

GONOCOCCAL ENDOCARDITIS

Errington C. Thompson, MD, and Damon Brantley, MD
Shreveport, Louisiana

In the postantibiotic era, systemic complications from a gonococcal infection are rare. Females tend to have a higher frequency of gonococcal sepsis than males. In contrast, males have a higher rate of gonococcal endocarditis. This article describes a case of a previously healthy young male who presented with aortic insufficiency and blood cultures positive for *Neisseria gonorrhoeae*. Despite adequate antibiotic coverage, the patient's aortic insufficiency worsened, requiring aortic valve replacement before discharge from the hospital. The patient's recovery was uneventful. (*J Natl Med Assoc.* 1996;88:353-356.)

Key words • gonococcal endocarditis • gonorrhea
• endocarditis

Neisseria gonorrhoeae infections in the United States have increased steadily since the advent of antibiotics to a peak of more than 1 million cases in 1978. In contrast, systemic complications from a gonococcal infection remain rare. Gonococcal endocarditis was common in the preantibiotic era, accounting for 11% to 26% of all cases of endocarditis.^{1,2} Since 1938, only 58 cases of gonococcal endocarditis have been reported. This article reports a case of a previously healthy young male who presented with *Neisseria gonorrhoeae* endocarditis. This represents the 59th reported case of gonococcal endocarditis in the postantibiotic era.

CASE REPORT

A 23-year-old man presented complaining of fever, chills, night sweats, anorexia, and malaise of 4 to 6

weeks duration. He denied productive cough, dyspnea, sore throat, chest pain, syncope, orthopnea, paroxysmal nocturnal dyspnea, dysuria, or frequency. His past surgical history was unremarkable. His past medical history was significant for a single episode of gonococcal urethritis 6 years prior to this admission.

On admission, his temperature was 38.1°C. His pulse rate was 110 beats/minute and blood pressure 150/64 mm Hg. A fundoscopic examination was unremarkable, and lungs were clear to auscultation and percussion. His cardiovascular examination revealed a new III/VI diastolic murmur at the right second intercostal space. The remainder of the patient's physical examination was normal. Laboratory tests revealed a hemoglobin of 8.2 g/dL and a hematocrit of 25.8%. The white blood cell count was 6800 mm³ (77 neutrophils, 19 lymphocytes, 3 monocytes, and 1 basophil), and the platelet count was 509,000/mL. The erythrocyte sedimentation rate was 115 mm/hour. A urinalysis was clear. A chest radiograph was without cardiomegaly. An electrocardiogram revealed left ventricular hypertrophy, and a dilated left ventricle with a flail aortic valve leaflet was seen on the emergent echocardiogram. Doppler examination uncovered significant aortic regurgitation. Blood, urine, and sputum cultures were sent for analysis.

A presumptive diagnosis of endocarditis was made, and the patient was placed on intravenous ceftazidime and amikacin. Urine and sputum cultures were without growth after 7 days; however, blood cultures grew *Neisseria gonorrhoeae*. A 28-day course of penicillin, 4 million units administered intravenously every 4 hours, was started.

The patient defervesced rapidly. A repeat echocardiogram 2 weeks after admission demonstrated progressive dilation of the left ventricle and the presence of a vegetation involving the aortic valve (Figure). The patient began to report mild dyspnea on exertion. Afterload reduction was achieved with 37.5 mg of oral captopril three times daily. Cardiac catheterization disclosed a prolapsing posterior aortic cusp with severe aortic insufficiency and a dilated left ventricle with an

From the Department of Surgery, Louisiana State University at Shreveport, Shreveport, Louisiana. Presented at the 99th Annual Convention and Scientific Assembly of the National Medical Association, July 23, 1994, Orlando, Florida. Requests for reprint requests should be addressed to Dr Errington C. Thompson, Assistant Professor of Surgery, Washington University School of Medicine, Ones Barnes Plaza, Campus Box 8109, St Louis, MO 63110.

