

# Delayed Diagnosis in a Case of Smoldering Sporotrichal Monoarthropathy

Rina Patel<sup>1\*</sup>, Lindsay P Busby<sup>1</sup>, Daria Motamedi<sup>1</sup>

1. Department of Radiology and Biomedical Imaging, University of California, San Francisco, San Francisco, USA

\* Correspondence: Rina Patel, University of California, San Francisco, 505 Parnassus Avenue, M-391 San Francisco, CA 94143, USA  
 rina.patel@ucsf.edu

Radiology Case. 2019 Jan; 13(1):17-23 :: DOI: 10.3941/jrcr.v13i1.3520

## ABSTRACT

We present the clinical, imaging, and laboratory findings of a 41-year-old male with culture proven *Sporothrix schenckii* osteoarticular infection of the right knee. Fungal arthropathies are a rare and indolent form of septic arthritis, which often leads to a delayed diagnosis. Early diagnosis and treatment of fungal arthropathies is critical to preventing permanent functional disability.

## CASE REPORT

### CASE REPORT

A 41-year-old male presented to an outpatient orthopedic clinic with a history of right knee pain that had persisted for nine months following a work-related injury. According to the patient, he injured his knee at work, while jumping off of a stack of pallets. The patient described the sensation of his knee twisting and collapsing medially. The patient reported that he worked as a ranch hand, which involved working around animals. Prior to this, the patient stated that he worked as a gardener, which involved cutting roses. He was off duty for 1 month following the injury. The patient stated that seven months after the initial injury, a palpable mass had developed on his medial right knee.

The patient reported severe pain that was worse with ambulation, and up to 10 out of 10 on the pain scale. He had been prescribed ibuprofen 200 milligrams (mg) three times a day and tramadol 50 mg every six hours for pain control by an outside outpatient urgent care center. The urgent care center also prescribed hydrocodone-acetaminophen 10-325 mg to the patient to take as needed up to every six hours. According to the patient, he took the hydrocodone-acetaminophen when he had severe, break-through pain that was not managed by the scheduled ibuprofen and tramadol. The patient was unable to recall exactly how often he used the hydrocodone-acetaminophen. On physical exam, there was tenderness along

the medial femoral condyle and a moderate-sized, warm, fluctuant joint effusion with posteromedial swelling. There was limited range of motion with decreased range of flexion and extension of the knee (normally 0 through 135 degrees of extension through flexion, reduced to 10 through 60 degrees in this patient). The patient stated that due to the pain and limited range of motion, he had limited the use of his right leg. On physical exam, the patient had moderate quadriceps muscle atrophy determined by inspection. The patient was referred for radiographs (Figure 1a-c), which led to referral for magnetic resonance imaging (MRI).

A complete blood count (CBC) demonstrated a normal white blood cell (WBC) count of 10.4 K/uL (normal range is 3.8-10.8 K/uL). The erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) were elevated at 33 mm/h (normal range is < or = 15 mm/h) and 1.41 mg/dL (normal range is <0.80 mg/dL), respectively. Four months after the initial presentation, the joint was aspirated by orthopedic surgery. The synovial fluid cell count was 39 x 10<sup>9</sup>/L WBCs and 83 x 10<sup>9</sup>/L RBCs, with a differential of 13% neutrophils, 7% lymphocytes, and 52% monocytes/histiocytes. The gram stain was negative for organisms. Fungal culture was positive for *Sporothrix schenckii*.

### Imaging Findings

Radiographs of the knee demonstrated a large soft tissue mass or fluid collection along the posterior medial aspect of the right knee measuring up to 6.8 cm in superior to inferior dimension and 2.9 cm in medial to lateral dimension, which was thought to represent a hematoma, bursal collection or soft tissue mass (Figure 1b). There was erosion of the tibial spines of the right knee and of the patella, which was thought to be related to chronic infection or inflammatory arthropathy (Figure 1a). Additional evaluation with MRI was recommended.

