A 44-Year-Old HIV-Infected Man With Right-Shoulder Swelling

Carl Mickman, MS; Carrie Caruthers, MD; Jaclyn Spiegel, MD; Ron Schiro, BS; Joanne Maffei, MD; Charles V. Sanders, MD; Fred A. Lopez, MD

Immunocompromised patients are susceptible to various joint infections with less-common pathogens, such as mycobacterium. Physicians should have a low threshold to investigate the cause of an arthropathy further. An aspiration of the effusion is usually warranted to identify the possible pathogen and target treatment. We report an unusual presentation of a human immunodeficiency virus-infected patient with a chronic effusion arthropathy of his right shoulder due to Mycobacterium kansasii. We review the risk factors, transmission, clinical manifestations, and management of Mycobacterium kansasii.

CASE PRESENTATION

A 44-year-old man with a past medical history of human immunodeficiency virus (HIV) and hepatitis C infections presented for a therapeutic paracentesis secondary to acute liver failure. His past medical history also included non-adherence to combination antiretroviral therapy, a history of Pneumocystis jirovecii pneumonia, and a resection of a squamous cell cancer of the tongue. At this presentation, the patient was also evaluated for a longstanding effusion arthropathy of the right shoulder. He had first noticed swelling in the area two years earlier and denied any trauma, associated pain, or limitation of his daily activities. Three weeks prior to presentation, his CD4 count was 40/mm³ with a CD4 percentage of 8.3% and a viral load of 49,504 copies/mL. His tuberculous interferon-gamma release assay test was negative, he denied any respiratory symptoms, and his chest X-ray was within normal limits. He admitted to prior intravenous drug use, and his last use was more than one year prior to presentation. He had been monogamous for the past two years with one partner who was also HIV-infected. At the time of presentation, the patient had recently been prescribed a new regimen of combination antiretroviral therapy; however, he had been non-adherent due to medication side effects.

On examination, the patient’s right shoulder manifested a marked effusion anterior to the deltoid muscle that extended to the subdeltoid region (see Figures A, B). The area was non-tender, non-erythematous, and cool to the touch; and a transillumination test was positive. There were no associated skin lesions. He had nearly full active range of motion, and his strength was only mildly decreased compared to the contralateral side. The patient developed minimal discomfort with medial humeral rotation; however, he had no point tenderness or pain with use of rotator-cuff muscles.

An X-ray revealed degenerative changes of the humeral head, including subchondral cysts and narrowing of the joint space. Swelling caused displacement of the deltoid muscle laterally. Magnetic resonance imaging (MRI), with and without gadolinium contrast, revealed a large simple subacromial-subdeltoid bursa fluid collection with no septations or irregularity of the wall (see Figure C). The fluid collection involved the majority of the entire undersurface of the deltoid muscle. It measured approximately 11 cm anteroposteriorly, 8 cm craniocaudally, and 2 cm in thickness. There was no communication between the subacromial-subdeltoid bursa and the glenohumeral joint space. Extensive diffuse synovial thickening with pannus formation and periarticular erosions was present in the glenohumeral joint.

The patient underwent a diagnostic arthrocentesis of the bursa. Approximately 10 ml of a thick, reddish, myxoid fluid with fatty material were aspirated. Drainage was limited in quantity by the viscosity of the fluid. A Gram stain noted moderate white blood cells (WBC) and no organisms. No crystals were noted, and the cytology for malignant cells was negative. Smears for fungal and mycobacterial organisms were also negative (including acid-fast bacilli smears), and cultures for aerobic and anaerobic organisms were negative.
The patient was discharged home with symptomatic treatment for his ascites. He was restarted on combination antiretroviral therapy and scheduled for close follow-up with his infectious diseases primary care provider. Two weeks after discharge, cultures of the shoulder aspirate grew *Mycobacterium kansasii* (see Figures D, E). The speciation of the mycobacteria was first determined by high-performance liquid chromatography, which gave the isolate a similarity index of 0.887 for *Mycobacterium kansasii* and 0.573 for *Mycobacterium szulgai* (see Figure F). The isolate was later confirmed as *Mycobacterium kansasii* with a DNA probe for RNA target (GEN-PROBE). Blood cultures were consistently negative for acid-fast bacilli, indicating that his infection was likely not disseminated. Due to marked serum transaminase elevations, thought to be hepatic disease, the patient was not able to receive treatment for his mycobacterial infection. His combination antiretroviral therapy was halted as well. The patient expired approximately three months later due to progressively worsening liver failure.

**INTRODUCTION**

*Mycobacterium kansasii* is an atypical, slow-growing mycobacterium that causes pulmonary infections in the immunocompromised host. It is the second-most common opportunistic atypical mycobacterial pathogen after *Mycobacterium Avium Complex* (MAC). *M. kansasii* is commonly differentiated by its characteristic yellow pigmentation. It has been isolated almost exclusively from municipal water sources, and the majority of reported cases have presented in the southern United States. *M. kansasii* is not considered a public-health threat, as there is no evidence of person-to-person transmission. The primary method of colonization is thought to be pulmonary. Pulmonary-disease presentation is similar to that of *Mycobacterium tuberculosis*, though symptoms are typically milder. Pulmonary *M. kansasii* occurs in both

![Figure A](image1.jpg) **Figure A:** Gross anterior image of chest and bilateral shoulders. The degree of anterior and lateral swelling of the right shoulder can be appreciated in comparison to the patient’s left shoulder.

