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(CASE REPORT)

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Disseminated gonococcal infection: A case report of gonococcal polyarthritis

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Abstract

Neisseria gonorrhoeae (N. gonorrhoeae) is a sexually transmitted pathogen and its dissemination can lead to a variety of clinical signs and symptoms, such as arthralgias and arthritis. We report a case of an immunocompetent, 20-year- old patient with purulent arthritis due to disseminated gonococcal infection (DGI). Before discharge diagnosis, the patient was treated for rheumatoid arthritis, which worsened his clinical condition and delayed diagnosis. On further questioning, the patient reported urethral discharge, then the causative agent was identified by performing a PCR on the first stream of urine which came back positive for *Neisseria gonorrhoeae*. This case's aim is to demonstrate an infrequently seen manifestation of *Neisseria gonorrhoeae*, since the incidence of *N. gonorrhoeae* infections has increased in recent years, and to highlight the need for awareness of extragenital manifestations of gonococcal infection especially in young adults.

Keywords: *Neisseria gonorrhoeae*; Disseminated gonococcal infection; Arthritis; Pathogen identification

1 Introduction

Neisseria gonorrhoeae (*N. gonorrhoeae*), is a gram negative strictly aerobic diplococci, it is a sexually transmitted pathogen. The most frequent clinical manifestations of *N. gonorrhoeae* in males most often include urethritis with purulent efflux as well as inflammation of tissue in close proximity to the urethra, and cervicitis in females, although, in both sexes symptoms may be absent. We report a case of a gonococcal polyarthritis, an infrequently seen manifestation of disseminated gonococcal (DGI), to highlight the need for awareness of extra genital manifestations of *Neisseria gonorrhoeae* infection.

2 Case report

A 20-year-old male with no significant past medical history, presented to the emergency reception department reporting two months history of fever, muscle aches, as well as right knee and both ankles pain and swelling, then he was hospitalized in the department of infectious diseases. The patient reported unprotected sexual intercourse with multiple female partners. Physical examination revealed significant swelling of the right knee, tenderness, and decreased range of motion of the right knee. Both of his ankles were also warm, swollen, and tender to palpation. The patient reported a urethral discharge, he had no skin genital or perigenital lesions or rash, and no sore throat or oral lesions. Systolic/diastolic blood pressure was of 125/70 mm Hg, pulse 82 beats per minute (bpm), respiratory rate 16 cycles per minute, temperature of 39°C and SpO2 100%. The rest of the examination was unremarkable. Laboratory results revealed white blood count (WBC) of 12.170/µL, with 72.8% of neutrophils, an erythrocyte sedimentation rate (ESR) of 108 mm/hr and C-reactive protein (CRP) of 122 mg/L suggesting bacterial infection. Human immunodeficiency virus-1-2 and hepatitis C virus antibodies were negative, and the patient was immune for hepatitis B virus. A radiograph

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of the right knee and both ankles showed diffuse soft tissue swelling without any cortical bone destruction. A right knee arthrocentesis demonstrated WBC of 19,100/uL with 85 % neutrophils, an absence of crystals and bacteria, on direct examination then on culture. PCR on first urine stream was positive for *Neisseria gonorrhoeae*. Chlamydia trachomatis (C. trachomatis) co-infection was excluded. Blood cultures were negative. Our patient completed a 15-day course of intravenous ceftriaxone (1 g/day) with significant clinical improvement, being discharged 16 days after admission. The patient received a single dose of azithromycin to treat a possible co-*C. trachomatis* infection. Symptomatic treatment includes analgesia with paracetamol and joint icing. During 3 months of follow-up, the patient remained asymptomatic. Before this hospitalization and the identification of the triggering agent, the patient had suffered from inflammatory joint pain, particularly in the ankles and wrists, which appeared for the first time 2 months ago. The patient consulted a doctor who suspected rheumatoid arthritis because the laboratory parameters showed an elevated CRP of 138 mg/l, an elevated erythrocyte sedimentation rate of 125 mm at the 1st hour, Antibody antistreptolysin O was negative, and a slightly elevated rheumatoid factor of 16 IU. Arthrocentesis of the right knee demonstrated WBC of 13,000/uL with 80 % neutrophils, with absence of crystals and bacteria, on direct examination then on culture. Accordingly, the suspected diagnosis was maintained and treated with prednisolone (100 mg for the first two days, followed by 500mg for three days, then gradual reduction). However, the patient's condition did not improve and he continued to complain of severe arthralgia and fever, prompting him to go to the emergency reception department. At that time, the patient already had ureteral discharge but he never reported it to the doctor because he didn't ask him about it, and the patient thought it would be unrelated.

