

Short Research Communication

# Gonococcal Prosthetic Joint Infection

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## Abstract

*Neisseria gonorrhoea* is a common sexually transmitted infection worldwide. Disseminated gonococcal infection is an infrequent presentation and rarely can be associated with septic arthritis. Incidence of this infection is rising, both internationally and in older age groups. We present the first documented case of *N. gonorrhoea* prosthetic joint infection which was successfully treated with laparoscopic debridement and antimicrobial therapy.

Key words: Gonorrhoea; prosthetic joint infection; gonococcal arthritis; DGI.

## Introduction

*Neisseria gonorrhoea* is an aerobic facultative intracellular gram negative bacteria typically appearing as diplococci [1]. It is sexually acquired and a common cause of urethritis, tenosynovitis and migratory polyarthralgia [2]. In approximately 0.5 – 3% of infections disseminated gonococcal infection (DGI) may occur through bacteraemia [3, 4]. Localised septic arthritis occurs in approximately 40% of DGI infections [1]. We present the unique case of DGI with associated prosthetic joint infection of the knee.

## Case

Mr AJ is a sixty-year-old Caucasian man originally from Australia, currently residing in Papua New Guinea who presented to our facility with an acutely inflamed right knee associated with a febrile illness, malaise, and sweats. Two weeks prior to presentation he described self-limiting dysuria without urethral discharge, followed 1 week later by pain and swelling of his right first metacarpophalangeal joint. He denied any history of recent illness, trauma, and denied any history of sexual contact since separation from his wife 15 years earlier. His past medical history was notable for a right total knee replacement four years prior and

poorly diet controlled type 2 diabetes mellitus, HbA1C: 8.3% (4.3-6.0).

Clinical examination was remarkable for a warm, tender, oedematous and erythematous right knee, with associated decreased range of movement and limited mobility. No dermatological lesions were evident and genital examination revealed no urethral discharge, testicular tenderness nor inguinal lymphadenopathy. Blood investigations demonstrated a neutrophilia of 13.6 cells/mm<sup>3</sup> (2.0-8.0) and elevated C-reactive protein of 86 mg/L (<5.0). The white cell count from the initial joint fluid aspiration in the emergency department was 57,500 ×10<sup>6</sup>/L, of which 83% were polymorphonuclear cells; gram stain was negative. The patient underwent laparoscopic washout of the knee the following day. The knee fluid aspiration was centrifuged and the spun deposit was cultured onto blood agar (aerobically and anaerobically), chocolate agar, and inoculated into Brewer thioglycollate Broth. These plates and broth were incubated in a CO<sub>2</sub> enriched environment at 35°C except for the anaerobic blood agar plate. Blood cultures were also collected and performed using BacT/Alert (BioMerieux Marcy l'Etoile, France). On day two of admission the

patient's blood and aspirate culture results returned positive for growth of *Neisseria gonorrhoea*, Figure 1. Bacterial Identification was made based on MALDI-TOF technology using the Vitek MS (BioMerieux Marcy l'Etoile, France) and sugar fermentation. Further confirmation was obtained from the aspirate and surgical washout fluid samples using in house Real Time Polymerase Chain Reaction (RT-PCR). Antibiotic susceptibility testing using NNN agar dilution and Minimum Inhibitory Concentration (MIC) revealed that the organism was sensitive to ceftriaxone (MIC: 0.008mg/L), ciprofloxacin (MIC: 0.03mg/L), azithromycin (MIC: 0.12mg/L), and spectinomycin (MIC: 64mg/L). The organism was resistant to penicillin (MIC: 4mg/L) and tetracycline (MIC: 16mg/L). Notably urine and rectal RT-PCR testing was negative for gonorrhoea and chlamydia. However, a urine RT-PCR was positive for *Trichomonas vaginalis*. Additional investigations including human immunodeficiency virus (HIV), syphilis, and hepatitis viruses were all negative. Complement levels were within normal range. Surgical management involved one arthroscopic surgical washout with synovectomy and retention of prosthesis. Antibiotic therapy included a two week course of intravenous ceftriaxone 2g daily. Given concerns over prosthetic joint infection a twelve week course of oral ciprofloxacin 500mg twice daily was completed. The patient tolerated therapy without incident and had no signs of relapse 60 days after completion.

## Discussion

*N. gonorrhoea* is a common sexually transmitted infection [5, 6]. While DGI and bacteraemia are uncommon, it is often associated with septic arthritis, occurring in 60% as a triad of migratory polyarticular disease, dermatological manifestations usually macules or papules, and tenosynovitis [2]. The most commonly affected joints include knees and wrists [2, 7]. Localized septic arthritis occurs in up to 40% of

DGI cases [1, 2]. There are multiple reported cases of rare or unusual presentations of gonococcal infection [8-10]. However, on review of the literature including PubMed, Medline, and Google Scholar, we believe this to be the first description of *N. gonorrhoea* prosthetic joint infection.

Our patient's initial presentation with urethritis, accompanied by fever, malaise and polyarthritis is classic [1, 11]. On multiple occasions the patient denied recent female sexual contact, no male sexual contact ever, nor any other risk factors for either sexually transmitted infections or blood borne viruses. Given both the DGI and *T. vaginalis* infection, it is likely that the true aetiology of the infection was sexual contact. Considering the risk of acquisition from a female partner is approximately 20% per sexual encounter, and the time for infection to symptoms is 1-9 days, he is likely to have had recent intercourse [1, 12]. Aside from initial infection, our patient's risk profile for septic arthritis included age and diabetes mellitus [13, 14]. Interestingly, from a gonococcal arthritis risk perspective our patient is not female, did not have an asymptomatic mucosal infection, no low socio-economic status, not an intravenous drug user and HIV negative [15]. Complement deficiency has been associated with increased susceptibility to *Neisseria* infections associated with up to 13% of DGI cases [1, 15]. Although our patient had multiple positive blood and synovial fluid cultures, he did not have complement deficiency.

In terms of microbiological samples, our patient's culture results are uncommon. Gram stains are negative in over 75% of cases of gonococcal septic arthritis [15, 16]. Culture results are positive in up to approximately 50% of synovial fluid samples and less than 30% of blood cultures [7, 16]. Although PCR has markedly improved the diagnosis with a specificity of 96-98% and sensitivity of 78-80%, it was only confirmatory in this case [15].



**Figure 1. A.** Gram stain revealing gram negative diplococci; **B.** *N. gonorrhoea* growth on chocolate agar.

Sexually transmitted infections are rising both in Australia and abroad [5, 6]. The incidence of gonorrhoea in Australia has more than doubled over the last decade, and notably, the incidence in the over 40 age category has almost tripled in the same timeframe with a male predominance of 2.9:1 [5]. Similarly, there has been an increase in both joint replacement procedures and prosthetic joint infections worldwide [17]. Given an aging population, increased prevalence of joint prostheses and a rising rate of sexually transmitted infections in an older population, the case described herein may portend an emerging pathology [5, 6, 17].

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## Competing Interests

The authors have declared that no competing interest exists.

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