CASE REPORT

Group G *Streptococcus* Septic Arthritis: An Unusual Cause

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ABSTRACT

Group G *Streptococcus* is a Gram positive bacteria which normally colonized the nasopharynx, skin and genital tract. It is unusual for this organism to cause serious infection. Here we reported a rare manifestation of septic arthritis caused by *Streptococcus* Group G in a 55 years old lady with underlying invasive breast cancer when she presented with a unilateral knee joint swelling associated with fever. Microbiological study of the pus aspirate identified Group G *Streptococcus* as the pathogenic organism. She was successfully treated with intravenous antibiotic and had a good recovery. This case highlighted a low virulence *Streptococcus* is worth identified in patients with underlying comorbid diseases and clinical interpretation is crucial.
Malaysian Journal of Medicine and Health Sciences (2025) 21(1):373-375. doi:10.47836/mjmhs.21.1.45

Keywords: *Streptococcus*, Group G, Septic, Arthritis, Gram positive

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INTRODUCTION

Group G *Streptococcus* (GGS) is a Gram positive bacteria, low virulence and exhibit β-hemolysis when grow on a blood agar. It was first described by Lancefield and Hare in 1935. GGS are normal commensals of the oropharynx skin, gastrointestinal tract and female genitourinary tract. Nevertheless, it has been reported previously to cause infections involving multiple organ systems. Infection often occurs in hosts with underlying immunosuppressed states such as malignancy, extremes age, corticosteroid therapy and cytotoxic drugs. Alcoholism and diabetes mellitus were another risk factors that have been reported (1).

CASE REPORT

A 55 years old lady presented with a sudden onset of left knee pain for 3 days duration. The pain was initially described as mild, and she was able to ambulate around as well as doing daily activities. However, two days later the pain became worse and the knee was noted to be swollen which restricted her movements. The pain was mostly severe during flexion of the knee. Symptoms were associated with fever. Further history revealed she has underlying invasive breast carcinoma with left axillary lymph nodes involvement, which was diagnosed eight months prior. Unfortunately, she refused any chemotherapy or surgical intervention for the management of her breast carcinoma

Upon presentation in Emergency Department, her vital signs were stable, except she was having a fever with a documented temperature of 38°C. Left knee examination revealed marked swelling of the joint with dilated veins. Supra patellar region effusion was suspected and warrant further knee joint examination, however, the procedure was abandoned due to unacceptable pain. Otherwise, the sensation was intact, both proximal and distal popliteal arteries were palpable, and the capillary filling was normal.

She was started empirically with IV ampicillin/sulbactam 1.5g TDS and was admitted for further management. Ultrasound of the left knee was carried out on day two of admission and noted to have bursitis with effusion. With the findings, diagnosis of septic arthritis of the left knee joint was made and a bedside aspiration was done for microbiological analysis, however, culture revealed no growth. In view of underlying invasive breast carcinoma with local lymph node metastasis, she was scheduled for magnetic resonance imaging (MRI) to look for any evidence of distant metastasis to the left lower limb. MRI findings were suggestive of synovitis, which the most likely due to an infection or inflammation (Figure 1). Arthrotomy washout of the left knee was performed at day 10 of admission to the ward. Intraoperatively,

the presence of infected synovial was evidenced by the collection of pus at the suprapatellar area.

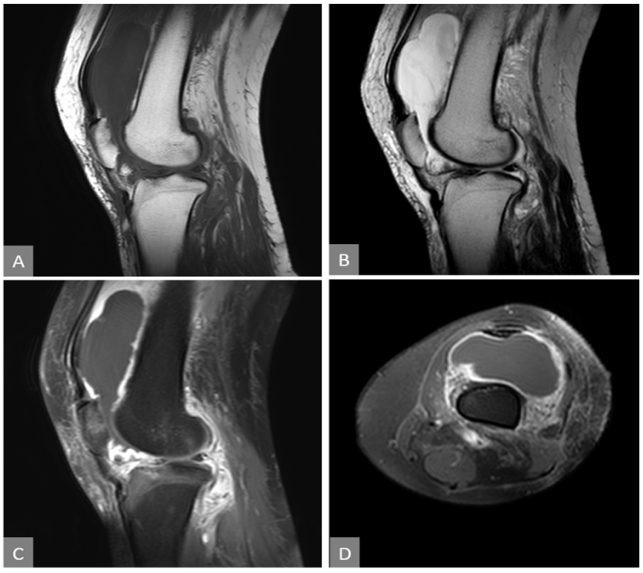

Figure 1: MRI of left knee shows moderate to severe knee effusion which demonstrate homogenous hypointense signal intensity on sagittal T1W (A) and heterogeneously hyperintense on sagittal T2W (B). Diffuse irregular thickening of the synovium also noted which enhances post contrast (C) and (D).