![Figure B](image2.jpg) **Figure B:** Anterolateral view of the patient’s right shoulder, status post-removal of fluid sample from bursa.
immunocompetent and immunocompromised patients, but it is much more common in immunocompromised hosts, including HIV-infected patients. Immunocompromised patients, particularly those with CD4 counts below 100/mm³, represent the largest percentage of those with articular mycobacterial infections. Individuals receiving immunosuppressive therapy for inflammatory diseases that affect the joints are also at high risk, such as those with rheumatoid arthritis, psoriatic arthritis, dermatomyositis, lupus, gout, or those receiving intraarticular steroid injections. Previous articular pathologies are thought to promote the colonization of injured tissue and predispose affected individuals to hematogenous spread. Researchers have also described cases of acute-onset articular manifestations secondary to immune reconstitution inflammatory syndrome (IRIS). Patients receiving immunosuppressive therapy for inflammatory diseases that affect the joints are also at high risk, such as those with rheumatoid arthritis, psoriatic arthritis, dermatomyositis, lupus, gout, or those receiving intrarticular steroid injections. Previous articular pathologies are thought to promote the colonization of injured tissue and predispose affected individuals to hematogenous spread. Researchers have also described cases of acute-onset articular manifestations secondary to immune reconstitution inflammatory syndrome (IRIS). Researchers have also described cases of acute-onset articular manifestations secondary to immune reconstitution inflammatory syndrome (IRIS). Researchers have also described cases of acute-onset articular manifestations secondary to immune reconstitution inflammatory syndrome (IRIS). Researchers have also described cases of acute-onset articular manifestations secondary to immune reconstitution inflammatory syndrome (IRIS). Researchers have also described cases of acute-onset articular manifestations secondary to immune reconstitution inflammatory syndrome (IRIS).

TRANSMISSION

Mycobacterial articular infections typically occur through one of two methods: direct inoculation or disseminated infection. Joint infection with *M. kansasii* via direct inoculation has been documented in both immunocompromised and immunocompetent patients. Patients usually present with monoarticular disease and a history of trauma, though recent steroid injection is also a significant risk factor. Patients rarely present with systemic symptoms such as fever or malaise and usually complain of only localized pain and swelling.

Disseminated infection leading to joint colonization with *M. kansasii* has almost exclusively been documented in immunocompromised patients, and case reports reveal presentations of both monoarticular and polyarticular disease. Patients can present with systemic symptoms, though subacute presentation with only mild articular complaints is more common. Pulmonary infections have been reported to lead to disseminated infections in 35% of those infected with HIV. Joint colonization in the presence of disseminated disease is well documented; however, no study has looked at the likelihood of dissemination leading to articular manifestations.

DIAGNOSIS

Healthcare providers should consider mycobacterial infection when evaluating immunocompromised patients who present with subacute joint pathology. Aspirates of the infected area should be sent for histopathologic analysis and cultured for aerobic, anaerobic, fungal, and mycobacterial organisms. A histopathologic analysis should be performed using the fluorochrome technique for optimal sensitivity. Smear analysis is often negative; however, a negative smear does not rule out infection.

CLINICAL MANIFESTATIONS

Articular manifestations of *M. kansasii* infections, and particularly infections of the bursae, are extremely rare. In 1999, only 50 cases of *Mycobacterium kansasii* septic arthritis were described, and another review in 2012 discussed four cases of *M. kansasii* bursitis. Of the four cases reported, one presented with monoarticular disease while the three others presented with polyarticular disease. *M. kansasii* is seldom reported to infect via direct inoculation while organisms such as *Mycobacterium fortuitum*, *Mycobacterium chelonae*, and *Mycobacterium marinum* are well-known causes of localized trauma-associated infections. The most common bursal infections associated with these organisms are the olecranon and prepatellar bursae, as
they are superficial and most frequently exposed to trauma. This presentation is in contrast to that of *M. tuberculosis*, which, due to its propensity for hematogenous spread, does not show preference for particular bursae. One patient, described by Barham and Hargreaves, presented with monoarticular *M. kansasii* bursitis contracted through local trauma and direct inoculation. In contrast, three cases of polyarticular *M. kansasii* bursitis described by Mathew et al. were thought to result from hematogenous spread. Interestingly, all three patients were immunocompromised secondary to immunosuppressive therapies. The only patient described with *M. kansasii* subacromial bursitis was predisposed to infection secondary to articular manifestations of dermatomyositis. The patient initially presented with cutaneous nodules on his forearms that later spread to the subacromial bursa, a result of hematogenous dissemination. *M. tuberculosis* is the only other mycobacteria that has been demonstrated to infect this particular bursa, though neither of the two cases described were in HIV-infected patients. All of these infections occurred in the absence of trauma.

