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Case Report

Gemella Morbillorum Endocarditis in a Patient with a Bicuspid Aortic Valve

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Infective endocarditis caused by *Gemella morbillorum* is a very rare occurrence and only a few cases have been reported in the literature so far. We describe a case of *G. morbillorum* endocarditis in a 31-year-old Pakistani woman who had a congenitally bicuspid aortic valve. She had also undergone repair of a large aortic aneurysm 1 year before this presentation. She presented to our institution with a 1.5-month history of fever, exertional dyspnea and generalized edema. A transthoracic echocardiogram showed two large, echogenic and mobile vegetations (7 × 15 mm and 8 × 10 mm) attached to the right coronary cusp and non-coronary cusp. Blood cultures of the patient grew pan-sensitive *G. morbillorum*. The patient fulfilled the Duke's criteria for infective endocarditis. She was successfully treated with ceftriaxone and gentamycin therapy. At two years' follow up she has remained well. This case represents a rare cause of infectious endocarditis that was successfully managed with medical treatment alone in a patient with the predisposing risk factor of a bicuspid aortic valve.

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The first description of *Gemella morbillorum*, a catalase-negative and facultative anaerobic organism, was given by Tunnicliff in 1917. It is a part of the normal flora of the oropharynx, genitourinary tract and gastrointestinal tract of the human body.[1] Although initially classified as *Streptococcus morbillorum*, the organism was relocated to the genus *Gemella* in 1988.[2] *G. morbillorum* causes a diverse range of infections in man, including meningitis,[3,4] cerebellar and other brain abscesses,[5,6] arthritis,[7] necrotizing pneumonia,[8] pleural empyema,[9] osteomyelitis,[10] hepatic abscess,[11] endocarditis,[1,12] mediastinitis,[13] Ludwig's angina,[13] dialysis-related peritonitis,[14] and spontaneous bacterial peritonitis.[15]

Infective endocarditis caused by *G. morbillorum* remains a rare occurrence hitherto. Native valves have been reported to be more commonly affected as compared to prosthetic valves. Mitral and aortic valves have been reported to be affected in an almost equal number of cases, sometimes even simultaneously. On the other hand, the tricuspid valve is only rarely involved.[12] We report here the first case of *G. morbillorum* endocarditis from Pakistan in a young woman who had a bicuspid aortic valve.

Case presentation

A 31-year-old woman presented with a 1.5-month history of fever, exertional dyspnea, generalized myalgias, generalized edema and anorexia. Her past history was significant for a congenitally bicuspid aortic valve, mild aortic regurgitation, repair of a large aortic arch aneurysm (12.5 × 10 cm) 1 year previously, and chronic anemia. The fever was intermittent, high grade, associated with chills and rigors, and temporarily relieved by antipyretics. She did not report

any chest pain or cough. There was no history of intravenous drug abuse or recent dental procedures.

On examination, she was febrile with a temperature of 38° C and tachycardic with a heart rate of 120 bpm. Her blood pressure on admission was 110/80 mmHg. She had pallor, clubbing, a grade III diastolic decrescendo murmur and a grade II pansystolic murmur. Auscultation of the chest revealed clear lung fields bilaterally without any adventitious sounds. Other vascular and immune phenomena of infective endocarditis, such as Janeway lesions, splinter hemorrhages, Osler's nodes, petechiae and Roth's spots were not seen. Head and neck examination and remaining systemic examinations were unremarkable. A complete blood count revealed leukocytosis (11.4×10^6/L) with left shift, anemia (Hb 7.1 g/dL) and elevated C-reactive protein (16 mg/dL). An electrocardiogram revealed normal sinus rhythm and slight left axis deviation.

A transthoracic echocardiogram showed aortic valve regurgitation, mild to moderate mitral regurgitation, left ventricular diastolic dysfunction grade II, and trace tricuspid regurgitation. Left atrial dilation, mild concentric left ventricular hypertrophy and an ejection fraction of 60% were noted. The aortic valve was bicuspid with a thickened right coronary cusp. Two large, echogenic and mobile vegetations (7 × 15 mm and 8 × 10 mm) were seen attached to the right coronary cusp and non-coronary cusp, creating obstruction, with a peak pressure gradient of 42 mmHg and mean pressure gradient of 28 mmHg across the aortic valve. The dimensions of the left ventricle were 48 mm (systolic) and 67 mm (diastolic). Estimated pulmonary artery pressure at rest was 31 mmHg. The width of the regurgitant jet was about 48-50% of the left ventricular outflow tract.

Three sets of blood cultures (each set contained one aerobic and one anaerobic vial) were taken over a period of 24 hours and the patient was empirically started on amikacin, ceftriaxone and vancomycin therapy. On the third day of admission, two of her three cultures grew alpha-hemolytic, catalase-negative Gram positive to Gram variable cocci arranged in clusters. *G. morbillorum* was subsequently identified using an API 20 STREP system (Bio Merieux) along with successful sub-culturing. Susceptibility testing of the organism was done using the disc diffusion method; the organism showed pan-sensitivity. Following the results of the susceptibility testing, vancomycin and amikacin were discontinued and the patient was then put on ceftriaxone for 6 weeks and gentamycin for 2 weeks. The patient responded well to this treatment regimen.

