

# Acute Extensor Tenosynovitis due to Disseminated Gonococcal Infection

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**Summary:** Infections from *Neisseria gonorrhoeae* (*N. gonorrhoeae*) are on the rise. Disseminated gonorrhea infections have the unique propensity for causing extensor tenosynovitis of the hand, a topic which has not recently been discussed in the plastic surgery literature. We therefore present a case report of a patient with extensor tenosynovitis of the hand from disseminated gonorrhea and review the literature. A 78-year-old man arrived in the Emergency Department with extensor tenosynovitis of the wrist, dermatitis, and polyarthralgias. He was taken to the operating room for washout of his extensor tendons at the wrist and was subsequently diagnosed with disseminated *N. gonorrhoeae* and treated with a third-generation cephalosporin. The patient ultimately recovered and regained normal active range of motion of the wrist. With the increasing incidence of *N. gonorrhoeae*, it is important for hand surgeons to recognize and treat the infection early in its course. This article serves to alert hand surgeons of the unique clinical patterns of *N. gonorrhoeae* infection, specifically focusing on presentations that include extensor tenosynovitis of the hand. (*Plast Reconstr Surg Glob Open* 2019;7:e2432; doi: [10.1097/GOX.0000000000002432](https://doi.org/10.1097/GOX.0000000000002432); Published online 24 September 2019.)

The clinical spectrum of infections caused by *Neisseria gonorrhoeae* (*N. gonorrhoeae*) spans minor asymptomatic mucosal infections to disseminated blood-borne infections affecting the skin, joints, tendons, and rarely meninges, heart, and bone. Disseminated gonococcal infection (DGI) results from failure of the body's host defenses to isolate the infection to mucosal surfaces, allowing the bacteria to spread to other organs of the body.

Gonorrhea has been a nationally notifiable disease since 1944.<sup>1</sup> Between 1968 and 1994, gonorrhea was the most commonly reported notifiable disease in the United States.<sup>1</sup> There were 350,062 cases reported in 2014 with a dramatic rise in the reported rate among men from 91.0 in 100,000 people to 120.1 in 100,000 people in 2014.<sup>1</sup> DGI occurs in 0.1% to 0.3% of all patients with an *N. gonorrhoeae* infection.<sup>2</sup> Of the patients with DGI, most develop tenosynovitis.<sup>3</sup>

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DGI is seen most commonly in women (with the greatest risk during menses and in the second and third trimester of pregnancy). Risk factors associated with DGI include intravenous drug use, immunocompromised host status from complement deficiency, systemic lupus erythematosus, or infection with human immunodeficiency virus, and infection with particular gonococcal strains that have enhanced virulence factors.<sup>3</sup>

Disseminated gonorrhea usually presents in two distinct patterns: (1) a triad of tenosynovitis, dermatitis with petechial or pustular skin lesions, and polyarthralgias or (2) suppurative arthritis that is usually limited to one joint.<sup>4</sup> Patients usually present with constitutional symptoms such as fevers and chills in addition to one of the two patterns above. The tenosynovitis and arthralgias that occur in disseminated gonorrhea are thought to be due to immune complex deposition which results in an inflammatory response, thereby yielding negative synovial fluid and joint cultures. It rarely leads to significant joint destruction. Tenosynovitis usually affects multiple joints simultaneously, including the wrists, fingers, ankles, and toes.<sup>5</sup> The pathophysiology and reasons for preferentially affecting these sites are not well understood. Suppurative arthritis most commonly affects the knee and, less often, can manifest in the wrist, ankle, and elbow.<sup>6</sup> The dermatitis seen in disseminated gonorrhea is thought to be due to immune hypersensitivity phenomena secondary to a small number of gonococcal antigens in the lesions. Cutaneous lesions of DGI can include abscesses, cellulitis, petechiae, purpuric macules, necrotizing fasciitis, or vasculitis.<sup>7</sup>

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In most cases, the diagnosis of gonococcal infection is based on clinical findings or results of nucleic acid testing. However, the laboratory nucleic acid amplification testing result may not always return in time to help the hand surgeon decide whether or not to incise and drain the affected extensor tendons or joints of the upper extremity. Although confirmation of gonorrhea with nucleic acid testing takes only a few hours to complete, institutions often bundle the tests, and results can take a couple of days to return. Thus, the hand surgeon is faced with a dilemma to trial antibiotics versus surgical intervention. At this point, there are no clear guidelines regarding how to treat tenosynovitis expected from disseminated gonorrhea before securing the diagnosis.

The offending organism may not be available for antimicrobial susceptibility testing as aspirations may reveal no organisms. Gonorrhea treatment has been driven by the evolution of antimicrobial resistance to each recommended antibiotic agent. Penicillins, tetracyclines, and newer macrolides have limited utility, and spectinomycin (and in many parts of the world, quinolones) has been withdrawn because of resistance.<sup>8</sup> Of the usually recommended treatments, only the third-generation cephalosporins have retained their efficacy, but decreased susceptibility to these antibiotics has also appeared.<sup>8</sup> The development of gonococcal “super bugs” has raised alarms, and practitioners may find themselves increasingly treating these infections.

## CASE REPORT

### Patient Information

A 78-year-old male patient with a history of previous gonorrhea infection presented to the emergency department with three days of wrist pain preceded by two weeks of pharyngitis. The patient also complained of two days of right knee and bilateral ankle pain/myalgias, pustular skin lesions on bilateral lower extremities, and neck pain. Social history was significant for recent unprotected oral sexual intercourse, alcohol abuse, and cocaine use.