about 40 ml of pus was drained out and sent for culture, in which the Group G *Streptococcus* (GGS) was isolated. Blood culture taken prior to the operation grew the same organism. Both isolates were sensitive to antibiotics tested (ceftriaxone, penicillin and erythromycin). Upon knowing the culture results and antibiogram profiles, the antibiotic was subsequently changed. Intravenous benzylpenicillin 4 mega unit was commenced for 2 weeks and followed by oral penicillin for another 2 weeks. After completion of antibiotics and good wound healing (Figure 2), she was discharged from the ward and to be reviewed in the outpatient clinic for follow-up assessment.

Figure 2: Surgical wound on the left knee before patient was discharged

DISCUSSION

The Bergey's Manual of Systemic Bacteriology is the main reference for bacterial nomenclature and taxonomy in many medical microbiology since 1984. Classification and identification of streptococci was relied on a very limited number of complex characters; colony size, hemolysis type and group carbohydrate antigens. Many changes in the nomenclature and taxonomy of the *Streptococcus* genus have taken place since 1984. These changes were the result of an advancements in molecular techniques such as 16S rRNA gene sequencing, that helps characterizing the differences in bacteria and species. Taxonomic classification of group C streptococci (GCS) and group G streptococci (GGS) are known to be complex. GCS and GGS of human origin are now considered to constitute a single subspecies, *S. dysgalactiae subsp.equisimilis* (2)

GGS colonizes the pharynx, skin, gastrointestinal tract and female genital tract in humans and was previously treated as a contaminant. However, for the past few decades, GGS has been identified as one of the causes for a spectrum of human infections and warrant further investigations. GGS cause diseases similar to that caused by *S. pyogenes*. It has been proved with molecular analysis that the virulence determinants are almost identical. Although cutaneous infections and pharyngitis are encountered most often, a wide variety of infections have been reported (1). A variety of factors contribute to the development of septic arthritis. The incidence is linked to orthopedic-related infections, an aging population, previous joint pathology, invasive surgical intervention and patient's immunosuppressive state (3). In all age and risk groups, the most frequent causative organisms identified were S*taphylococcus aureus* and streptococci. These organisms account for 60–90% of total septic arthritis cases.

Isolation of GGS from clinical specimens is still considered to be the "gold standard" for the diagnosis. In this case, the blood culture taken on the day of admission grew GGS. Initial pus aspirate culture from the left knee was unremarkable, however, subsequently grew GGS when the sample was obtained intraoperatively. The probability of developing septic arthritis following bacteremia is closely related to the causative organism. In *Staphylococcus aureus* bacteremia, up to 90% of cases have a probability to develop septic arthritis. Given the rare occurrence of GGS causing bacteremia and septic arthritis, one may interpret isolation of GGS from a single blood culture as contamination rather than clinically significant. In the current case, opinion might defer in view of her underlying breast cancer which put her under an immunocompromised state. Malignancy, cardiovascular disease, diabetes mellitus, bone and joint diseases, and cirrhosis are among the prevalent

risk diseases in patients with GGS bacteremia. About 45% of patients with GGS infections had an underlying malignancy (4).

Septic arthritis is an emergency condition that warrants immediate diagnosis and prompt treatment to prevent mortality and lifelong disability. Surgical debridement in combination with antimicrobial therapy is the recommended management. Antimicrobial therapy varied but most often included a β-lactam with the length of therapy ranged from 14 to 90 days, and the organism cleared rapidly from the joint in most cases (5). GGS is susceptible to the ureidopenicillins, most cephalosporins, vancomycin, and linezolid. Clindamycin, erythromycin, and tetracycline have relatively poor activity against group G streptococci (1).

CONCLUSION

Non-gonococcal septic arthritis caused by β-hemolytic streptococci, particularly Group G, is uncommon. However, the isolation of this organism from sterile sites should be thoroughly evaluated and investigated before finally being regarded as contamination. Targeted antibiotic therapy and adequate surgical intervention improve clinical outcomes.

ACKNOWLEDGEMENT

We would like to thank the patient who gave us permission for the publication of this case report.

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