A repeat echocardiogram 4 weeks after the initiation of treatment showed a reduction in the size of the echogenic densities (7 × 9 mm and 5 × 6 mm). Only mild restriction of the leaflet mobility was present. The peak pressure gradient and mean pressure gradient across the aortic valve were reduced to 32 and 19 mmHg, respectively. Her C-reactive protein also showed a reduction (0.8 mg/dl) after the completion of therapy. Subsequent blood cultures were negative. The patient has not developed any other episode of infective endocarditis during two years of follow up.

Discussion

Our patient met the Duke's criteria for infective endocarditis. The major criteria met included endocardial involvement documented by positive echocardiographic evidence of vegetations. The presence of a new murmur is debatable because of the lack of a previously documented physical examination. The minor criteria met by this patient included fever, the predisposing condition of a congenitally bicuspid aortic valve, and a blood culture growing an organism that does not meet major criteria.

G. morbillorum endocarditis is a rare clinical entity. At least 24 cases of *G. morbillorum* endocarditis have been reported in the literature.[12,16] The mean age for patients with this condition is 53 years, with a male predominance.[1] Although most of the reports of *G. morbillorum* endocarditis are in adults, this entity has also been reported in the pediatric population.[17] Our patient was not only female but was also of a younger age when compared to the usual pattern of infection by this organism.

Predisposing factors for *G. morbillorum* endocarditis include poor dental hygiene, dental manipulation, gastrointestinal procedures, inflammatory bowel disease and colon malignancies.[1,12] In our patient, the definitive source of infection for the organism was not found, but the genitourinary tract and oropharynx are likely possibilities. Examination of the oropharyngeal mucosa did not show any lesions that could have acted as portals of entry for the organism.

Cardiac structural abnormalities, such as valvular lesions, congenitally bicuspid valves, hypertrophic cardiomyopathy and cardiac myxoma, also increase the risk of *G. morbillorum* endocarditis.[1,12] Bicuspid aortic valve has a reported incidence of up to 0.9-2% in the general population.[18] It can either occur alone or in association with other anomalies, such as aortic coarctation, hypoplastic left ventricle, atrial septal defect, ventricular septal defect, congenital aneurysm of

the sinus of Valsalva, and dilated ascending aorta.[19] Bicuspid aortic valve is a well known predisposing risk factor for infective endocarditis.[18,20] It can disturb the mechanics of laminar blood flow; this subjects the valve to abnormal stresses[20] and this in turn predisposes to infectious seeding. Autopsy results have shown that infective endocarditis occurs in 7-25% of patients with bicuspid aortic valves. Also, when this complication arises against the backdrop of a bicuspid aortic valve, it usually requires major surgery in most cases and is associated with significant mortality.[18] In our patient, the complication was managed successfully using medical therapy alone.

Our patient had also undergone repair of a thoracic aortic aneurysm using a synthetic vascular graft. We feel that this may be another factor that increased the risk of infection by indigenous commensals. To the best of our knowledge, there is no previous report of *G. morbillorum* endocarditis after aortic arch aneurysm repair. However, our hypothesis is supported by reports of *G. morbillorum* causing infections in synthetic materials in the body, such as orthopedic implants,[21] ventriculoperitoneal/ventriculoatrial shunts,[22] and transjugular intrahepatic portosystemic shunt.[23] The mechanism of such infections, however, remains to be elucidated.

Steps in the diagnosis of *G. morbillorum* include gram staining of slow-growing, fastidious organisms. Colonies are seen on enriched media, such as chocolate agar or *Brucella* agar with vitamin K after about 48 hours' incubation. Typically, *G. morbillorum* shows a positive pyrrolidonyl arylamidase disc test and leucine aminopeptidase disc test. A 16S RNA sequence may also be used for identification.[1,12]

The treatment of *G. morbillorum* is either surgical replacement of the valve or medical therapy. *G. morbillorum* is generally sensitive to penicillin G and ampicillin.[24] In our patient, the *G. morbillorum* isolated was sensitive to vancomycin, penicillin, aminoglycosides and macrolides. We used ceftriaxone and gentamycin for the treatment of *G. morbillorum* endocarditis. Since the patient responded well to the medical treatment, as evidenced by reduced vegetation size on echocardiogram and improvement in symptomatology, there was no indication for surgical management in this case. *G. morbillorum* endocarditis is a potentially treatable condition; mortality has been reported in two previous cases.[1]

Conclusion

It is important for clinicians to be cognizant of the fact that unusual indigenous pathogens such as *G. morbillorum* can be an occasional cause of infective endocarditis. These organisms must be considered, particularly when underlying or predisposing conditions are present in the patient. There is no doubt that modern medicine has revolutionized the way infective endocarditis is approached, diagnosed and treated. However, we should not forget that it is nevertheless a potentially life-threatening disease that warrants immediate medical attention.[25]

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