Gemella morbillorum Septic Arthritis of the Knee and Infective Endocarditis

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Gemella morbillorum is a commensal facultative anerobic gram-positive coccus found in the oropharynx and gastrointestinal, respiratory, and urogenital tracts of human beings.[1,2] *Gemella morbillorum* is a rare cause of infection with few reported cases. *Gemella* spp are related to the viridans group streptococci, causing similar infections and often posing a diagnostic challenge. The bacterium may exhibit α-hemolysis on sheep blood agar, which may lead to the initial presumptive identification as a viridans group streptococcus.[3] In 1988, *Streptococcus morbillorum* was reclassified into the genus *Gemella* on the basis of DNA hybridization.[4]

Much of what is currently known about the clinical manifestations of infections caused by *G morbillorum* have been based on case reports. *Gemella* spp. have been most frequently associated with endocarditis[5,6] but also have been reported to cause abscesses,[7,8] meningoencephalitis,[9] and sepsis in the immunosuppressed patient.[2,10]

A literature review revealed only 3 reports of septic arthritis caused by *G morbillorum*[11-13] (Table). We report on a patient who presented with septic arthritis of the knee and infective endocarditis. Despite an extensive investigation, a portal of entry into the circulation for this organism could not be identified.

Case History

A 75-year-old man with a 2-year history of diabetes presented to an emergency room for evaluation 2 days after acute onset of pain and swelling in the right knee. During the previous 4 weeks he had experienced flulike symptoms, including chills, fever, sweating, dizziness, weight loss, and anorexia. Initial examination showed an oral temperature of 38.5° C. The right knee was noted for swelling, warmth, an effusion, tenderness, and marked restriction of range of motion. Heart sounds were normal. The rest of the physical examination was noncontributory. Radiographs of the right knee showed a large effusion, mild medial compartment narrowing, and marginal osteophytes. Initial laboratory investigations revealed a mildly decreased hemoglobin value (10.5 g/dL), normal white blood cell count (9.7×10^8 cells/dL), and an elevated erythrocyte sedimentation rate (100 mm/hr). No knee joint aspiration was done by the emergency room physician.

The patient was treated empirically with 1 intravenous dose of ceftriaxone (1 g) and discharged home on cephalexin (500 mg PO qid). Blood cultures drawn at presentation showed gram-positive cocci in clumps at 2 days, presumptively identified as coagulase-negative staphylococci; however, 4 days later the final identity of the microorganism was confirmed as *G morbillorum*. This prompted admission to hospital for further evaluation. Oral temperature was 37.0° C. Cardiac auscultation revealed a soft mid-systolic, grade 1/6 murmur heard best at the left sternal border. Peripheral manifestations of bacterial endocarditis were absent. The right knee was noted for a moderate effusion, tenderness, and marked reduction in range of motion. The oral cavity was edentulous, and the gums had no signs of inflammation. Physical examination was otherwise noncontributory.

Aspiration of the right knee yielded 105 mL purulent synovial fluid with a white cell count of 19,259 cells/mm^3, of which 92% were mature neutrophils; crystals were not detected. *Gemella morbillorum* was recovered from both the right knee fluid and a repeat blood culture. Irrigation of the knee was performed with a single needle puncture and multiple syringes of normal saline (total volume, 500 mL); however, surgical débridement of the knee was not done. Transesophageal echocardiography revealed a vegetation adherent to the posterior mitral valve leaflet with moderate mitral regurgitation. A double-contrast barium enema did not reveal any colonic abnormalities. Despite a thorough evaluation, a source for the *G morbillorum* bacteremia could not be detected.

The oral cephalexin was discontinued, and therapy was initiated with intravenously administered ceftriaxone (2 g, once daily) for 6 weeks. The right knee effusion completely resolved by 5 weeks after irrigation and initiation

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Table I. Summary of Reported Cases of Septic Joints Caused by *Gemella morbillorum*

Age (years)	Gender	Joint Disease	Duration of Illness	Source/Etiology	Therapy	Patient Outcome	Reference
45	Female	Infected total elbow arthroplasty	9 months	Two periarticular fistulas	Two-stage revision arthroplasty. Antibiotic therapy not stated.	Not stated	von Essen et al[11]
48	Male	Presumed septic wrist	3 weeks	Poor dentition with multiple dental caries. Bacteremia. Possible infected renal dialysis access graft.	Vancomycin and gentamicin for 1 day, then vancomycin for 6 weeks. Wrist aspiration. Excision of aneurysmal segment of renal dialysis access graft.	Resolved	Omran and Wood[13]
42	Male	Trochanter osteomyelitis and ipsilateral septic hip	6 months	Long-term hydrocortisone, levothyroxine, and testosterone after excision of suprasellar hypophyseal adenoma and radiotherapy	Débridement of hip joint on 2 separate occasions; penicillin G and clindamycin for 6 weeks, followed by oral clindamycin for 3 weeks; delayed bone grafting.	Resolved	van Dijk et al[12]
75	Male	Septic knee	4 weeks	Bacteremia Endocarditis	Ceftriaxone for 6 weeks. Knee aspiration and irrigation.	Septic arthritis and cardiac vegetation resolved	Present case

