with atopic dermatitis. So we also have experienced that there is a duodenitis frequently in the biopsy of the duodenum of patients with atopic dermatitis. Also Kira et al., [5] had reported the presence of cervical spinal cord inflammation against atopic dermatitis. We have demonstrated that there is an abnormality in the high frequency to the cervical spine of patients with atopic dermatitis. Ito et al., [6] had reported in Neurological Sciences in 2003 that atopic dermatitis can cause cervical intervertebral disc disorder in high frequency.

We also were carried out using the PCR method detection of the toxin produced from the detected *Staphylococcus aureus* from 196 cases in patients with atopic dermatitis who visited our hospital. The detection rate of the toxin was high as 80.1 percent. Clinically it is possible to measure the anti-IgE antibodies to the toxin SEA and SEB. SEA and SEB occupied in the entire toxin was 60.2%.

These things have come to be recognized in the world published in 2002 as The Importance of Disinfection Therapy Using Povidone-iodine Solution in Atopic Dermatitis [7] in Dermatology. Kino et al., [8] had reported that there is a lesion in the colon of infants of atopic dermatitis with a food allergy. Among them, they have reported to the Pediatric Radiology that it has also improved inflammation of the colon along with the improvement of the rash of patients in 2002.

Isodine® fluid can cause contact dermatitis of the skin. However,

since we are performing this treatment method to limit the disinfection frequency and application time, effects on the skin is small, and since there are many cases that improvement of the rash of atopic dermatitis can be obtained in a short period of time, we adverse effect of contact dermatitis does not have a thing to take up the issue. We had observed in a number of multi-organ failures of the intestinal tract and cervical spine in addition to the skin in patients with atopic dermatitis. That toxin that *Staphylococcus aureus* is produced has led to multiple organ failure serves as a super antigen and we think.

*Staphylococcus aureus* is a familiar pathogenic bacterium to human, and *Staphylococcus aureus* is possible to create pathogenic toxins to exert a lot of T-cell stimulating activity has been known for a long time. White et al., [9] in 1989 had proposed the concept of super-antigen for these toxins. Super antigen, is attracting attention in terms of activating a large number of T cells exactly the antigen recognition of normal T cells in a different way, quite a lot of the disease was thought to be caused by the super antigen.

The number of antigen-specific presenting cells is a common allergic reaction to be mobilized have for one antigen exposure is mobilization is one of the lymphocytes in about 10 million of the lymphocytes. Stimulation of super antigen can directly stimulate the  $V\beta$  of antigen-specific presenting cells and will produce cytokines. Lymphocytes that are mobilized in the stimulation of the super antigen is one in about 30 pieces of lymphocytes, cytokine is several orders of magnitude enormous that is produced in the stimulation of the superantigen.

We had recognized the multi-organ failure at a high rate in patients with atopic dermatitis. It has reported that as incentive of multi-organ failure was estimated the presence of the toxin of *Staphylococcus aureus* in 2006 in Dermatology [10]. We had demonstrated the duodenitis 43 cases out of 53 cases performed a biopsy of the duodenum of patients with atopic dermatitis. In addition to the repeat biopsy examination in 12 cases, 5 examples of duodenitis was normalization we experienced.

Further we diagnosed neurologically abnormality in 89 cases in patients out of 110 cases with atopic dermatitis. In clinically abnormal 89 cases, we diagnosed 54 cases out of 69 cases showed some abnormality in the cervical spine MRI.

32 patients with atopic dermatitis who underwent neurological examination and duodenal biopsy, 6 patients showed no abnormal neurological examination and 5 patients showed normal duodenal tissue, but the 21 patients with atopic dermatitis showed abnormality both in neurological examination and duodenal tissues.

## Conclusion

Last year, for the first time in the world [11] had reported that atopic dermatitis may be one of the super-antigen diseases. Since it has been demonstrated that *Staphylococcus aureus* in the onset or aggravation factors of atopic dermatitis [1] are involved, it is critical to minimize the impact of *S. aureus* in the treatment of atopic dermatitis. In the future, treatments that are developed is considered to be highly recommended treatment.

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