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Two Episodes of *Stenotrophomonas maltophilia* Endocarditis of Prosthetic Mitral Valve

: Report of a Case and Review of the Literature

Stenotrophomonas maltophilia (previously named *Xanthomonas maltophilia*) is an aerobic, non-fermentive, Gram-negative bacillus that is wide spread in the environment. It was considered to be an organism with limited pathogenic potential, which was rarely capable of causing diseases in human other than those who were in debilitated or immunocompromised state. More recent studies have established that *Stenotrophomonas maltophilia* can behave as a true pathogen. Endocarditis due to this organism is rare, and only 24 cases of *Stenotrophomonas maltophilia* endocarditis have been reported in the medical literature. Most cases were associated with risk factors, including intravenous drug abuse, dental treatment, infected intravenous devices, and previous cardiac surgery. We present a case with two episodes of *Stenotrophomonas maltophilia* endocarditis after mitral valve prosthesis implantation, which was treated with antibiotics initially, and a combination of antibiotics and surgery later. To our knowledge, this is the first case of repetitive endocarditis due to *Stenotrophomonas maltophilia*.

Key Words : *Stenotrophomonas maltophilia; Endocarditis; Heart Valve Prosthesis*

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INTRODUCTION

Stenotrophomonas maltophilia (*S. maltophilia*) is a Gram-negative aerobic bacillus (1) that is increasingly recognized as an important cause of nosocomial infection, especially in debilitated and immunocompromised hosts (2-6). It is associated with significant morbidity and mortality rates. Infective endocarditis due to this organism is rare. A review of the literature revealed only 24 cases including one case in Korea. Prosthetic valves are more commonly associated than native valves. *S. maltophilia* is characterized by its resistance to many currently used antimicrobial agents (7, 8). We experienced a case of repetitive *S. maltophilia* endocarditis following mitral valve prosthesis implantation in an apparently immunocompetent man.

CASE REPORTS

A 44-yr-old man was admitted to our hospital in June 1998 with a 10-day history of fever and chills. In 1993, the patient had undergone 27 mm Carbo Medics metallic mitral valve replacement for severe rheumatic valvular disease. No other underlying disease was found. His medical history revealed no predisposing event such as dental procedures or injections of intravenous drugs. On physical examination, blood pressure was 110/70 mmHg, pulse rate 85/min, and body temperature 38℃. He was not so ill in appearance and cardiac examination revealed normal S1, S2 with metallic heart sound. There was no audible murmur. The remainder of the physical examination was unremarkable.

Laboratory tests showed that white blood cell (WBC) 10,500/μL, erythrocyte sedimentation rate (ESR) 52 mm/hr, and C-reactive protein (CRP) 5.56 mm/dL. Rheumatoid factor was positive (35.6 mm/dL) and urinalysis were normal. Increased cardiothoracic ratio was observed on chest radiography. Electrocardiogram revealed a normal sinus rhythm. The transthoracic echocardiogram demonstrated suspicious vegetation on prosthetic mitral valve. The transesophageal echocardiogram revealed thread-like structure on the posterior leaflet of mitral annulus. The patient was begun on a regimen of vancomycin (15 mg/kg q 12 hr) and gentamicin (1 mg/kg q 8 hr) before the sensitivity report (Table 1). *S. maltophilia* was identified on blood culture. We did not change the antibiotics because he became afebrile and improved clinically. Also, there was the possibility of laboratory contamination because *S. maltophilia* was isolated only once among six blood culture sets. After three weeks' antibiotic therapy, the patient was transferred to another hospital and continued the therapy for another week.

In December 2000, he was hospitalized again due to fever, myalgia, and anorexia for one month. One month before admission, there was an episode of dysarthria, dysphagia and drooling for 1 day, which was assumed to be a transient ischemic attack. He visited our hospital because fever and myalgia persisted despite 1 month therapy with vancomycin and gentamicin in another hospital. Laboratory data included a WBC count of 6,400/μL, ESR 90 mm/hr, and CRP 5.56 mg/dL. Urinalysis showed three to five red blood cells per high-power field. The transesophageal echocardiogram showed a thread-like structure attached to the rim of the prosthetic mitral valve (Fig. 1). There was no evidence of mitral regurgitation, perivalvular abscess, or new partial dehiscence of the prosthetic valve. *S. maltophilia* was isolated from 6 blood culture sets. We assumed that *S. maltophilia* was colonized somewhere in the body and reinfection had occurred. On the basis of sensitivity profile (Table 1), a regimen of trimethoprim-sulfamethoxazole (400 mg/80 mg q 8 hr) and tobramycin (1.7 mg/kg q 8 hr) was used. Because of deterioration of renal function, tobramycin was discontinued and trimethoprim-sulfamethoxazole was reduced (9, 10). Because there was a history of transient ischemic attack, surgical replacement of the prosthetic valve was undergone on the 9th day after beginning of antibiotics. There was a material which seemed like a vegetation on the posterior leaflet of the mitral valve. No organism was isolated from culture of the mitral valve vegetation. He was discharged after six weeks of antibiotic therapy (trimethoprim-sulfamethoxazole). The patient remained afebrile and asymptomatic for 2 months after he was discharged.

