



Rising Awareness of the Relationship Between Infective Endocarditis and Atopic Dermatitis

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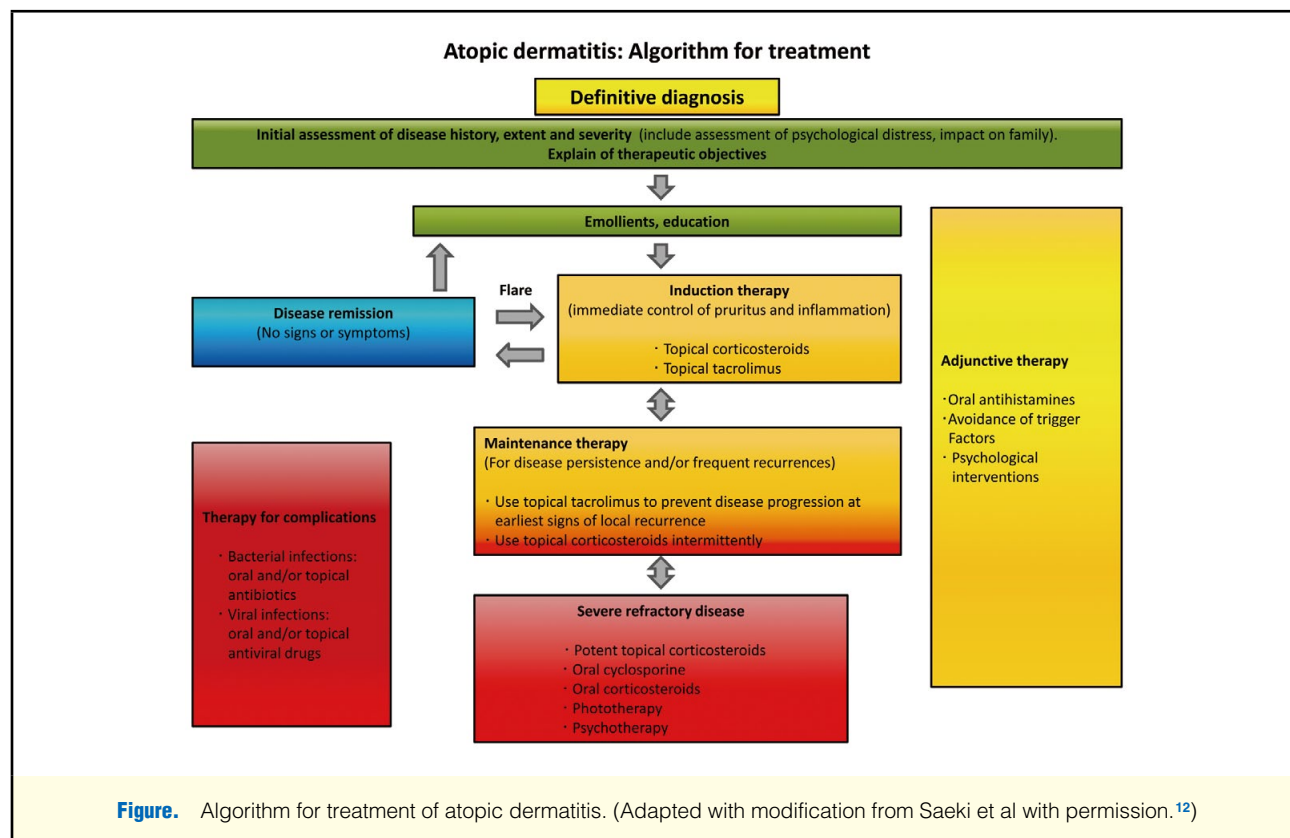
Infective endocarditis (IE) is a disease in which a microorganism colonizes a focus in the heart, producing fever, heart murmur, embolic manifestations, and bacteremia or fungemia. Early diagnosis of this condition is crucial, because devastating complications and death almost invariably result if treatment with antibiotics with or without surgery is not instituted.¹

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Atopic dermatitis (AD) is a chronic, relapsing eczematous skin disease characterized by pruritus and inflammation and

caused by the intervention of various unspecific stimulations and specific allergens. AD is one of the most common skin diseases, affecting up to 20% of children and 1–3% of adults in most countries around the world.² The cardinal feature of AD is itch, and scratching may account for most of the signs. Colonization by *Staphylococcus (S.) aureus* is commonly observed in the skin lesions of AD patients, and scratching of the pruritic lesions may lead to reiterative bacteremia and endocarditis.³ Some authors have reported a relationship between IE and AD in case reports.^{3–5}

