



Case report

A case of purulent gonococcal arthritis

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ABSTRACT

We present a case of a generally healthy, immunocompetent, 57 year old male on HIV pre-exposure prophylaxis (PrEP) who developed the sudden onset of right wrist pain and swelling with associated left second finger tenosynovitis, due to a disseminated gonococcal infection (DGI) with purulent arthritis. This case's aim is to demonstrate a well-documented but infrequently seen manifestation of *Neisseria gonorrhoeae* infection and to highlight the need for awareness of extragenital manifestations of gonococcal infection in the era of HIV PrEP. DGI accounts for less than 3 % of *N. gonorrhoeae* infections, with purulent arthritis being one presentation. The incidence of *N. gonorrhoeae* infections has increased in recent years and is high among those taking PrEP. Providers should be aware of the possibility of DGI and *N. gonorrhoeae* as a potential etiologic agent in septic bacterial arthritis.

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Introduction

Gonococcal arthritis is a type of bacterial septic arthritis and a form of disseminated gonococcal infection that results from the bacteremic dissemination of *Neisseria gonorrhoeae*, usually acquired sexually through genital, ano-rectal or oral contact. This case's aim is to demonstrate a well-documented but infrequently seen manifestation of *Neisseria gonorrhoeae* infection and to highlight the need for awareness of extragenital manifestations of gonococcal infection in the era of HIV pre-exposure prophylaxis (PrEP).

Case

A 57 year old male who has sex with men, with history of carpal tunnel syndrome of the right wrist (diagnosed 8 months prior, and managed conservatively without surgery) who presented with right hand and wrist pain and swelling for three days without any noted fevers. He had been taking daily tenofovir disoproxil fumarate and emtricitabine (TDF-FTC) for HIV pre-exposure prophylaxis (PrEP) for the past two years, and he had frequent follow up for HIV and three site gonorrhea and chlamydia testing, most recently two weeks prior to admission, with negative urethral, throat, and rectal test results and a negative fourth generation HIV test.

Until the day that his symptoms began he had been in his usual state of health, engaging in regular exercise, working at his office-based business, and having sex, including unprotected sex. One evening he was awakened in the middle of the night by severe right wrist pain and swelling. Over the following days he spoke to his primary care physician who recommended acetaminophen. He also visited an emergency department (ED), where a right wrist radiograph did not reveal any evidence of osseous, articular, or significant soft tissue abnormality. He was given a diagnosis of a possible flare of his known carpal tunnel syndrome or a new possible sprain and discharged home. He had no fever or chills, but the pain and swelling of his right wrist progressed and was associated with decreased range of motion due to edema and pain, and he developed new pain without swelling in the second digit on his left hand between the distal interphalangeal (DIP) joint and proximal interphalangeal joint (PIP). He was then seen by a physiatrist who referred him to the ED to exclude possible septic arthritis. In the ED, he was initially afebrile, but later had fever to 102 degrees Fahrenheit. Physical exam findings were notable for prominent right wrist swelling, tenderness, and decreased range of motion of the right wrist and fingers. His left second finger was also tender to palpation between the DIP and PIP with pain upon flexion. He had no skin genital or perianal lesions or rash and no sore throat or oral lesions. Laboratory tests were notable for a white blood cell count (WBC) of 14,000/uL, 82 % neutrophils, an erythrocyte sedimentation rate (ESR) of 21 mm/hr, and a C-reactive protein (CRP) of 170 mg/L. A radiograph of the wrist showed diffuse soft tissue swelling over the dorsal aspect of the wrist and hand, without any cortical bone destruction. A right wrist arthrocentesis demonstrated WBC of 108,000/uL with 89 %

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neutrophils and no crystals. He was initially treated with ceftriaxone and vancomycin. He was later taken to the operating room for a right wrist irrigation, and intraoperatively was found to have a significant purulent collection in the radiocarpal joint. Microbiology results of the synovial fluid showed gram-negative diplococci subsequently identified as *N. gonorrhoeae*, susceptible to ceftriaxone (MIC 0.064 ug/mL) and tetracyclines (MIC 0.19 ug/mL), with intermediate susceptibility to ciprofloxacin (MIC 1.5 ug/mL). Throat, rectal and urine testing for gonorrhea and chlamydia were all negative. Blood cultures were negative. The vancomycin was discontinued, he received one gram of azithromycin orally when the gram stain results became available, and the patient was treated with four weeks of intravenous ceftriaxone 2 g daily.