An MRI of the patient's right knee was performed two months after the initial presentation to the orthopedic clinic. Fluid and fat sensitive sequences demonstrated a large suprapatellar effusion with associated synovial thickening (Figure 2a). A large parameniscal collection was seen communicating with the joint space (Figure 2a-c). The large parameniscal collection extends through a defect in the posterior medial oblique ligament, posterior to the medial collateral ligament. The lateral collateral supporting structures, anterior and posterior cruciate ligaments, and extensor mechanism were intact. Bone marrow edema was noted in the patella with associated erosion at the medial aspect of the patella. Osseous erosions were also noted at the medial femoral trochlea and central tibial eminence (Figure 2a-c). Given the synovial thickening and erosions, the differential considerations included rheumatoid arthritis or infection. However, given the patient's history, clinical presentation, and lab findings, the findings were determined to be consistent with chronic infection.

### Management

The patient was referred to infectious disease clinic, at which time itraconazole 200mg PO BID was initiated. This was titrated to a goal of greater than 1-2 mcg/ml and was to be continued for at least 1 year. In conjunction with the infectious disease department, the orthopedic surgery department made the decision to proceed with arthroscopy and surgical debridement of the joint. The surgery was performed five months after the initial presentation to the orthopedic clinic, and approximately fourteen months after the initial injury.

Two months after the surgery, the patient presented with a new complaint of tinnitus. As itraconazole has been demonstrated to be ototoxic, the patient was then switched to Posoconazole 300mg by mouth, twice a day. Following therapy, the patient's clinical symptoms improved, and his pain was controlled with non-steroidal anti-inflammatory drugs (NSAIDs). He worked with physical therapy to attempt to recover functional status. Follow-up radiographs one year after initial presentation to the orthopedic clinic, showed resolution of the previously noted soft tissue mass (Figure 3b). Compared to the prior exam, there were new, more distinct osseous erosions with corticated margins in the medial femoral condyle and patella, as well as joint space narrowing in the tibiofemoral compartments (Figure 3a and 3b). These findings were consistent with the history of prior infection.

## DISCUSSION

### Etiology & Demographics:

Sporotrichosis is a rare cause of infectious chronic synovitis presenting clinically as an inflammatory arthropathy caused by the organism *Sporothrix schenckii*(1-4). Osteoarticular disease in sporotrichal infection is uncommon, with a reported 3-4% of sporotrichal infection cases involving the joints(5). Cutaneous and subcutaneous infection are the most common site of sporotrichal infection(2). *Sporothrix schenckii* is a dimorphic fungus, which can be found on living or decaying plant material (classically roses), soil, or animal excrement(1,2,4,6). Additionally, cases of zoonotic exposure have been reported involving cats, rodents, horses, dogs and birds(2,4). While cases have been reported on five continents, cases in the tropical and temperate climates are most common(2,6). Sporotrichal infection is caused by direct traumatic inoculation and typically causes local soft tissue infection, but can progress to pulmonary, neurologic and(or) musculoskeletal involvement(1-3). Osteoarthritic involvement is rare but it is the most common extracutaneous manifestation and occurs via hematogenous dissemination or direct spread from the primary cutaneous lesion(1-6).

Sporotrichal osteoarticular involvement affects both men and women with reported gender predilections varying by country(2). While both adults and children can be affected, the majority of reports suggest that patients are aged greater than 40 to 50 years(2). Patients who are immunosuppressed, secondary to acquired immune deficiency syndrome (AIDS), alcoholism or other etiology, are more likely to experience osteoarticular involvement(1,2,4,6). Risk factors for exposure include occupational and recreational exposures to agricultural or zoonotic sources of infection, such as those working in floriculture, mining, and veterinary sciences. Sporotrichal infection is colloquially known as "rose gardener's disease"(2,4).

### Clinical & Imaging Findings:

Patients with sporotrichal or other fungal arthropathy, present clinically with significant progressive pain, swelling, and decreased range of motion of the affected joint(3). Patients typically present with a monoarthropathy, though it can involve multiple joints(2,6). The knee is the most common joint affected and is seen in 50-64% of cases(3,6). Other joints affected include the hand and wrist (50%), elbow (24%) and ankle (20%)(6). Systemic constitutional symptoms like fever are rare (5% of patients)(6). In chronic cases, a draining sinus tract to the skin may be identified(6). Laboratory findings often include increased ESR (87.5% of cases), however elevated WBC count is rare (7% of cases)(6). Confirmatory diagnosis is dependent on fungal culture of synovial fluid or synovial tissue(2,3).