In the study by Fukunaga et al⁶ in this issue of the Journal, 8 of the 120 patients (6.7%) who underwent cardiovascular



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surgery on cardiopulmonary bypass for IE at a single center also had AD. Although the bacterial spectrum of the causative organisms in their complete series of IE cases and in a nationwide survey of IE in Japan was very similar⁷ (streptococci, 45.8% vs. 51.9%, respectively; *S. aureus*, 17.5% vs. 21.0%, respectively), the frequency of *S. aureus* was much higher (7/8, 88%) in the IE+AD group. Analysis of the clinical characteristics of IE patients with and without AD showed younger age and higher frequencies of stroke and *S. aureus* infection in IE patients with AD. All cases of IE+AD, there was preexisting heart valve disease, but no potential risk factors for IE such as dental cavities or oral procedures before the occurrence of IE. This report potentially offers direct evidence of a relationship between AD and IE. They also report excellent results without hospital deaths or recurrent IE in all survivors during a mean follow-up period of 5.5 years. The authors made various efforts to avoid postoperative mediastinitis. The patients received skin care for AD by dermatologists prior to surgery. In terms of surgical approach, either median sternotomy or right thoracotomy was used, based on factors identified in their previous experiment, including the condition of the skin.⁸

The development of IE is the net result of complex interactions between bloodstream pathogens with matrix molecules and platelets at sites of endocardial cell damage. IE is likely to result from frequent exposure to random bacteremias associated with daily activities.⁹ The microbial species entering the circulation depend on the unique endogenous microflora that colonizes the particular traumatized site. Therefore, a potential risk of staphylococcal bacteremia and acute native valve endocarditis in patients with uncontrolled AD is present.¹⁰ Although proof is needed for the contention that an increase in antimicrobial peptides decreases the severity of skin infection, 1 study suggested the involvement of a deficiency in the expression of the innate immune system against antimicrobial peptides in AD patients, accounting for their susceptibility to skin infection with *S. aureus*.¹⁰ *S. aureus* is an aggressive pathogen¹¹ and bacteremia with this organism can infect healthy heart valves. Neurological complications of IE, particularly embolic events, tend to be more frequent with this organism.³

The density of *S. aureus* colonization in AD correlates significantly with clinical severity, and patients with severe AD may thus achieve improvements (but not cure) with anti-staphylococcal treatment. In severe exacerbations, systemic antibiotic treatment may prove helpful.² However, treatment with systemic antibiotics should be limited to the short term. Such treatment may be beneficial if the skin is obviously superinfected with bacteria, and oral antibiotics offer no benefit for the skin condition in AD as long as skin lesions are not obviously superinfected.² In addition, various approaches should be used in the treatment of AD (Figure). Cardiac surgeons and cardiologists must work closely with dermatologists to treat patients.

In a national survey of dermatological patients conducted in 2007 by the Japanese Dermatological Association, the age distribution of patients with AD showed a bimodal pattern, with peak incidences in the age ranges of 0–5 and 21–25 years.¹² These data support the finding of the current report that patients with IE and AD are much younger than those without AD.⁶ The percentage of adolescent/adult-type AD has also been increasing, with a prevalence of 8.3–9.4% in patients in their 20s and 30s.¹³ In addition, the incidences of very severe and severe AD are significantly higher in the adolescent/adult AD group than in the infantile and childhood groups.¹⁴

Various reports have examined the nationwide prevalence of IE in Japan. Nakatani et al conducted web-based surveys of the current clinical characteristics of IE from 2000 to 2001 and

from 2007 to 2009. In total, data were received for 848 cases and 513 cases, respectively.^{7,15} AD was included as a predisposing factor, and the authors stated that attention should be paid to that factor.⁷ IE with AD was seen in 5 cases (0.6%) in the former period⁷ and in 5 (1.2%) in the latter.¹⁵ Fukunaga et al reported that 6.7% of IE patients had AD,⁶ and this difference in proportions might indicate their awareness of the skin condition of their patients.

The present study by Fukunaga et al⁶ had a substantial number of patients with IE and AD, and such patients display *S. aureus* infection at a much higher frequency than IE patients without AD. Further studies should be conducted to clarify these findings. Although prevention of IE is important, taking into consideration the population of AD patients, it is no more realistic to check for valvular disease when encountering an AD patient than it is to check for valvular disease in every patient presenting with dental cavities. Currently, attention should be paid to whether patients with IE have AD or a history of AD, because AD patients have a high incidence of staphylococcal colonization of skin lesions. As cardiac surgeons and cardiologists, we should also share interesting data such as those shown in the current study⁶ with dermatologists.

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