3 Discussion

Gonorrhoea is a well-known sexually transmitted infectious disease that poses an increasingly worrying public health problem. With approximately 82.4 million cases worldwide in 2020, it was the second most common bacterial sexually transmitted disease worldwide and has significant prevalence in both developed and underdeveloped countries [1].

N. gonorrhoeae is transmitted during vaginal, oral, or anal sex with an infected person, and during childbirth. Urethral infections caused by *N. gonorrhoeae* among men can produce symptoms that cause them to seek curative treatment soon enough to prevent sequelae. Among women, gonococcal infections are commonly asymptomatic or might not produce recognizable symptoms until complications have occurred [1, 2].

However, depending on the site of infection, the symptoms can vary in their characteristics and aren't often as clear as is in the case of urethral gonorrhoea, or are even absent. Besides pharyngeal, anal and ocular gonorrhoea [2, 3], there are rare variants of this disease which are caused by systemic dissemination of bacteria with signs and symptoms that may include fever, chills, malaise, polyarthralgia of small and/or large joints, tenosynovitis and dermatitis; even osteomyelitis, meningitis and endocarditis can occur [4].

Gonococcal septic arthritis is a manifestation of DGI and it is often misdiagnosed and therefore poses a risk of ineffective treatment. There is a characteristic triad often referred to as an arthritis-dermatitis syndrome which consists of migratory polyarthralgia, dermatologic lesions, and tenosynovitis. In the absence of treatment, progression to septic pyogenic arthritis occurs in less than a third of patients, which was the case of our patient given the delay in consultation and initiation of treatment [5].

It is recommended to collect knee joint aspirate samples into a blood culture bottle. According to the literature, neither direct cultures of synovial fluid samples nor blood cultures are very sensitive detection tools [6, 7]. This is why their diagnostic value may be limited in cases of DGI. Collection of samples from all exposed urogenital sites as well as extra genital sites, i.e. including joint aspirates, the pharynx, anal region and skin lesions, is recommended [6]. According to the literature there are two particular reasons why the use of joint aspirates collected in blood culture bottles for the identification of gonococcal arthritis is superior to direct culture of native samples: The most important factor is the time the bacteria spend in a favourable environment. While native samples may be subject to lengthy transport at room temperature, samples collected in blood culture bottles are generally transported more quickly and incubation begins earlier. Second, there are fewer initial work steps for blood culture samples [6, 8].

Antibiotic resistance has recently increased and currently presents a new challenge in the treatment of patients with DGI. The majority of isolated cases are resistant to penicillin, tetracycline, and fluoroquinolone; thus, these antibiotics are no longer recommended for the treatment of DGI. Susceptibility testing now focuses on emerging resistance to cephalosporin and azithromycin [9]. The standard treatment for DGI currently is parenteral ceftriaxone (1 g) for 7 to 14 days, combined with a single dose of azithromycin for combination therapy aimed at reducing the emergence of resistance and treating possible co -*C. trachomatis* infection, which was the case in our patient [9, 10].

In our case the misdiagnosis of rheumatoid and treatment with corticosteroids may have helped the bacteria to further disseminate to the other joints which were affected. Nevertheless, the presence of a high count of leucocytes should have made the treating doctor suspect that there was an infectious cause after all. It wasn't until when the patient mentioned that he had had ureteral discharge before the current symptoms and that he still suffered from it, that PCR on the first stream of urine was performed and the agent responsible could be identified, which was the game changer for this case.

It is difficult to accurately determine the total number of cases of disseminated gonococcal infections (DGI) because there is no obligation to report infections. Rigorous surveillance of gonococcal infections in general, including forms of DGI, with education of healthcare providers of the multiple potential manifestations of gonococcal infections including its articular manifestations will be necessary.

4 Conclusion

Our case highlights that in all cases, a complete history must be carried out. This diagnostic tool is often underestimated. Although time in emergency departments is often limited, clinicians should always take sufficient time to take a detailed medical history because the patient's sexual history can be crucial. However, it is not necessary that there be signs of gonorrhea in the patient's history, as even asymptomatic cases or those with negligible symptoms can lead to systemic dissemination of the pathogen. Clinicians should be alert to the possibility of extragenital manifestations of gonococcal infection, DGI and gonococcal septic arthritis, particularly among young and sexually active individuals.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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