### Hospital Course

The hand service was consulted to evaluate the patient’s wrist pain. Due to the low severity of the patient’s neck, knee, and ankle pains, the hand was addressed first during his hospitalization. On examination, the patient’s right arm had erythema and warmth surrounding the wrist primarily on the dorsal surface (Fig. 1). There was no axial loading tenderness and minimal tenderness with extreme active flexion and extension. Patient was able to fully extend all fingers and form a composite fist and complained of no numbness or tingling in the fingertips. Laboratory values for the patient on admission included a white blood cell (WBC) count of 15.4, erythrocyte sedimentation rate of 92, and C-reactive protein of 15.3. Anterior-posterior, lateral, and oblique views of the right wrist demonstrated no acute fracture or joint abnormalities (Fig. 2). Aspiration of the wrist and extensor tenosynovium was attempted. No fluid was aspirated from the wrist. A small amount of cloudy yellow fluid was



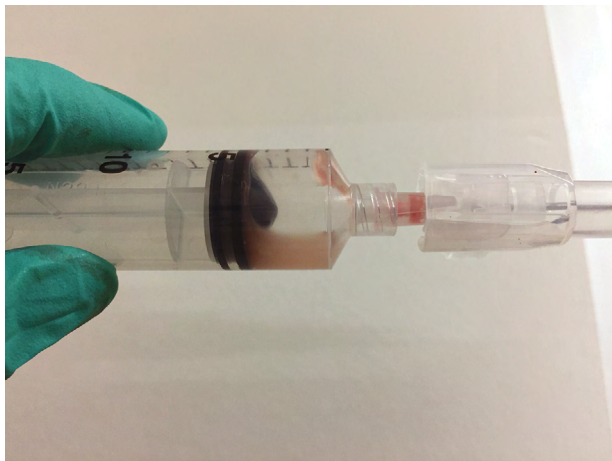
**Fig. 1.** Photograph from emergency room immediately after aspiration of the patient’s wrist and extensor tenosynovium demonstrating faint erythema on the dorsum of the wrist.

aspirated from the extensor tenosynovium (Fig. 3). This was found to have 74,500 WBCs with 88% neutrophils and 20,000 red blood cells. No organisms were seen.

Due to the high WBC count seen in the aspirate, the patient was brought urgently to the operating room for wash-out. A longitudinal dorsal incision was created to access the extensor tendons. Intraoperatively, the patient was found to have murky fluid surrounding the tendons, consistent with extensor tenosynovitis. The tendons were irrigated with



**Fig. 2.** Patient’s hand x-rays on the day of admission showing no bone or joint space abnormalities of the wrist.



**Fig. 3.** Fluid aspirate from the extensor tenosynovium revealing minimal cloudy fluid.

copious amounts of normal saline. A Penrose drain was placed at the conclusion of the case to allow for continued drainage. The patient was monitored in the hospital on a daily basis, and the Penrose was removed on postoperative day 3 when drainage from the incision had decreased.

Due to triad of polyarthralgias, tenosynovitis, and pustular dermatitis (Fig. 4), DGI was considered, and a urine nucleic acid amplification test for gonococcus was sent and returned positive. Additional workup showed blood cultures positive for *N. gonorrhoeae*.

Over the course of the hospital stay, the patient developed neck pain and stiffness, and a lumbar puncture was found to have a WBC count of 2. Magnetic resonance imaging of the spine also showed bilateral C1-C2 synovial joint effusions with trace prevertebral edema anterior to C2 and C3, likely secondary to DGI. This ultimately did not require any procedural intervention.

The patient was treated with 1 g of intravenous ceftriaxone daily for two weeks. The patient's knee and ankle pains resolved after starting antibiotics and did not require any procedural intervention or further imaging during his hospital stay. All three inflammatory markers resolved to normal levels by hospital day 4. The patient remained afebrile throughout the hospital course. At follow-up 10 days later, the patient reported no fevers and had marked improvement in his symptoms. There was minimal erythema and tenderness over the site of his wrist extensor tenosynovitis. The patient ultimately recovered full active wrist and finger range of motion at follow-up a year later.

Patient permission for reporting this case was obtained in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

## DISCUSSION

With the increase in gonococcal infections, it is important to review the specific triad of extensor tenosynovitis, pustular dermatitis, and polyarthralgias with hand surgeons. This case study not only serves as an interesting



**Fig. 4.** Patient's skin lesions, classic for systemic dissemination of *Neisseria gonorrhoeae*.

report but also alerts hand providers to consider this disease in patients who present with extensor tenosynovitis. This is of particular importance because in the United States, *N. gonorrhoeae* infection is the second most common sexually transmitted disease, and its incidence is on the rise, especially in male populations.<sup>1</sup>

In this scenario, the patient presented with the form of disseminated gonorrhea that included tenosynovitis, polyarthralgias, and petechial skin lesions. He did not have any evidence of suppurative arthritis in any of his joints. The wrist flexor tendons were washed out due to the uncertain diagnosis at the time of presentation and the concern for inadequately treating infection of the extensor tendons from a more destructive organism, such as *Staphylococcus aureus*.

Although it is possible that the extensor tenosynovitis may have resolved with antibiotics alone, the diagnosis of gonorrhea had not been confirmed until later in the hospital course. There are currently no guidelines for how best to manage this scenario. We recommend that clinicians proceed with drainage and washout of the infected site even if there is suspicion for DGI because failing to operate on an infection from a more destructive organism could result in irreversible damage to the hand.

## CONCLUSIONS

*N. gonorrhoeae* infections are on the rise and should be considered as a potential etiology in patients with teno-

synovitis and risk factors for DGI, even in the absence of other symptoms or synovial culture of the pathogen. It is important for hand surgeons to recognize and treat the infection early in its course.

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