

[CASE REPORT]

The Early Diagnosis of Endophthalmitis Due to Group B Streptococcus Infective Endocarditis and Its Clinical Course: A Case Report and Literature Review

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Abstract:

A 68-year-old Japanese man was admitted to our hospital with right eye pain, a sudden worsening of his eyesight, and a fever. He was diagnosed with endogenous bacterial endophthalmitis due to infectious endocarditis (IE) of Group B *Streptococcus* (GBS) on the day of admission. He recovered systemically, but his right eye became phthisical only with the administration of antibiotics. We conducted a review of the reported cases of IE caused by GBS complicated with endogenous bacterial endophthalmitis. IE should be considered when an undetermined etiology of endogenous endophthalmitis is encountered. The prompt diagnosis and treatment of IE will improve patients' outcomes.

Key words: endophthalmitis, infectious endocarditis, Group B *Streptococcus*

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Introduction

Infective endocarditis (IE) is associated with subsequent morbidity and mortality, possibly due in part to one or more end-organ complications. Group B *Streptococcus* (GBS) is a rare cause of IE, but IE cases due to GBS are characterized by an acute onset and high mortality (1). Endophthalmitis is an emergency disease in the field of ophthalmology, and its endogenous bacterial etiology is rare (2, 3). We experienced a rare case in which we were able to diagnose IE caused by GBS from the initial diagnosis of endogenous bacterial endophthalmitis; a relatively good course was obtained. We herein report the details of this case and those of our systematic review of previous cases of IE caused by GBS complicated with endogenous bacterial endophthalmitis.

Case Report

A 68-year-old Japanese man with hypertension, benign prostatic hyperplasia, and chronic kidney disease was admit-

ted to our hospital with right eye pain and suddenly worsened eyesight that had persisted for 4 days. He had also been experiencing a fever and cloudiness of urine for eight days before admission. At admission, he was febrile (39°C) and showed a Levine III/VI systolic murmur at the apex. His right eye had a hypopyon and fibrin in the anterior chamber (Fig. 1A), and it exhibited conjunctival edema and was bloodshot. A fundoscopic examination showed a Roth spot of the left eye (Fig. 1B). He was diagnosed with right endogenous bacterial endophthalmitis. No Osler's nodes, Janeway lesions, or splinter hemorrhaging was observed.

A laboratory investigation revealed an increased neutrophil count of 14,941/ μ L and a C-reactive protein (CRP) level of 15.1 mg/dL, serum creatinine at 6.2 mg/dL, estimated glomerular filtration rate (eGFR) of 8 mL/min/1.73 m², and bacterial urine. Because he had no history of trauma, we suspected IE as the cause of endogenous bacterial endophthalmitis. Transthoracic echocardiography (TTE) and transesophageal echocardiography (TEE) demonstrated 12-mm vegetation at the posterior mitral leaflet (PML) (Fig. 2A) and an aortic valve loop abscess (Fig. 2B) along

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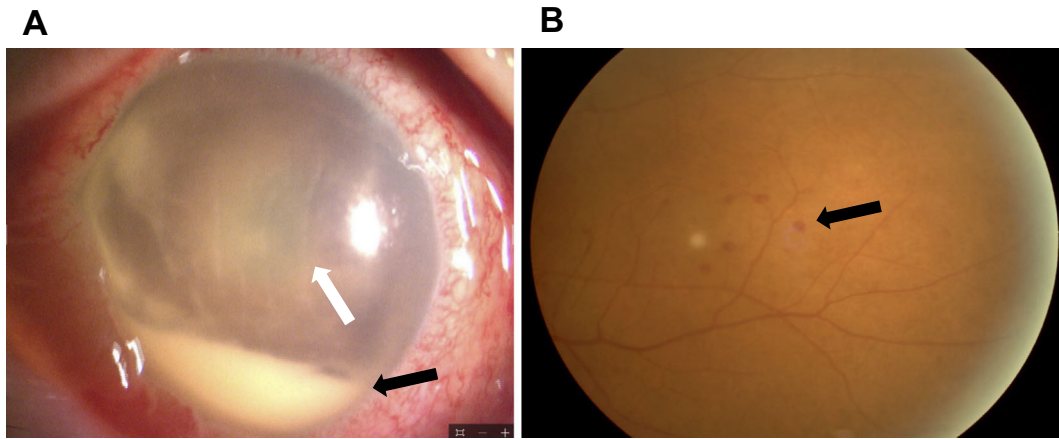


Figure 1. A: The right eye had a hypopyon (black arrow) and fibrin (white arrow) in the anterior chamber, conjunctival edema, and was bloodshot. B: The left eye had a Roth spot (black arrow).