Diagnosis is classically dependent on epidemiologic and laboratory data, but can be supported by imaging findings(2). Described radiographic imaging findings are nonspecific, but include juxta-articular bone destruction, osteopenia, and loss of joint space(3). On gross pathology, marked synovial hypertrophy has been seen(3). Synovial hypertrophy is also a feature that has been described on MRI(5).

Treatment & Prognosis:

There have been no clinical trials that evaluate therapy for sporotrichal osteoarthropathy and as such, management guidelines are based on case reports and meta-analyses(1). The therapy with the most literature support is long term oral itraconazole, with a recommended dose of 200mg PO BID, which has a 60-80% success rate(1,2). Amphotericin B may also be considered if itraconazole is not effective or if the patient has disseminated disease(1). Though posaconazole is a broad spectrum antifungal, it has not been well evaluated(2).

Routine surgical debridement in these cases has not been supported in the literature. However, in cases of advanced disease, surgical debridement, synovectomy and even arthrodesis can be considered in adjunct to antifungal therapy(3).

Because patients typically present with non-systemic symptoms and due to the rarity of the disease, delay in diagnosis is common(1,2,5). Because of this patients can have extensive joint destruction at the time of diagnosis, which can lead to severe, even permanent disability(1-3,5). Early diagnosis is essential to preventing progression of joint destruction and restoration of joint function(5).

Differential Diagnosis:

Differential diagnosis for sporotrichal infection includes other disorders of synovial proliferation, including other atypical infections, rheumatoid arthritis, pigmented villonodular synovitis, hemophilia, synovial chondromatosis, and tuberculosis(3). Cortical erosions associated with the synovial proliferation can also been seen in pigmented villonodular synovitis, hemophilia, and rheumatoid arthritis. Susceptibility artifact on gradient echo sequences, consistent with hemosiderin deposition, may be useful in differentiating pigmented villonodular synovitis and hemophilia from infection. Polyarticular disease may help differentiate rheumatoid arthritis from infection.

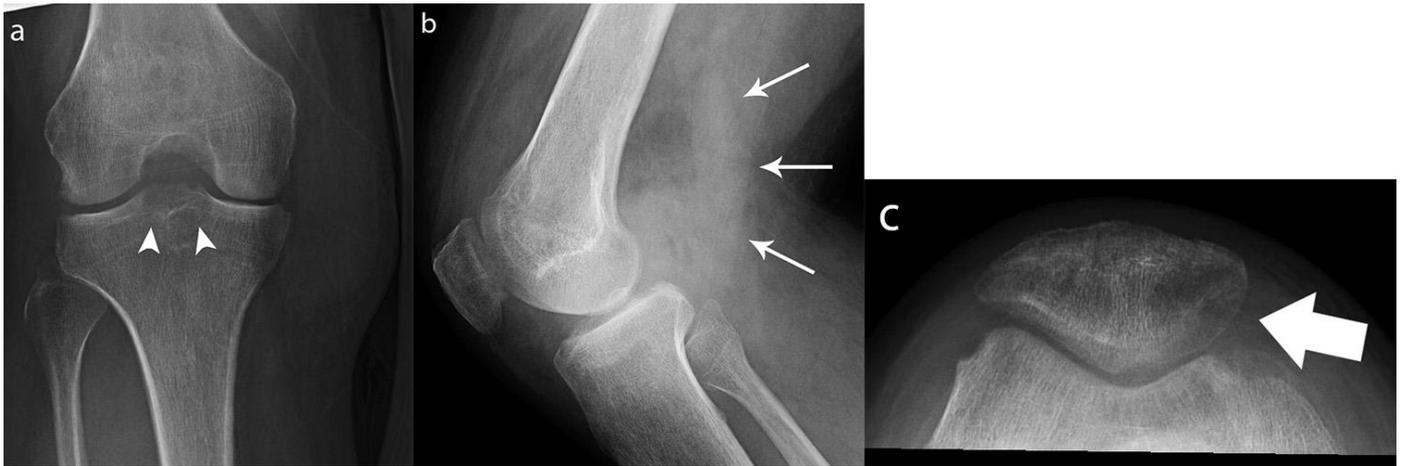
TEACHING POINT

Fungal arthropathies, such as sporotrichosis, should be considered early in the differential in patients presenting with chronic monoarthropathies, particularly in the absence of systemic symptoms, as a delay in diagnosis can lead to permanent functional disability. When taken into consideration with clinical history and laboratory findings, imaging findings of juxta-articular erosions and chronic synovitis can help support this diagnosis.

