Case report

A case of *Gemella morbillorum* native valve endocarditis and results of *in vitro* susceptibility testing

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**ABSTRACT**

We present a case of a 48 years old male with *Gemella morbillorum* native mitral valve endocarditis. Due to poor growth of the organism, antimicrobial susceptibility test (AST) could not be performed using the CLSI approved method. AST was determined using Etest® strips and the patient was successfully treated with mitral valve replacement and intravenous ceftriaxone.

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**Introduction**

Infective endocarditis (IE) is an uncommon but life threatening infectious disease with serious complications. Globally, in 2010, IE was associated with 1.58 million disability-adjusted life-years or years of healthy life lost because of death and nonfatal illness or impairment [1]. IE has been classified as “acute” or “subacute-chronic” based on the onset and severity of the clinical presentation and the progression of the untreated disease. The bacteriology of IE varies depending on the cohort examined; however, *Staphylococcus aureus* and *Streptococci* are among the predominant organisms involved. In recent years, changes in epidemiological profile of infective endocarditis have been noted with emerging species that are often difficult to grow. Infective Endocarditis caused by *Gemella* species remains rare and the literature has been based mainly on case reports. *Gemella* species are gram-positive, catalase-negative, facultative anaerobic cocci which are part of human oropharynx, upper respiratory, genitourinary, and gastrointestinal system flora [2]. These bacteria are easily decolorized during the Gram-staining process, resulting in highly variable gram stain characteristics. The organism’s cell wall chemical composition of peptidoglycan is consistent with Gram-positive organisms [3].

**Case**

A 48 years old, previously healthy male presented to the outpatient Infectious Disease clinic with an unintentional fifty pounds weight loss, extreme fatigue, drenching night sweats, and progressively worsening shortness of breath with exertion for four months. There was no history of fever, cough, drug abuse, unusual exposures or dental procedures. Physical examination revealed normal vitals but a grade 4/6 systolic murmur in the mitral area. Rest of the physical examination was unremarkable. Laboratory investigations done by his primary care doctor a month prior to this presentation showed normocytic normochromic anemia, and an elevated erythrocyte sedimentation rate at 46 mm/hr. Complete metabolic panel, thyroid function test, HIV screen and QuantiFERON were normal. Recent computed tomography of chest, abdomen, and pelvis without contrast showed moderate splenomegaly and few areas of diminished attenuation in the spleen representing old infarcts. Blood cultures were obtained and within 48 h grew gram-positive cocci, identified as *Gemella morbilliform*.

Patient was admitted and started on intravenous vancomycin and ceftriaxone. Repeat blood cultures 48 h after initiation of antibiotics were negative. Echocardiogram revealed two mitral valve vegetations, 23 × 23 mm and 13 × 8 mm in size, with severe mitral regurgitation requiring mitral valve replacement. Patient was also found to have acute kidney injury secondary to endocarditis associated immune complex mediated glomerulonephritis. To further investigate the source of bacteremia, he underwent colonoscopy which was normal.

The isolate was submitted to a reference laboratory for antimicrobial susceptibility test (AST) but was unable to be performed using CLSI approved method due to poor growth of the organism. We also tried to perform AST in our research laboratory using broth microdilution testing but was unsuccessful as the organism did not grow in the wells when using Mueller Hinton Broth with 5% lysed horse blood [4]. We were able to determine AST results for the *Gemella* sample using Etest® strips. The E-test...
The four species of Gemella that can cause human infections are G. morbillorum, G. haemolysans, G. bergeriae, and G. sanguinis. These species have been implicated in meningitis, brain abscess, endophthalmitis, empyema, blood stream infections, and endocarditis. Gemella morbillorum was initially thought to be part of the genus Streptococcus until 1988 when it was found to be related to G. haemolysans at the genus level. A recent review of literature suggested that G. morbillorum is the most common species associated with endocarditis and mitral valve is the most common heart valve involved. Onset of illness was subacute in most cases and fever was the most common presenting complaint [7]. Predisposing factors for endocarditis include dental infections and procedures, colon malignancies or gastrointestinal diagnostic procedures, immunosuppression, and preexisting cardiac abnormalities [8]. In our patient we were not able to identify any predisposing conditions.

According to published data, the majority of the Gemella isolates from various clinical samples are reported to be susceptible to beta lactams and vancomycin. Other antibiotics which can have variable activity include clindamycin, macrolides, levofloxacin, linezolid and aminoglycosides [9,10]. Inherent resistance to TMP-SMX and low-level resistance to aminoglycosides has been reported [9]. Aminoglycosides have been used in combination with beta lactams especially aqueous crystalline penicillin G and ampicillin for synergy and currently this combination is considered the treatment of choice [3,7,11]. Intravenous vancomycin can be used in patients with beta lactam allergy. We did not use aminoglycoside in our patient due to elevated creatinine and he was successfully treated with intravenous ceftiraxone. The susceptibility method reported in this study may assist other laboratories seeking to perform antimicrobial susceptibility test (Table 1).

**Table 1**

| Gemella morbillorum E -rest results-35 C with CO2. |
|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|
| Brucella HK                              | TSA w/ 5% BLD                           | Gemella spp.                             | Brucella HK                              | Acceptable ATCC |
| Agar                                     | Agar                                    | Breakpoint                               | Agar                                    | Range          |
|                                          |                                        | Susceptible                              |                                          |                |
| 48 h                                     | 48 h                                    | 24 h                                     | 49,619                                   |                |
| Brucella HK                              | TSA w/ 5% BLD                           | Gemella spp.                             | Brucella HK                              | Acceptable ATCC |
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| Gentamicin     | ≤ 0.002 | ≤ 0.002 | ≤ 0.12 | 0.06–0.25 | 0.03–0.12 |
| Vancomycin     | ≤ 0.002 | ≤ 0.002 | ≤ 0.25 | 0.125     | 0.03–0.12 |
| Ceftriaxone    | 0.38    | 0.25    | 1.0    | 0.38      | 0.12–0.50 |
| Ampicillin     | 0.094   | 0.094   | 0.016  | 0.064     | 0.06–0.25 |
| Clindamycin    | 0.38    | 0.016   | 0.002  | 0.064     | 0.03–0.25 |
| Levofloxacin   | ≤ 0.002 | ≤ 0.002 | ≤ 0.2  | 0.5       | 0.5–2.0   |
| Meropenem      | 0.032   | 0.094   | ≤ 0.5  | 0.064     | 0.03–0.25 |
| Doycyccline    | NA      | 0.125   | NA     | 0.016–0.12| Not Available|

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**Ethical approval**

Obtained.

**Consent**

Obtained from the patient.

**Author contribution**

Analysis and interpretation of laboratory data: Joan Pawlak, Louis Saravolatz
Drafting of manuscript: Farah Tanveer, Dima Youssef
Critical review: Louis Saravolatz

**Declaration of Competing Interest**

The authors report no declarations of interest.

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