Case Report

A rare case of right-sided infective endocarditis caused by group B *Streptococcus* complicated with septic knee arthritis and subcutaneous abscess in the lower extremity

Shinsuke Takeda,[1,2] Yoshihiro Tanaka,[3] Yosuke Takeichi,[4] Hitoshi Hirata,[2] and Akihiko Tabuchi[5]

[1]Department of Orthopaedic Surgery, Toyohashi Municipal Hospital, Toyohashi, Japan, [2]Department of Hand Surgery, Nagoya University Graduate School of Medicine, Nagoya, Japan, [3]Department of Preventive Medicine, Northwestern University, Evanston, Illinois, [4]Department of Orthopaedic Surgery, Anjo Kosei Hospital, Anjo, Japan, and [5]Emergency and Critical Care Center, Anjo Kosei Hospital, Anjo, Japan

Background: Several reports have assessed group B *Streptococcus* (GBS) infections in non-pregnant cohorts, especially in immunocompromised hosts and patients with severe disease, including diabetes mellitus.

Case presentation: We report a rare case of large GBS-associated tricuspid valve infective endocarditis (IE) complicated with septic knee arthritis and s.c. abscess formation in the lower extremity of a non-i.v. drug user. After confirming the absence of vegetation on transthoracic echocardiography (TTE) at admission, the lower extremity was irrigated, and antibiotic therapy was initiated. One week later, the causes of persistent fever were reinvestigated. The TTE detected a large mass around the tricuspid valve. The cultured GBS was penicillin sensitive. The vegetation completely disappeared without surgery within 4 weeks.

Conclusion: When patients with untreated diabetes mellitus have persistent fever and s.c. abscess or septic arthritis, IE is a possible differential diagnosis. Repetitive evaluation by TTE is warranted to avoid this fatal complication.

Key words: Group B *Streptococcus*, infective endocarditis, lower extremity, septic knee arthritis, subcutaneous abscess

INTRODUCTION

GROUP B *STREPTOCOCCUS* (GBS) is a bacterium associated with infections in neonates and women during pregnancy and early puerperium. Group B *Streptococcus*-associated diseases might also be an emerging public health problem among non-pregnant adults.[1–3] Infective endocarditis (IE) caused by GBS is an uncommon serious disorder with high mortality rates that affects patients with several comorbidities, including diabetes mellitus (DM).[2,4,5] Tricuspid valve infective endocarditis (TVIE) is relatively rare, accounting for 5–10% of all IE cases and is reportedly associated with HIV infection and i.v. drug use (IDU).[6–9] Additionally, the vegetation size (>2.0 cm in diameter) is significantly associated with increased mortality.[10]

Herein, we report the case of a 51-year-old man with a medical history of diabetes and GBS-associated TVIE complicated with septic knee arthritis and s.c. abscess in the lower extremity, which was completely treated by conservative therapies using antibiotics.

Corresponding: Shinsuke Takeda, MD, Department of Orthopaedic Surgery, Toyohashi Municipal Hospital, 50 Aza Hachiken Nishi, Aotake-Cho, Toyohashi, Aichi, 441-8570, Japan. E-mail: s7.takeda.jpn@gmail.com

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CASE REPORT

A 51-YEAR-OLD MAN with untreated DM, an incidental finding at admission (hemoglobin A1c 6.6%), presented with fever lasting for 7 days and severe pain in the left lower extremity. He had no episode of any recent trauma and no wounds over his lower limbs. He was a current smoker (20 cigarettes/day) and denied any use of alcohol and illicit drugs. He had no history of any infection such as tinea pedes, arthrocentesis, and dental procedures within at least 1 year. His pain was progressive, and he could not walk 1 day before admission. His vital signs on admission were as follows: temperature, 39.1°C; heart rate, 112 b.p.m.;

blood pressure, 146/76 mmHg; and oxygen saturation, 96% on room air. On physical examination, his left knee and lower extremity were swollen with marked tenderness and warmth (Fig. 1A). There were no findings of Osler's nodes, Janeway lesions, Roth spots, or splinter hemorrhage. On auscultation, cardiac murmur was not audible. Electrocardiography showed no notable findings other than sinus tachycardia. Blood test results revealed C-reactive protein elevation (37.6 mg/dL; normal range, <0.5 mg/dL). White blood cell count was significantly elevated (17.7 × 10^3/μL with 84.3% neutrophils). Tests for syphilis, hepatitis B virus, hepatitis C virus, and HIV yielded negative results. Transthoracic echocardiography (TTE) carried out at the emergency department showed no vegetation around the mitral or tricuspid valves.