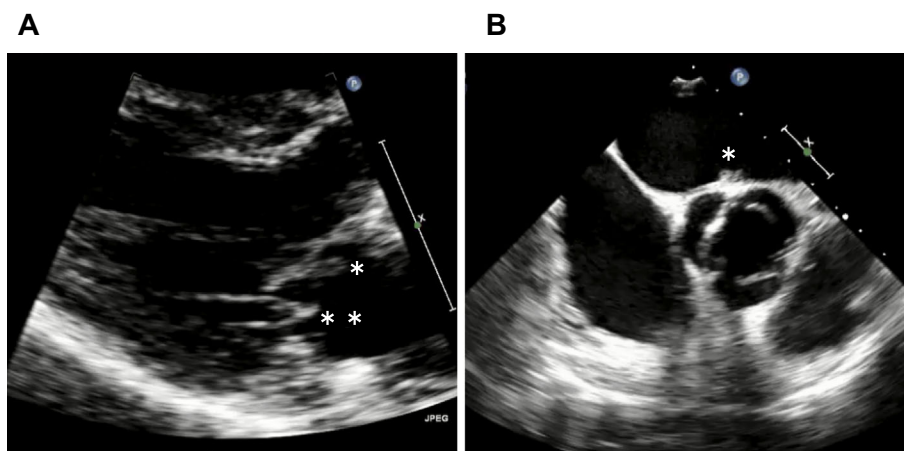


Figure 2. A: Transesophageal echocardiography (TEE) demonstrated a 12-mm vegetation (*) at the posterior mitral leaflet (PML) and prolapse (**) at the PML. B: TEE demonstrated an aortic valve loop abscess (*).

with severe mitral valve regurgitation (MR) due to P3 prolapse. The patient's case met two major and two minor Duke's criteria, so we made a diagnosis of IE. Blood cultures grew GBS.

Because the patient had been using urine catheters due to enlarged prostate disease, we speculated that the cause of IE might be urinary tract infection, which resulted in the occurrence of endogenous bacterial endophthalmitis as one of systemic embolism due to IE. We began treatment with intravitreal ceftriaxone 2 g and vancomycin 1.25 g on the day of admission. The patient was treated with intravenous ceftriaxone for 6 weeks; he avoided open surgery and enucleation of the eyeball. He recovered systemically, but the right eye became phthisical (Fig. 3).

Systematic Review

We reviewed the relevant literature to identify other reported cases of endophthalmitis due to infectious endocarditis caused by GBS. We performed a systematic survey of the Pub-Med database and the Japan Medical Abstracts Society database using the key words “endogenous endophthalmi-

tis”, “infectious endocarditis” and “Group B *Streptococcus*”. We identified nine cases: three in Asia and six in Western countries (Table) (4-10). The average age of the 9 patients (4 men and 5 women) was 60.1 years (range 42-80 years). Two patients (22%) had hypertension (HT), 1 (11%) had congestive heart failure (CHF), and 4 (44%) had no significant underlying chronic disease. The presumed source of infection included urinary tract infection (UTI) and septic arthritis (2 patients; 22%), pharyngitis (1 patient; 11%), and cellulitis (1 patient; 11%), other sources were unknown.

The most frequent systemic symptom was a fever (5 patients; 44%). Other symptoms were joint pain and altered mental condition, chill, and sore throat. Our patient had only a fever. The most common eye symptom was blurred vision (8 patients; 89%), followed by eye pain (4 patients; 44%). Our patient also showed floaters.

The time of onset between the systemic infection and ocular manifestation was variable. Almost all of the patients, including our present patient, showed systemic symptoms first; only one patient showed the same onset times for systemic and ocular symptoms.

