

# Gemella Endocarditis: Consider the Colon

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*Gemella* species, including *Gemella morbillorum*, are part of the normal flora of the human oropharynx, upper respiratory tract and gastrointestinal tract. Differentiation of *Gemella* from viridans streptococci in the laboratory may be difficult. Although uncommonly pathogenic, they have been implicated in a variety of human infections, most notably infective endocarditis. Dental instrumentation appears to be the usual source of infection. The case is reported of *Gemella morbillorum* native valve endocarditis, which was associated with an underlying colonic car-

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## Case report

A 63-year-old man was admitted to the district general hospital for investigation of a petechial rash of the

lower limbs. Subsequent to admission, he had a lower gastrointestinal hemorrhage which required the transfusion of packed red blood cells. Over the previous four months, during investigations for iron-deficiency anemia, the patient had undergone a normal esophagogastroduodenoscopy and left-sided colonoscopy. A barium enema was inconclusive. While in hospital for these procedures, the patient was found to have a systolic murmur, and mitral regurgitation was confirmed by transthoracic echocardiography. During this admission, Gram-positive diplococci were isolated from both the aerobic and anaerobic bottles of one set of blood cultures; these were initially thought to be viridans streptococci but were subsequently identified as *Gemella morbillorum*. Susceptibility testing using the E-test confirmed the organism to be susceptible to penicillin (E-test = 0.094 mg/l). Infective endocarditis was suspected and treatment with benzylpenicillin (1.2 g, four-hourly) and gentamicin (80 mg, eight-hourly) was started. Transesophageal echocardiography (TEE) demonstrated the presence of a vegetation on the posterior mitral valve leaflet, and raised the possibility of chordal rupture. The patient was transferred to a tertiary referral teaching hospital for further cardiological investigation, and assessment for valve replacement surgery. On examination there was a systolic murmur consis-

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tent with mitral regurgitation, but no evidence of cardiac failure. There were no vascular or immunological manifestations of infective endocarditis, and no organomegaly. The patient's dentition was poor.

Routine laboratory investigations were performed. The patient's hemoglobin level was reduced at 9.1 g/dl (normal range: 13.0 to 18.0 g/dl), but the platelet count ( $208 \times 10^9/l$ ; range: 150 to  $400 \times 10^9/l$ ) and white blood cell count ( $6.3 \times 10^9/l$ ; range: 3.5 to  $11.0 \times 10^9/l$ ) were within normal limits. The patient had renal impairment, with a serum urea level of 12.0 mmol/l (range: 2.5 to 6.6 mmol/l) and serum creatinine 238  $\mu\text{mol/l}$  (range: 62 to 115  $\mu\text{mol/l}$ ). The serum C-reactive protein level was elevated at 37 mg/l (range: 0 to 4 mg/l).

The patient was examined by the hospital microbiology service, which advised continuation of the benzylpenicillin/gentamicin treatment. The blood culture isolate was confirmed as *G. morbillorum* using the commercial identification kit API 20Strep (BioMerieux). Repeat TEE confirmed the presence of a large vegetation on the posterior mitral valve, and moderate mitral regurgitation. There was no chordal rupture or intracardiac thrombus. Thus, the patient's condition was discussed with the cardiothoracic surgery team, and valvular surgery was planned.

Shortly afterwards, the patient had another lower gastrointestinal hemorrhage requiring further transfusion. Colonoscopy showed a large cecal tumor due to an infiltrating adenocarcinoma, which was confirmed on histological examination. Unfortunately, while awaiting staging investigations, the patient suffered a left-sided cerebrovascular accident (CVA) and died several hours later. Neither computed tomography of the brain nor repeat TEE was performed prior to death, and so whether the CVA was due to thrombotic embolus or septic embolus remained unknown. The cause of the petechial rash which prompted the initial admission was never established.

## Discussion

The present case illustrates the association of *Gemella* endocarditis with underlying colonic malignancy, and also highlights the potential difficulties of differentiating *Gemella* species from viridans streptococci in the laboratory.

The *Gemella* genus includes six species - *G. haemolysans*, *G. morbillorum*, *G. sanguinis*, *G. bergeriae*, *G. palaticanus* and *G. cunicula*. Of these, *G. haemolysans*, *G. morbillorum* (1), *G. sanguinis* (2) and *G. bergeriae* (3) have been reported in association with human infection. *G. palaticanus* has been found only in dogs (4), and *G. cunicula* only in rabbits (5).

*Gemella* species are facultatively anaerobic Gram-variable cocci arranged in pairs, tetrads, clusters and,

occasionally, in short chains. They may decolorize in the Gram stain and appear Gram-negative. They grow poorly on blood agar in 10% CO<sub>2</sub>, and produce variable hemolysis. On blood agar the colonies are small, gray or colorless, and resemble slowly growing viridans streptococci. Most strains are leucine aminopeptidase (LAP) and pyrrolidonylarylamidase (PYR) positive, though these tests may require a heavy inoculum (1). *Gemella* species are frequently difficult to differentiate from viridans streptococci, and commercially available rapid phenotypic identification kits may not accurately identify all strains. Partial 16s rRNA gene sequencing may be useful in the definitive identification of these organisms (6).

*Gemella* species form part of the normal human flora, and have been found in the mouth, gastrointestinal tract and genitourinary tract. *Gemella* species have been implicated in a variety of human infections, including endocarditis, meningitis (1), brain abscess (7), septic arthritis (8), pleural empyema (9), and bloodstream infection (1). Endocarditis is the most common clinical presentation of *Gemella* infection, having been described with *G. haemolysans* (10), *G. morbillorum* (11-14), *G. sanguinis* (2), and *G. bergeriae* (3), and has also occurred on both native and prosthetic valves (14). *Gemella* endocarditis has been associated with poor dental hygiene and previously damaged cardiac valves. Dental instrumentation is the usual source of infection (15). The present patient had poor dentition, but had not undergone any recent dental procedures.

In only three previous cases has *Gemella* endocarditis been described in the setting of an underlying colonic malignancy - two involving *G. morbillorum* (11,12) and the other *G. haemolysans* (10). In another case, *G. morbillorum* endocarditis occurred after anal surgery (13). It is likely that in these cases the gastrointestinal tract was the portal of entry of *Gemella*, which normally resides therein. Instrumentation of the gastrointestinal tract, inflammatory bowel disease (16) and colonic neoplasm have all been implicated as the source of bloodstream infection in patients with infective endocarditis caused by other organisms, most notably *Streptococcus bovis* (17). Thus, colonic investigation should be considered in patients with infective endocarditis caused by *Gemella* species in whom no other source is apparent.

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