**MANAGEMENT**

Guidelines for the treatment of *M. kansasii* joint infections currently do not exist due to the uncommon nature of this condition, and guidelines regarding disseminated nontuberculous mycobacterial infections are similar to those for pulmonary infections. Clinical experience has shown that with other infectious causes of bursitis, antibiotic treatment alone is often inadequate, and needle or surgical drainage is recommended. Pulmonary infections with rifampin-susceptible *M. kansasii* isolates have been shown to respond well to a prolonged regimen of isoniazid (300 mg/d), rifampin (600 mg/d), ethambutol (15 mg/kg/d), and pyridoxine (50 mg/d) for at least 12 to 18 months. As in HIV-associated MAC infections, the duration of therapy should also be dictated by the immune status of the patient. Clinical recovery should be monitored closely as resistance to rifampin can lead to failure of treatment and resistance to other drugs. If failure of the initial regimen does occur, a new three-drug regimen based on susceptibilities should include clarithromycin or azithromycin, moxifloxacin, ethambutol, sulfamethoxazole, or streptomycin. For patients who are co-infected with HIV, additional information must be considered. Combination antiretroviral therapy and the agents used for the treatment of *M. kansasii* have associated side effects and may also interact with each other when used concomitantly. Importantly, rifabutin is known to interact less with combination antiretroviral therapy than rifampin. The interplay of preexisting comorbidities must also be taken into account. Since isoniazid is a known hepatotoxic drug, liver enzymes should be closely monitored, and patients must be educated to strictly avoid alcohol.

Since the majority of HIV patients with disseminated *M. kansasii* infections present with very low CD4 counts, the possibility of IRIS must be considered as well. Currently, no guidelines exist recommending when to discontinue combination antiretroviral therapy, and clinical judgment must be used in these situations. Steroids should be used to treat any inflammatory symptoms that appear. Combination antiretroviral therapy should only be discontinued in the presence of life-threatening inflammatory conditions that do not respond to steroids.

**DISCUSSION OF CASE**

Our patient’s case is significant for multiple reasons. First, his presentation was more indolent than the cases described in the available literature. His lack of pain or inhibition of his daily activities contrasts with the other cases, in which patients directly sought medical attention for their joint complaints. In addition, the patient’s physical exam showed no signs of acute inflammation such as pain, warmth, or erythema – all of which were present in the other cases of *M. kansasii* joint infections, even those with deficient immune status. Immunocompromised patients are susceptible to less-common pathogens and often present with unusual symptoms and findings. It is imperative that physicians have a low threshold to further investigate the cause of an arthropathy, whether it be monoarticular or...
Figure E: Mycobacterium kansasii with TB Carbolfuchsin KF stain (Becton-Dickinson) from 7H11 plate that was inoculated with an aspirate from the right subacromial-subdeltoid bursa, viewed at 1,000x with oil-immersion lens.

Figure F: High-performance liquid chromatography (MIDI, Inc.) results identified a similarity index for Mycobacterium kansasii (0.887) and Mycobacterium szulgai (0.573).
polyarticular. It is often essential to sample fluid from the joint space or bursa in order to identify any pathogen and tailor treatment.

Another noteworthy aspect of our case is the presence of articular pathology, including subchondral cysts, diffuse synovial thickening with pannus formation, and periarticular erosions. The pathology could be explained as a primary bone or joint infection that later spread to the bursa or repetitive mechanical friction between bone and skin leading to chronic bursitis. A differential diagnosis of these changes could include common joint pathology, such as rheumatoid or psoriatic arthritis or, more rarely, HIV arthropathy; however, an indolent infectious process should also be included. The mechanism of infection in our patient remains unclear as he had no evidence of lung pathology, no other manifestations of disseminated \textit{M. kansasii}, and no history of trauma to the area.

Our patient's case presentation and diagnosis stress the importance of further investigating unusual presentations of uncommon infections in the immunocompromised patient population.

**CITATIONS**


**Mr. Mickman** is a Medical Student at the Louisiana State University School of Medicine in New Orleans. **Dr. Caruthers** is a Chief Resident in the Department of Medicine at the LSU Health Sciences Center in New Orleans. **Dr. Spiegel** is a Resident in the Department of Medicine at the LSUHSC-New Orleans. **Mr. Schiro** is a Medical Laboratory Technician in the Microbiology Department at the Interim LSU Hospital in New Orleans. **Dr. Maffei** is an Associate Professor of Clinical Medicine in the Department of Medicine, Section of Infectious Diseases/HIV, at the LSUHSC-New Orleans and the Medical Director of the Infection Control Department at the Interim LSU Hospital in New Orleans. **Dr. Sanders** is the Chairman of the Department of Medicine, the Edgar Hull Professor of Medicine, and a Professor of Microbiology, Immunology, and Parasitology at the LSUHSC-New Orleans. **Dr. Lopez** is the Vice Chair of Education in the Department of Medicine, the Richard Vial Professor of Medicine, and Assistant Dean of Student Affairs in the School of Medicine at the LSUHSC-New Orleans.