To identify the cause of lower leg pain, magnetic resonance imaging was carried out, showing a large quantity of s.c. fluid at the proximal sural region and intra-articular fluid in the left knee joint (Fig. 2, white and black arrowheads). Paracentesis to the s.c. abscess (Fig. 1B) and irrigation of intra-articular and intra-abscess cavities was carried out. One of the two blood cultures and both abscess and synovial fluid cultures were positive for pan-sensitive GBS. These positive results were revealed on day 3.

Ampicillin 8 g/day was initiated instead of initial cephazolin therapy. Blood cultures and synovial fluid culture collected on day 3 yielded negative results. Spiking fever over 40°C had lasted from day 1 to 5. After day 6, spiking fever >38°C was persistent regardless of the gradual improvement in the left leg swelling. On day 7, we reinvestigated the causes of persistent fever and undertook TTE because IE was considered a differential diagnosis for persistent fever. A large mass around the tricuspid valve (Fig. 3A, arrowheads) was found, suggesting IE. Transesophageal echocardiography (TEE) showed a large mobile vegetation (30 × 15 mm) around the tricuspid valve (Fig. 3B, arrowheads), which was compatible with IE. Enhanced chest computed tomography did not detect pulmonary embolism or abscesses.

Ampicillin 8 g/day was continued because GBS was susceptible to ampicillin; fever gradually decreased after initiating antibiotics. We continued ampicillin for approximately 6 weeks (until day 47) with careful attention. On day 26, the vegetation disappeared on TEE. No fever or vegetation was observed even after discontinuing antibiotics. On day 55, he was discharged from our hospital on a crutch.

DISCUSSION

WE REPORT ABOUT a rare case of large GBS-associated TVIE complicated with septic knee arthritis and s.c. abscess in the lower extremity in a non-pregnant and non-IDU patient. Group B *Streptococcus* is generally related to bacteremia, meningitis, endocarditis, pneumonia, and bone, joint, skin, and soft tissue infections.[3,11] Recently, several reports have focused on GBS infections in non-pregnant

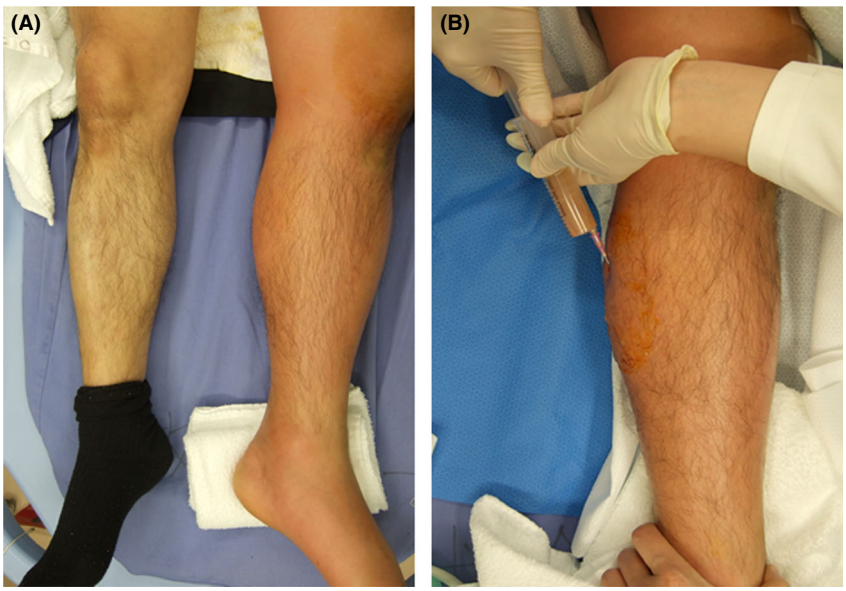

Fig. 1. Findings in the left knee and lower extremity of a 51-year-old man with untreated diabetes mellitus, fever lasting for 7 days, and severe pain in the left lower extremity. (A) Swelling of the left knee and lower extremity. (B) Subcutaneous abscess by paracentesis to the left proximal sural region.

