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Case Report

Staphylococcus Aureus Infective Endocarditis in Patients with Atopic Dermatitis: Three Cases and Review

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Abstract

Atopic dermatitis is a common skin disease colonized by *Staphylococcus aureus*. It has a potential risk causing infective endocarditis. We experienced three atopic cases of serious active infective endocarditis. A 13-year-old girl and two women of 21- and 29-year-old underwent valve replacement because of active infective endocarditis with heart failure and/or thrombo-embolic episodes. One developed thrombosed prosthetic valve because of inadequate anticoagulation therapy, and she successfully underwent re-valve replacement. The three patients received intensive skin cares after the surgery, and all had no recurrence of endocarditis. Infective endocarditis should be considered in young patients with atopic dermatitis and unknown fever origin.

Keywords: Infective endocarditis; Atopic dermatitis; *Staphylococcus aureus*; Heart valve surgery

Abbreviations

AD: Atopic Dermatitis; IE: Infective Endocarditis; S. aureus: *Staphylococcus aureus*

Introduction

Infective Endocarditis (IE) might be followed by dental procedures, drug abuse, and others. Atopic Dermatitis (AD) is a common skin disease colonized by *Staphylococcus aureus* (S. aureus). It has a potential risk causing IE. We experienced three cases of active IE associated with AD lesions such as characteristic scratches and colonizations in their skins.

Case Presentation

Case 1

A 13-year-old girl was admitted for treatment of active IE with congestive heart failure. Initially, she was presented with high body temperature above 40^{0}c. She had suffered from AD since her childhood period. Echocardiogram showed massive mitral valve regurgitation with a vegetation of 8mm in diameter. Preoperative brain CT showed multiple abscess formation. Both blood and cerebrospinal fluid cultures revealed S. aureus. The mitral valve was extremely destructive, and it was successfully replaced with a mechanical valve of 23mm. She and her family gave us an informed consent for a mechanical valve implantation. The posterior mitral annulus with an abscess was also repaired with a patch. Sensitive antibiotics were administered intravenously for 8 weeks. Anticoagulation therapy of Coumadin with an antiplatelet agent was scheduled in an ordinary fashion, but her adherence to the treatment was notsufficient.

She developed heart failure four months after operation. Echocardiogram showed a prosthetic valve dysfunction with severe stenosis. She underwent the secondary mitral valve replacement with another mechanical valve of 25mm. Operative findings showed a thrombosed prosthetic valve. Thereafter, anticoagulation therapy has been adequately controlled associated with skin treatment for AD. She is doing well 25 years after the operation.

Case 2

A 21-year-old woman was transferred to our hospital for treatment of active IE. She had AD, and she had suffered from multiple splenic infarction without brain abscess before admission. Multiple Osler nodules were recognized upper and lower extremities. Methicillin sensitive S. aureus was identified by blood culture, and echocardiogram showed a bicuspid artic valve with massive regurgitation associated with a vegetation of 12mm in diameter on the left ventricular aspect. A root abscess cavityat the left coronary cusp was closed and the aortic valve was replaced with a mechanical valve of 17mm under standard cardiopulmonary bypass. Sensitive antibiotics were administered for 6 weeks followed by two-week oral intake of antibiotics. Postoperative course was uneventful, and skin care was depended on her dermatologist. She is doing well six years after the operation.

Case 3

A 29-year-old woman with AD presented with consciousness disturbance and high body temperature above 40^{0}c. Work-up studies revealed active IE by methicillin sensitive S. aureus and mild mitral valve regurgitation associated with multiple moving vegetations of 5~10mm on the anterior and posterior leaflets. Operative findings were compatible to echocardiographic ones. Multiple vegetations on the anterior and posterior leaflets were observed, the mitral valve were observed, and the mitral valve was replaced with a bioprosthetic valve of 27mm. Sensitive antibiotics were administered intravenously for 6 weeks. The dermatitis was cared with a dermatologist. Postoperative course was uneventful, and she is doing well three months after the operation.

Discussion

The genetic studies on atopic disorders including AD implicate that genetic risk factors in the context of ancestry variation [1], and AD is national subject of concern in Japan. The definition and

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diagnostic criteria for AD by the Japanese Dermatological Association require the presence of pruritus, typical morphologic skin lesions and a relapsing course. Our patients had been treated with their dermatologists, but they had somewhat active skin lesions of pruritic scratches and small colonizations.

Yamamoto and colleagues reported a case with recurrent prosthetic valve endocarditis in an atopic 27-year-old man in 2007 [2]. S. aureus was identified as a causative organism. Their review showed that 10 patients age between 1989 and 2003 was 26.6 years in average and that S. aureus was identified in all patients.

Fukunaga and colleagues showed interesting clinical results about IE in patients with AD in 2013 [3]. They analyzed eight IE patients with AD and 112 IE patients without AD. The former were significantly younger than the latter (28.4 years vs. 53.7 years; p,0.0001). In seven patients with AD, IE was induced by S. aureus, and preoperative stroke was recognized in six patients.

Patel and colleagues reported 2 cases with systemic complications caused by S. aureus and reviewed bacteremia, cardiovascular, osteoarticular, pulmonary, and ocular complications induced by S. aureus in atopic patients [4]. They concluded that although reports were rare, practitioners should be aware of these important, albeit unlikely, complications of staphylococcal infections in individuals with AD. Other investigators including a dermatology unit considered AD as a risk factor for acute native valve IE [5-9].

As treatment modality an immunosuppressive agent may be subscribed for AD patients. An AD patient using the agent has the increased risk for IE. Tanioka and colleagues reported a case with prosthetic endocarditis in a patient with AD using the agent [10]. The patient successfully underwent re-valve replacement surgery. Intensive skin care with topical corticosteroids and/or immunosuppressive agents plays an important role to prevent primary and secondary occurrences as well as oral intakes of them [11].

Conclusion

We followed three cases with active IE associated with AD lesions and reviewed articles reporting IE cases with AD. Intensive skin care following surgery is requiredto prevent recurrence of IE, and the possibility of IE should be considered in young patients with AD and fever of unknown origin.

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