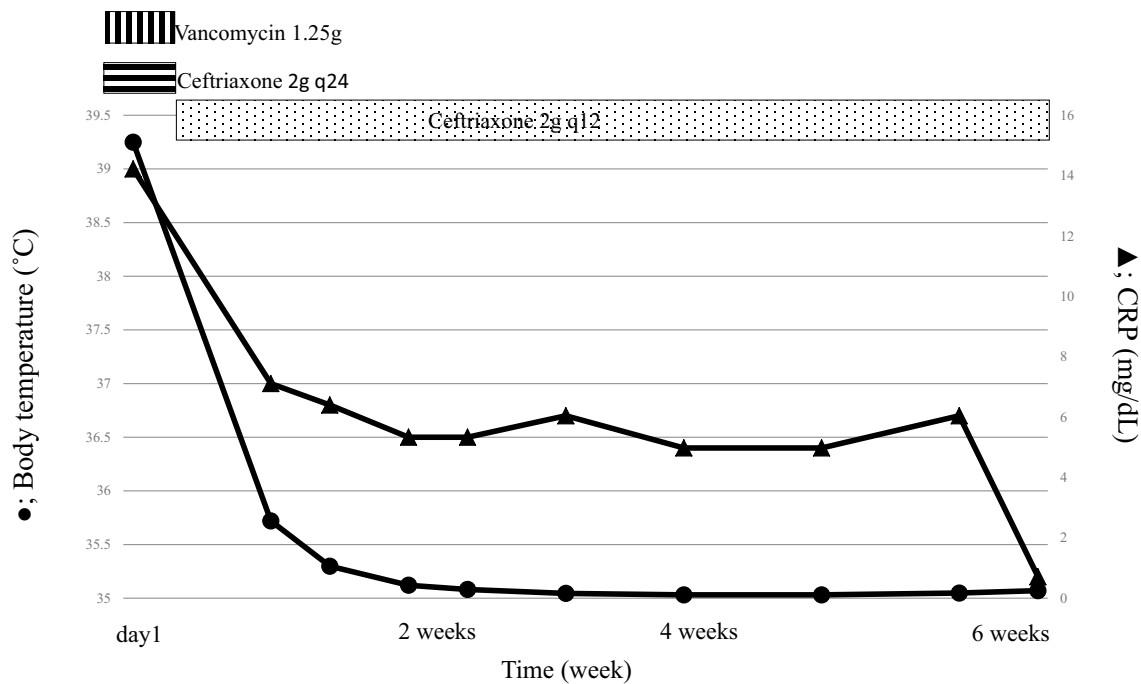


Figure 3. The use of antibiotics and serial changes in the patient's body temperature and CRP. CRP: C-reactive protein

At admission, only three patients, including our patient, were suspected of having IE and had undergone TEE. In the other six patients, IE was not suspected, so TEE was not performed. Only our patient received the diagnosis of IE on the same day as the diagnosis of endogenous bacterial endophthalmitis. The time to treatment varied among the 9 patients: the earliest treatment was started within 48 hours, and the latest was 2 weeks after the onset of symptoms. All patients were treated with intravenous antibiotics; two patients underwent surgical therapy for their IE, and two patients underwent vitrectomy. Our patient achieved remission with only intravenous antibiotics. Two patients died, and the remaining seven achieved remission, but two patients lost their sight, and five patients developed phthisis bulbi.

Discussion

We experienced a rare case of a patient who had GBS IE from the initial diagnosis of endogenous bacterial endophthalmitis. His case was promptly diagnosed as IE, and antibiotics treatment resulted in a relatively benign outcome. This case was complicated with endogenous endophthalmitis as a bacterial embolism of IE. Endophthalmitis is an emergency disease in the field of ophthalmology, as it results in devastating ocular complications, such as blindness (11). Endogenous bacterial endophthalmitis is rare, but it has a higher mortality rate than other causes of endophthalmitis (12, 13).

In their review, Sim et al. reported that the prevalence of endogenous bacterial endophthalmitis was 5-7% of all causes of endophthalmitis (6). Schiedler et al. reported that the prevalence of mortality in endogenous bacterial en-

dophthalmitis was 29%, which was significantly higher than that of other types of endophthalmitis (11). Endogenous bacterial endophthalmitis caused by GBS is very rare. Generally, GBS is part of the normal bacterial flora of the skin, intestinal tract and vagina, which often leads to its infection in pregnant women (14). In non-pregnant patients with endogenous bacterial endophthalmitis, the reported proportion of endogenous bacterial endophthalmitis caused by GBS was only 5.2% (3). Our patient had been using urinary catheters due to enlarged prostate disease, so it is likely that the cause of his IE was a urinary tract infection.