Since starting PrEP two years previously the patient has had regular three site STI testing (throat, rectal, and urine), approximately every three months and this was the patients' first diagnosis with a gonococcal infection; however, he had two episodes of rectal chlamydia infection since starting PrEP (and had never had any STI prior to starting PrEP). He had unprotected, condomless sex with three partners over the past month leading up to his presentation.

Discussion

Gonococcal septic arthritis is a bacterial arthritis due to the dissemination of sexually acquired *Neisseria gonorrhoeae*. In 1975 the incidence of gonococcal infection was estimated to be 465 per 100,000 population which had decreased to 150 per 100,000 population in 1995; however, the United States national incidence increased to 179.1 cases per 100,000 population in 2018 [1,5,6].

Gonococcal septic arthritis is a manifestation of disseminated gonococcal infection (DGI). A characteristic triad, often referred to as an arthritis-dermatitis syndrome which consists of migratory polyarthralgias, dermatologic lesions, and tenosynovitis. The other form of DGI is a localized purulent arthritis. Overlap of these forms of DGI can also occur, which was demonstrated by our patient who had a purulent right wrist gonococcal arthritis and also tenosynovitis of a left finger without any associated skin lesions. Blood cultures are positive in less than a third of cases of purulent gonococcal arthritis, as was the case in this patient [2,9].

It is estimated that only 0.4–3% of all gonococcal infections develop into DGIs [1,11]. Fortunately, while it can cause severe symptoms, with appropriate antimicrobial treatment and drainage of the involved joint, gonococcal arthritis has a favorable prognosis, with infrequent loss of joint function [7]. The pathophysiology of gonococcal septic arthritis is through bacteremic spread to the joint space after initial sexual acquisition of the infection. As the initial inoculation can be asymptomatic in more than 50 % of rectal *N. gonorrhoeae* infections and in up to 90 % of pharyngeal infections, the pathogen has the opportunity to infect a joint during a bacteremic episode prior to the patient seeking treatment, or as in this case, between episodes of routine screening [8,11,13]. DGI has been reported to have a female predominance (with a female to male ratio of 3:1), with an increased occurrence during menstruation and in pregnancy, and high rates of DGI have been noted in urban ethnic minorities with low socioeconomic status [1,3,8]. Our patient, however, was well engaged in medical care, was not a member of a racial ethnic minority and was of a high socioeconomic status. However, he did report more frequent engagement in unprotected sex after starting PrEP. Prior studies have found that among PrEP users there are high rates of STI with several studies noting an increased incidence of condomless sex compared to prior to PrEP initiation [10,12,14,15]. Nguyen et al. comment that PrEP users' perception of decreased risk of HIV acquisition can lead to behavioral disinhibition and therefore a

higher incidence of STIs. However, these authors also offered another hypothesis to explain the high STI rate, which is that more STIs are identified as more individuals are engaged in both PrEP and routine STI screening [12].

Our case highlights a historically well-recognized, but for many years relatively uncommon, form of DGI, purulent gonococcal arthritis. Clinicians should be alert to the possibility of extragenital manifestations of gonococcal infection, DGI and gonococcal septic arthritis, particularly among individuals on PrEP who may be engaging in unprotected sex. It should be considered in the differential diagnosis of sexually active patients who present with septic arthritis, including in cases of gram stain and culture negative arthritis, as gram stain and synovial fluid cultures are positive in fewer than 50 % of gonococcal arthritis as the organism can be difficult to grow in routine clinical microbiology testing [4,8,13]. Further, clinicians and patients should recognize that while three site testing can identify recent infections in the sites tested, that this testing does not identify or exclude extra-genital gonococcal infection and that gonococcal infection should be considered if extragenital symptoms, such as joint pain or swelling, develop. As our case highlights, as engagement in HIV prevention with PrEP is appropriately expanded to include more of those at risk of HIV, rigorous public health surveillance of gonococcal infections in general, including forms of DGI, and high levels of clinician awareness of the multiple potential manifestations of gonococcal infections will be needed.

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Nothing to declare.

Consent

Written informed consent was obtained from the patient for publication of this case report. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

MM Vidaurrazaga wrote the first draft, did the data collection and literature search and analysis, reviewed all drafts and prepared the submission and approved the final draft. DC Perlman reviewed, revised and contributed to each draft and approved the final manuscript. Both authors care for the patient.

Declaration of Competing Interest

Nothing to declare.

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