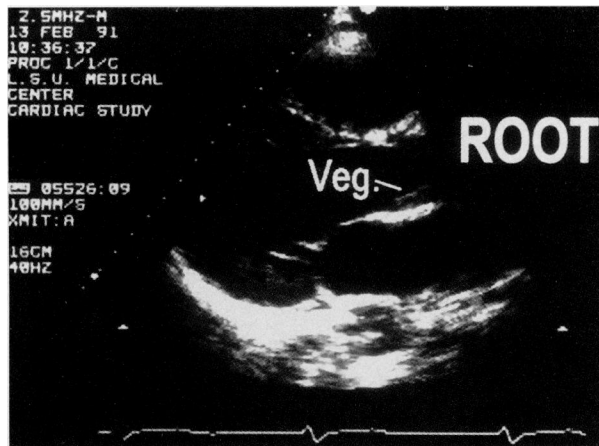


Figure. Echocardiogram showing the valvular vegetation (veg) with the aortic root (root).

end systolic volume index of 65 mL/m. Coronary anatomy was normal.

The patient underwent placement of a 23-mm St Jude prosthetic valve without complication. All intraoperative cultures and Gram's stains were negative. After the patient completed a 28-day course of antibiotics, he was discharged home in good condition.

DISCUSSION

The incidence of *N gonorrhoeae* infections has increased greatly over the last 50 years.³ Disseminated gonorrhea is still an unusual occurrence and occurs in 0.5% to 3 % of infected patients. Endocarditis from *N gonorrhoeae* is surprisingly rare.³ Between 1942 and 1970, only four were cases reported in the literature.⁴⁻⁷ The number of cases reported in the last 20 years has increased tenfold¹; the reason for this increase is not clear.

Thayer and Blumer³ were the first to describe infective endocarditis in 1895 in a patient with gonococcal sepsis. In the early part of this century, *N gonorrhoeae* accounted for up to 26% of all cases of infective endocarditis.² In 1939, Orgain and Poston were the first to document a cure of infective endocarditis with antibiotics (sulfapyridine).⁸ Since the advent of penicillin in 1943, the incidence of gonococcal endocarditis has dropped dramatically. There are 58 documented cases in the English literature since 1939 (Table 1).

Disseminated gonorrheal infections present with septic arthritis, polyarthritis, dermatitis, meningitis, osteomyelitis, and infective endocarditis. Infrequent presentations include hepatitis, myocarditis, and meningitis.⁹

Disseminated gonorrhea is more common in women than in men. In contrast, gonococcal endocarditis is

TABLE 1. CASES OF GONOCOCCAL ENDOCARDITIS SINCE 1939

Author	Year	No. Patients	Outcome
Orgain & Poston ⁸	1939	1	Survived
Futcher & Scott ¹⁹	1939	4	One survived & three died
Myers ⁷	1947	1	Survived
Dorset et al ⁵	1949	1	Survived
Davis & Romansky ⁴	1956	1	Survived
Gilson et al ⁶	1960	1	Survived
Voigt et al ²⁰	1970	1	Survived
Holmes et al ⁹	1971	2	One survived & one died
Tanowitz et al ²¹	1972	1	Survived
Okies et al ²²	1973	1	?
Hillless & Molloy ²³	1976	1	Survived
Conde ²⁴	1977	1	Died
John et al ²⁵	1977	3	One survived & two died
Dzindzio et al ²⁶	1979	1*	Survived
Cooke et al ²⁷	1979	3	Survived
Ebright & Komorowski ²⁸	1980	1	Survived
Mansheim ²⁹	1980	2	Survived
Woltjen et al ³⁰	1980	1*	Survived
Arvan & Delaverdac ³¹	1981	1	Survived
Rubin and Dratch ³²	1981	1	Survived
Timmis et al ³³	1981	1	Survived
Hopkins et al ³⁴	1982	1	Survived
Sugar et al ³⁵	1982	1	Survived
Al-Suleiman et al ³⁶	1983	3	Survived
Donachie & Siebert ³⁷	1983	1	Survived
Rosoff et al ³⁸	1983	1	Survived
Fernandez et al ³⁹	1984	4	Three survived & one died
Burstein et al ⁴⁰	1985	1	Survived
Jurica et al ⁴¹	1987	1	Survived
Williams & Corey ⁴²	1987	1	Survived
Black et al ¹⁸	1988	1	Survived
Yinnon et al ¹⁷	1988	1	Survived
Wall et al ²	1989	4	Survived
Owens & Kelchak ⁴³	1990	1	Survived
Bataskov et al ⁴⁴	1991	1	Died
Jackman et al ¹	1991	5	Four survived & one died
Weiss et al ¹⁶	1992	1	Survived
Thompson & Brantley	1994	1	Survived