of continuous ceftriaxone administration. A repeat echocardiogram 6 weeks after initiation of therapy revealed that the vegetation had resolved. By 3 months after beginning treatment, the patient had returned to all activities of daily living, including driving a tractor. At 6-month follow-up evaluation, he was afebrile and noted that the right knee was functionally as good as prior to the infection; radiographs of the right knee showed medial compartment narrowing and osteophytes.

Discussion

Gemella morbillorum, the organism recovered from the knee and blood cultures of this patient, is an uncommon cause of human disease. It has been suggested that the prevalence of *G morbillorum* infections may be higher than previously believed because of misidentification of the organism.[14] The current case confirms the findings of 3 previous case reports that *G morbillorum* may be a serious source of joint sepsis and is unique because none of the previously reported cases had involved the knee[11-13] (Table).

This patient had a nonspecific illness for approximately 1 month prior to presentation but sought medical attention only after he developed sudden onset of pain and swelling of the right knee. In the previously reported cases of *G morbillorum* joint disease, the patients had prodromal symptoms for 3 weeks to 9 months.[11-13] The paucity of reports of joint disease caused by this microorganism suggests that there may be a lower predilection for involvement of joints than endovascular structures such as heart valves. Endocarditis is a more common manifestation of *G morbillorum* sepsis, and a careful cardiac evaluation is indicated if this organism is identified on blood cultures. Infection can occur in both native[5,6,14-16] and prosthetic[17] valves and in patients with underlying heart disease, including valvular abnormalities, cardiomyopathy,[18] and atrial myxoma.[19] Antimicrobial therapy alone was effective in managing the valvular involvement in the present patient, but valve replacement surgery may be required in some cases.[6]

Cases of infection with *G morbillorum* have been reported in all age groups, including children[2,15] and adults.[5,7,14]

"In...previously recorded cases...patients had prodromal symptoms for 3 weeks to 9 months."

Periodontitis is the most frequently implicated source of this organism.[20] A wide variety of complications also have been associated with *G morbillorum* infection, including fatal septic shock,[2,10] retropharyngeal abscess,[8] and pulmonary abscess.[7] Furthermore, colon cancer may be associated with *G morbillorum,* and evaluation for an occult colonic neoplasm is indicated in a patient with sepsis from this organism.[1] None of these complications were observed in the present patient.

It has been suggested that an immunocompromised status may contribute to the pathogenesis of this organism, as previously noted in a patient treated with chemotherapy for Burkitt's lymphoma,[2] another patient receiving long-term corticosteroid therapy,[12] and 2 patients who were infected

with the human immunodeficiency virus.[10] There was no evidence of an immunocompromised status in the present case. However, the patient was diabetic, and diabetes may predispose to *G morbillorum* endocarditis.[5]

Treatment

The orthopedic management of this case is controversial because the orthopedist (who is not a coauthor of this report) elected aspiration and irrigation, described for treatment of septic arthritis in pediatric[21] and adult[22,23] patients, in lieu of arthroscopy or arthrotomy for irrigation and débridement.[23-25] In cases with symptoms present for more than 3 to 5 days, arthrotomy has been recommended over arthroscopy[24] or needle arthrocentesis.[23] Despite the delay in treatment and nonoperative management, this patient was fortunate to have a good functional outcome; however, other patients treated late with needle aspiration may have major functional problems,[22,23] suggesting that arthroscopy[24] or arthrotomy[23] may be advisable in these cases.

Intravenously administered ceftriaxone was effective in the present case, but other studies have shown that the organism may be sensitive to penicillin, ampicillin, erythromycin, vancomycin, amoxicillin/clavulanate, cefotaxime, cefepime, ciprofloxacin, imipenem, and gentamicin.[14,15] Resistance to penicillin[2] and gentamicin[14] has been reported. In penicillin-allergic patients, rifampicin and erythromycin[16] or vancomycin[13] have been used effectively.

Conclusions

Although *G morbillorum* is an infrequently reported cause of joint infection, it should be remembered as a potential pathogen. If this microorganism is detected in a joint aspirate, it should not be discounted as a contaminant, and management should include culture-directed antimicrobial therapy and knee aspiration and irrigation, arthroscopy, or arthrotomy with irrigation and débridement depending on time from onset of symptoms and surgeon's preference. Evaluation of the oropharynx and teeth, heart valves, and colon may reveal a potential source of infection.

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The authors report no actual or potential conflicts of interest in relation to this article.

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