Table 1. Antibiotic susceptibility of *Stenotrophomonas maltophilia* isolated from blood cultures of 1998 and 2000

Drugs	1998	2000
Amikacin	S	R
Ampicillin	R	R
Ampicillin/sulbactam		R
Cefazolin		R
Cefepime		R
Cefotaxime		R
Cefotetan	R	R
Ceftazidime		R
Ceftriaxone	R	
Cephalothin	R	
Ciprofloxacin	R	I
Gentamicin	S	S
Imipenem	R	R
Ofloxacin		S
Piperacillin	R	R
Tobramycin	S	S
Trimethoprim/sulfamethoxazole	S	S

I, intermediate; S, sensitive; R, resistant

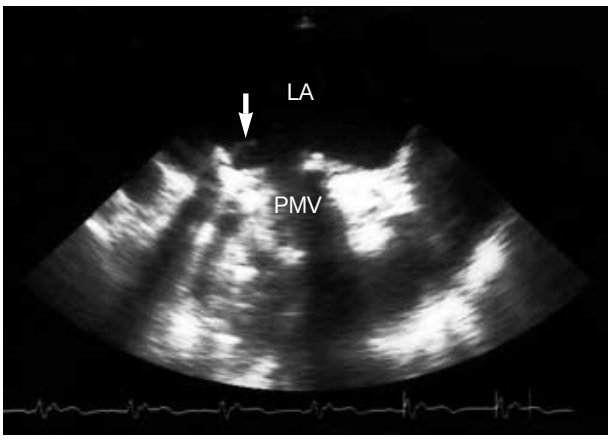

Fig. 1. Transesophageal echocardiogram showed a thread like structure attached to the rim of the prosthetic mitral valve. PMV: Prosthetic mitral valve, LA: Left atrium.

DISCUSSION

Previously named *Xanthomonas maltophilia* or *Pseudomonas maltophilia* has now been classified as *Stenotrophomonas maltophilia*, within which *S. maltophilia* is the only species (1). The genus was proposed by Palleroni and Brandbury in 1993 following many years of uncertain taxonomic position of this organism. *S. maltophilia* is an aerobic, non-fermentive, Gram-negative bacillus with 0.5 to 1.5 μm length (1, 3). It has been isolated from blood, respiratory secretion, urine, wound, cerebrospinal fluid, pericardial fluid, and pus (11). The organism may be isolated without clinical evidence of infection (12). When the organism is isolated from clinical specimens such as sputum, it is important to distinguish colonization from infection because true infection requires antimicrobial therapy (2). Culture of *S. maltophilia* from normally sterile specimens such as blood or cerebrospinal fluid must be considered as true infection beyond no doubt. Although it is an infrequent human pathogen, it has been reported as a causal agent in bacteremia, endocarditis, respiratory tract infection, central nervous system infection, ophthalmologic infection, urinary tract infection, gastrointestinal infection, skin, soft tissue, bone and joint infections (2-4, 13). Potential risk factors for infection of *S. maltophilia* are malignancies (5), prior therapy with broad-spectrum antibiotics (6), chronic respiratory disease (6), prolonged endotracheal intubation (4, 6), and indwelling vascular catheters (14).

S. maltophilia endocarditis is a rare disease. Most of the cases are associated with risk factors, including intravenous drug abuse, prosthetic valve surgery, dental treatment, and contaminated intravascular devices. Endocarditis in prosthetic valve is more common than in native valves. The prognosis of *S. maltophilia* endocarditis is variable. Favorable outcome with antimicrobial therapy alone has been reported (15) and surgery to replace the infected valve may be necessary (16). In reviewing of the literature, only 15 of 24 (63%) patients

reported survived. Seven of the survivors (47%) had undergone valve replacement. Six of 10 (60%) patients who were treated only medically survived.

An important clinical aspect of *S. maltophilia* is its difficulty to treat due to the resistance nature of the organism (17). Most strains of *S. maltophilia* are resistant to β-lactam agents due to two mechanisms, low outer membrane permeability and constitutive overproduction of β-lactamases (18, 19). Furthermore, a slow growth rate and an increased mutation rate can generate discordance between the in vitro susceptibility testing and clinical outcome (7). Standard in vitro susceptibility methods are not completely reliable for detecting resistant strains of *S. maltophilia*: therefore, these results should be cautiously interpreted (7). The antibiotic therapy of choice for *S. maltophilia* endocarditis is not known and largely empiric. In vitro data suggest that trimethoprim-sulfamethoxazole, ticarcillin-clavulanate, and cirpofloxacin are effective agents. Trimethoprim-sulfamethoxazole and aminoglycoside were used the most commonly. In this case, vancomycin and gentamicin were used during the first episode. It seems to have been effective because there was at least one effective antibiotics (gentamicin) and the bacterial burden was small, assumed from the fact that *S. maltophilia* grew in only once from 6 blood culture sets. During the second episode, the same regimen was administered for one month in another hospital. There was probably a greater bacterial burden, also assumed from the fact that *S. maltophilia* grew in all 6 blood culture sets even though in the absence of quantitative tests of this organism. This might be one reason why the regimen was ineffective.

In summary, *S. maltophilia* has emerged as a nosocomial pathogen, especially in immunocompromised or debilitated host. Infective endocarditis associated with this organism is a rare disease and carries a high mortality rate. When *S. maltophilia* was isolated from blood in the patients with risk factors even in non-nosocomial conditions, one should seriously consider the possibility of *S. maltophilia* endocarditis.

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