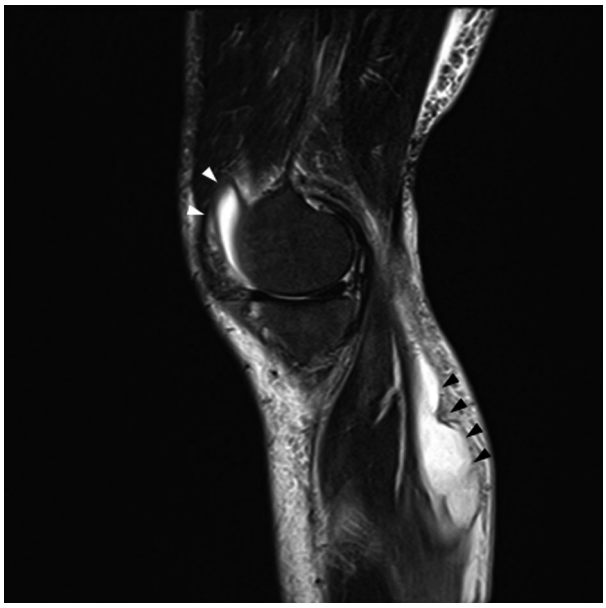

Fig. 2. Magnetic resonance imaging of left knee and lower extremity in a 51-year-old man with a medical history of diabetes and group B *Streptococcus*-associated tricuspid valve infective endocarditis complicated with septic knee arthritis and s.c. abscess in the lower extremity. Sagittal short tau inversion recovery-weighted magnetic resonance imaging shows a large volume of s.c. fluid at the proximal sural region (black arrowheads) and intra-articular fluid of the left knee joint (white arrowheads).

adult cohorts, especially in immunocompromised hosts and patients with severe underlying diseases, including DM, cancer, and chronic alcohol abuse.[11–13]

Group B *Streptococcus* is an encapsulated organism, and 10 antigenically distinct capsular serotypes have been described (1a, 1b, and II–IX). Capsule serotypes Ib, II, and III are globally common predominant serotypes associated with non-pregnant adult GBS disease.[14] Group B *Streptococcus*-associated IE leads to a deleterious clinical course with high mortality rate, and 40% of patients with GBS-associated IE required cardiac surgery because of extensive valve destruction.[15] Surgical operation is indicated in patients with persistent infection that does not respond to antibiotic therapy beyond 2 weeks, recurrent pulmonary emboli confirmed by computed tomography and pulmonary angiography, secondary valve endocarditis (multivalvular involvement), refractory heart failure, and vegetation size >1 cm.[16] Our patient responded to antibiotic therapy, and the vegetation completely disappeared within 4 weeks of commencing treatment with antibiotics.

Septic arthritis is a life-threatening disease. Early diagnosis and treatments are essential to avoid either irreversible joint destruction or death. Combination of antibiotics and prompt removal of the purulent material from the affected joint constitute the mainstay of successful treatment.[17]

Right-sided IE (RSIE) is rare and predominantly encountered in IDUs, where HIV and hepatitis C virus co-infection is often observed.[6,18] In our case, there were no common predisposing factors for RSIE, including IDU, dental procedures, congenital heart disease, intravascular catheters, pacemaker wires, and intracardiac devices.[10,16,19] Moreover, the tiny wound on the non-IDU patient with DM might have