Our patient's IE was due to GBS, which do not typically cause IE. The International Collaboration on Endocarditis-Prospective Cohort Study enrolled 2,781 patients with definite IE, and the proportions of cases of IE caused by different microorganisms was as follows: *Staphylococcus aureus*, 31%; viridans group, 17%; enterococci, 11%; and coagulase-negative *Staphylococcus*, 11% (15). Thus, although GBS is rarely responsible for IE, the onset of IE due to GBS is often acute and shows large vegetations with rapid valvular dysfunction, which results in a worse prognosis than with IE caused by other bacteria (1).

As noted above, IE complicated with endogenous endophthalmitis caused by GBS is very rare. We identified only nine cases, including our patient. He achieved remission with only intravenous antibiotics, whereas of the eight previous cases, six underwent cardiovascular surgery or vitrectomy, and the remaining two died. Our patient was immediately referred by the ophthalmologist to a cardiologist when endogenous endophthalmitis was diagnosed on the day of his admission. As a result, we were able to start antibiotics treatment for IE just nine days after the patient's eye

Table. Systematic Review: English, Japanese and Korean Studies of Cases of Endophthalmitis Due to Infectious Endocarditis Caused by GBS.

Reference	Country	Age/ sex	Patient history	Initial TTE	TEE	Time to diagnosis of IE	Time to treatment	Systemic symptoms	Eye symptoms	Infection root	Treatment	Systemic outcome	Visual outcome
4	U.S.	42/M	CHF	Unknown	Unknown	Unknown	2 months	Fever, chills, sore throat	Blurred vision	Pharyngitis	Intravenous antibiotics	Died	Died
5	ENG	42/M	Unknown	Unknown	Unknown	Unknown	Unknown	Fever, altered mental status	Unknown	Unknown	Enucleation, AVR	Remission	Phthisis bulbi (rt.)
6	KOR	43/F	None	+	Day 7	24 days	2 weeks	Skin abscess	Blurred vision, eye pain	Cellulitis	Intravenous antibiotics, vitrectomy	Remission	Phthisis bulbi (rt.)
7	JPN	53/F	None	-	-	24 days	8 days	Fever	Eye pain, blurred vision	Unknown	Intravenous antibiotics, vitrectomy	Remission	Phthisis bulbi (lt.)
Our patient	JPN	65/M	HT, BPH, CKD	+	Day 1	9 days	9 days	Fever, cloudiness of urine	Floaters, eye pain, blurred vision	UTI	Intravenous antibiotics	Remission	Phthisis bulbi (rt.)
8	ENG	65/M	DM	-	-	8 days	4 days	Pain & swelling of the right knee	Blurred vision	Septic arthritis	Intravenous antibiotics, intravitreal antibiotics, MVR+CABG	Remission	Phthisis bulbi (bi.)
9	U.S.	75/F	None	+	Day 7	19 days	12 days	Joint pain, decreased mental status	Blurred vision	Septic arthritis	Intravenous antibiotics	Remission	Visual loss (lt.)
8	ENG	76/F	None	-	-	4 weeks	48 h	Fever	Blurred vision	UTI	Intravenous antibiotics	Remission	Visual loss (rt.)
10	ENG	80/F	Af, HT, DLp, post knee replacement	-	-	On autopsy	2 weeks	Knee pain	Blurred vision, eye pain	Unknown	None	Died	Died

Af: atrial fibrillation, AVR: aortic valve replacement, BPH: benign prostatic hyperplasia, CABG: coronary artery bypass grafting, CHF: chronic heart failure, CKD: chronic kidney disease, DM: diabetes mellitus, DLp: dislipidemia, ENG: England, GBS: group B streptococcus, HT: hypertension, IE: infectious endocarditis, JPN: Japan, KOR: Korea, MVR: mitral valve replacement, TTE: transthoracic echocardiography, TEE: transesophageal echocardiography, UTI: urinary tract infection

symptoms started. This time period was significantly shorter than in most previous cases. Although the patient described by O'Brart et al. started treatment within eight days of eye-symptom onset, the patient eventually underwent cardiac surgery (8). That patient's case was complicated by diabetes mellitus; the immune system of individuals with diabetes is often impaired, making these individuals more susceptible to the development of a severe infection than those with intact

systems.

In conclusion, we encountered a rare case of IE complicated with endogenous bacterial endophthalmitis due to GBS. Our patient's case suggests that IE should be considered when a patient with endogenous endophthalmitis of an undetermined etiology is encountered. The prompt diagnosis and treatment of IE can be expected to improve patients' outcomes.

The authors state that they have no Conflict of Interest (COI).

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