*This is the same patient.

found more commonly in men than women.^{1,2} Several authors have postulated reasons for this difference. These reasons include sampling error and the fact that

disseminated gonorrhea may be more common in men than is reported. The strains of gonorrhea that cause dissemination are commonly those that also cause asymptomatic urethritis.¹⁰

Gonococci isolated from patients with dissemination commonly have a transparent phenotype that does not exhibit the Protein II complex on its cell surface.¹⁰ Although both transparent and opaque phenotypes have equal serum mediated resistance, transparent phenotypes may be more resistant to neutrophil-mediated killing.¹⁰

Gonococcal strains that require arginine, hypoxanthine, and uracil for growth were found to be associated with both asymptomatic men and dissemination.¹⁰ Some studies found an increase in dissemination with this phenotype,¹⁰ but this finding has been contradicted by some recent studies.¹¹ Why this strain does not stimulate neutrophils is unclear.

Patients deficient in complements 5, 6, 7, or 8 have been found to be at increased risk for disseminated gonococcal infection.^{10, 12-14} It has been shown that complement plus antibody form an attack complex important in killing the gonococcal bacteria. Normal human serum that has never been exposed to gonococci contains antigonorrheal antibodies. Interestingly, IgG antibodies against protein III, a cell surface protein, interferes with the formation of this attack complex. Once these antibodies are removed, the attack complex is able to kill the gonococcal organism.¹⁰

Systemic lupus erythematosus is associated with an increased risk of dissemination of *Neisseria* infections.¹⁵ There are multiple reasons why these patients are more susceptible to dissemination. These patients have complement deficiency and reticuloendothelial dysfunction, which includes abnormal neutrophil function and asplenia.¹⁵ Despite this, there have been no reports of gonococcal endocarditis in a patient with systemic lupus erythematosus.

The majority of patients with gonococcal endocarditis present without a history of urinary symptoms. In the modern era, the most common symptoms are fever, chills, arthralgia, and fatigue/malaise. The most common signs are murmur, fever ($\geq 38^{\circ}$ C), and tachycardia (Table 2). There seems to be a greater tendency for the aortic valve to be involved in the infective process. The incidence of isolated aortic valve endocarditis was 27% according to Thayer.² This has risen to greater than 50% during the postantibiotic era. Although all valves have been reported to be affected, *N gonorrhoeae* seems to have a greater affinity for the left side of the heart in the postantibiotic era.

TABLE 2. MOST COMMON SIGNS AND SYMPTOMS IN GONOCOCCAL ENDOCARDITIS

Sign/Symptom	No. Patients*
Sign	
Murmur	46
Fever (>80° C)	42
Tachycardia	32
Arthritis	11
Systemic embolization	10
Splenomegaly	8
Symptom	
Fever	38
Chills	27
Arthralgia	18
Malaise/fatigue	14
Dyspnea	15

*N=59.

Clinical deterioration, despite adequate antibiotic coverage, can occur as with our patient. Repeat echocardiogram with aggressive medical management is indicated. Of note, valvular vegetations were not seen on our initial echocardiogram but were visualized on the repeat examination.

Although the majority of isolated gonococcal species from patients with endocarditis are sensitive to penicillin,¹⁰ there are reports in the literature of penicillinase-producing gonorrhea causing endocarditis.^{16, 17} There are no prospective randomized trials of antibiotic regimens in patients with disseminated gonorrhea. The optimal duration of antibiotic therapy has not been studied. We recommend including ceftriaxone¹⁸ in the antibiotic combination until culture sensitivities are available.

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