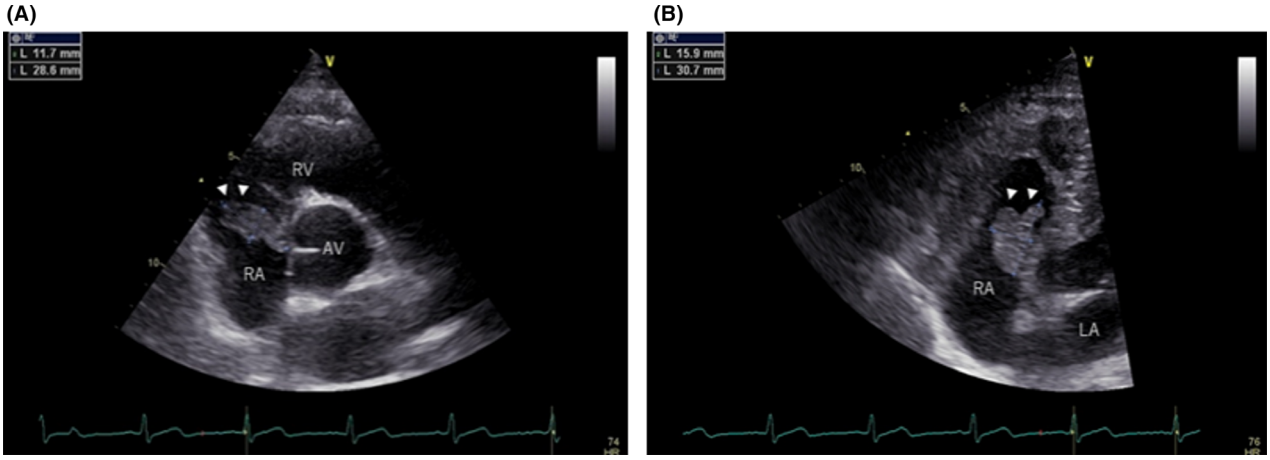

Fig. 3. Echocardiography in a 51-year-old man with a medical history of diabetes and group B *Streptococcus*-associated tricuspid valve infective endocarditis complicated with septic knee arthritis and s.c. abscess in the lower extremity. On day 7 during hospitalization, transthoracic echocardiography (A) and transesophageal echocardiography (B) show a large mobile vegetation around the tricuspid valve. AV, aortic valve; LA, left atrium; RA, right atrium; RV, right ventricle.

caused abscess formation in the lower extremity; subsequently, septic knee arthritis and RSIE developed.

Right-sided IE diagnosis can be delayed because right-sided murmurs often go undetected.[16] Delayed diagnosis and appropriate treatment of GBS-associated IE can be fatal.[2,4,5] Group B *Streptococcus* cultured in the present case was penicillin sensitive, and the vegetation completely disappeared without operation within 4 weeks, although GBS is often tolerant to penicillin.[15,20] The most frequent TVIE complication is pulmonary infarction due to septic emboli. Infective endocarditis caused by GBS is complicated with large vegetation or valvular destruction. Large vegetation and its friability could explain the high rate of systemic emboli.[15,21] Clinically, in contrast to left-sided endocarditis, pulmonary embolism was present in 60–100% of all TVIE cases.[22–24]

Finally, the timing of TEE needs to be discussed. In the present case, the patient did not meet the modified Duke criteria for IE,[25] and the probability of IE was considered low. Therefore, the choice of TTE was thought to be appropriate at the emergency department. However, we should have thought about the early indication of TEE because the blood cultures taken at the emergency department were positive for GBS on day 3, and because TTE has reportedly lower sensitivity for detecting vegetation compared to TEE.[26]

CONCLUSION

WE REPORT A rare case of large GBS-associated TVIE complicated with septic knee arthritis and abscess of the lower extremity in a non-IDU patient. When patients have persistent fever complicated with s.c. abscess or septic arthritis, IE should be considered as a differential diagnosis. Repetitive evaluation for IE is warranted to avoid this fatal complication.

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DISCLOSURE

Approval of the research protocol: N/A.
Informed consent: Written informed consent was obtained from the patient for publication of the case report and accompanying images.
Registry and the registration no. of the study/trial: N/A.
Animal studies: N/A.
Conflict of interest: None declared.

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