Denouement and Comment

Disseminated Gonococcus Infection

Gram-negative diplococci were identified on Gram stain of the patient's synovial fluid, and *Neisseria gonorrhea* was isolated from cultures of both synovial fluid and peripheral blood. The patient reported that she was sexually active with 1 partner, using condoms regularly, but was diagnosed as having, and treated for, gonococcal urethritis 6 weeks prior to this presentation. On this hospital admission, she was initially treated with vancomycin hydrochloride, then transitioned to ceftriaxone sodium therapy based on microbiology laboratory results. The patient's fever resolved within 24 hours of antibiotic therapy and her wrist pain slowly improved during the next week. She was eventually transitioned to cefixime to complete therapy at home.

The incidence of *Neisseria gonorrhea* (GC) infection remains high in the United States, with an estimated 700 000 new cases annually (although true prevalence rates are difficult to determine).[1] Infection most often causes dysuria, penile or vaginal discharge, or pharyngitis, but it may be asymptomatic. More serious complications include pelvic inflammatory disease, epididymitis, or disseminated gonococcal infection (DGI), with or without septic arthritis. Meningitis and endocarditis occur rarely.

Disseminated gonococcal infection likely occurs in less than 1% of patients infected with GC, predominantly in sexually active adolescents and adults, with a 3:1 female to male ratio.[2] Disseminated gonococcal infection presents most commonly as the arthritis-dermatitis syndrome, beginning as a vague prodrome of malaise and fever, often without local pharyngeal or genital symptoms. Fever may be absent in up to 40% of patients.[3] Arthralgia most commonly involves the knees, wrists, and elbows. If untreated, septic arthritis can occur, typically in 1 or 2 of these joints. Rash occurs in approximately 75% of patients, typically 5 to 40 papules, macules, or pustules, often with a hemorrhagic component.[3] *Neisseria gonorrhea* was the leading cause of septic arthritis in the United States in the 1970s and 1980s,[2] and despite a large decrease in overall GC prevalence and prevalence of strains capable of producing DGI, it continues to be a common cause of septic arthritis in adolescents.

Diagnosis of DGI is made by detection of GC in synovial fluid, blood, or a pustular skin lesion. Blood culture results are positive in approximately half of patients but may require multiple samples, as bacteremia is intermittent.[2] Genital and pharyngeal specimens should be sent for culture and/or nuclear amplification testing, and they can be used to confirm the diagnosis in a patient with a suggestive clinical picture. Joint aspirates of GC septic arthritis typically reveal a white blood cell count of greater than 50 000/mL, while those assessed during the arthritis-dermatitis syndrome phase reveal less than 20 000/mL. Treatment includes intravenous ceftriaxone for 24 to 48 hours, or until clinical improvement occurs, after which patients can be transitioned to oral cefixime to complete a minimum of 7 days of total antibiotic therapy.[2] All patients with GC infection should be tested and treated for *Chlamydia trachomatis* infection. The patient and all partners should be tested for additional sexually transmitted infections, including hepatitis, syphilis, and human immunodeficiency virus.

Suspected treatment failure should be reported to local and state health departments to evaluate for cephalosporin-resistant GC.[4] Penicillin and tetracycline resistance emerged in Asia and was identified in the United States in the 1970s. Increased rates of quinolone resistance has followed, leading to the removal of quinolones from the Centers for Disease Control and Prevention sexually transmitted infection treatment guideline in 2007.[5] Case reports of treatment failures with cephalosporins and isolates with increased minimum inhibitory concentrations to cefixime and ceftriaxone have been reported in both Asia and the United States, predominantly in Western states. Less than 2% of isolates in the United States have elevated ceftriaxone minimum inhibitory concentrations, and the Centers for Disease Control and Prevention Gonococcal Isolate Surveillance Project is actively monitoring this trend.[4]

The differential diagnosis for patients with DGI includes meningococcemia reactive arthritis, acute rheumatic fever, and typical bacterial (*Staphylococcus aureus* and *Streptococcus pyogenes*) septic arthritis. The monoarticular or pauciarticular involvement of small joints helps to distinguish DGI from typical immune-mediated reactive arthritis, which is more symmetric and extensive. Clinical culture results can be negative in both typical septic arthritis and DGI; therefore, a high index of suspicion and careful exposure history are critical to allow for timely diagnosis and appropriate treatment of this disease.

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