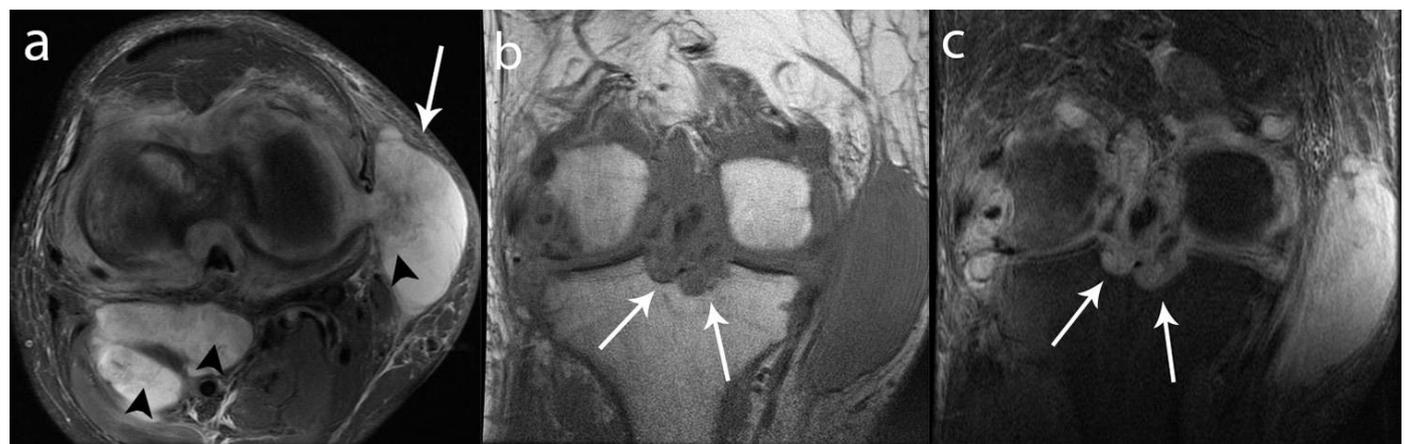
REFERENCES

1. Kauffman CA, Hajjeh R, Chapman SW. Practice guidelines for the management of patients with sporotrichosis. *Clinical Infectious Diseases*. 2000;30(4):684-687. PMID: 10770730
2. Barros MB d. L, de Almeida Paes R, Schubach AO. *Sporothrix schenckii* and Sporotrichosis. *Clinical Microbiology Reviews*. 2011 Oct 1;24(4):633-54. PMID: 21976602
3. Koëter S, Jackson RW. Successful total knee arthroplasty in the presence of sporotrichal arthritis. *The Knee*. 2006 Jun;13(3):236-7. PMID: 16542846
4. de Carvalho Aguinaga F, Trope BM, Fernandes NC, Engel DC, Ramos-e-Silva M. Sporotrichosis with Bone Involvement: An Alert to an Occupational Disease. *Case Rep Dermatol*. 2014 Apr 18;6(1):114-8. PMID: 24847249
5. Barbaryan A, El Atrouni E, Bailuc S, Jones MW, Bhakta M, Mahmoud K, Mirrakhimov AE. Isolated *Sporothrix schenckii* Monoarthritis. *Case Rep Infect Dis*. 2018 Jun 12;2018: 9037657. PMID: 30009064
6. Appenzeller S, Amaral TN, Amstalden EMI, Bertolo MB, Neto JFM, Samara AM, Fernandes SR. *Sporothrix schenckii* infection presented as monoarthritis: report of two cases and review of the literature. *Clinical Rheumatology*. 2006 Sep 25;25(6):926-8. PMID: 16333559

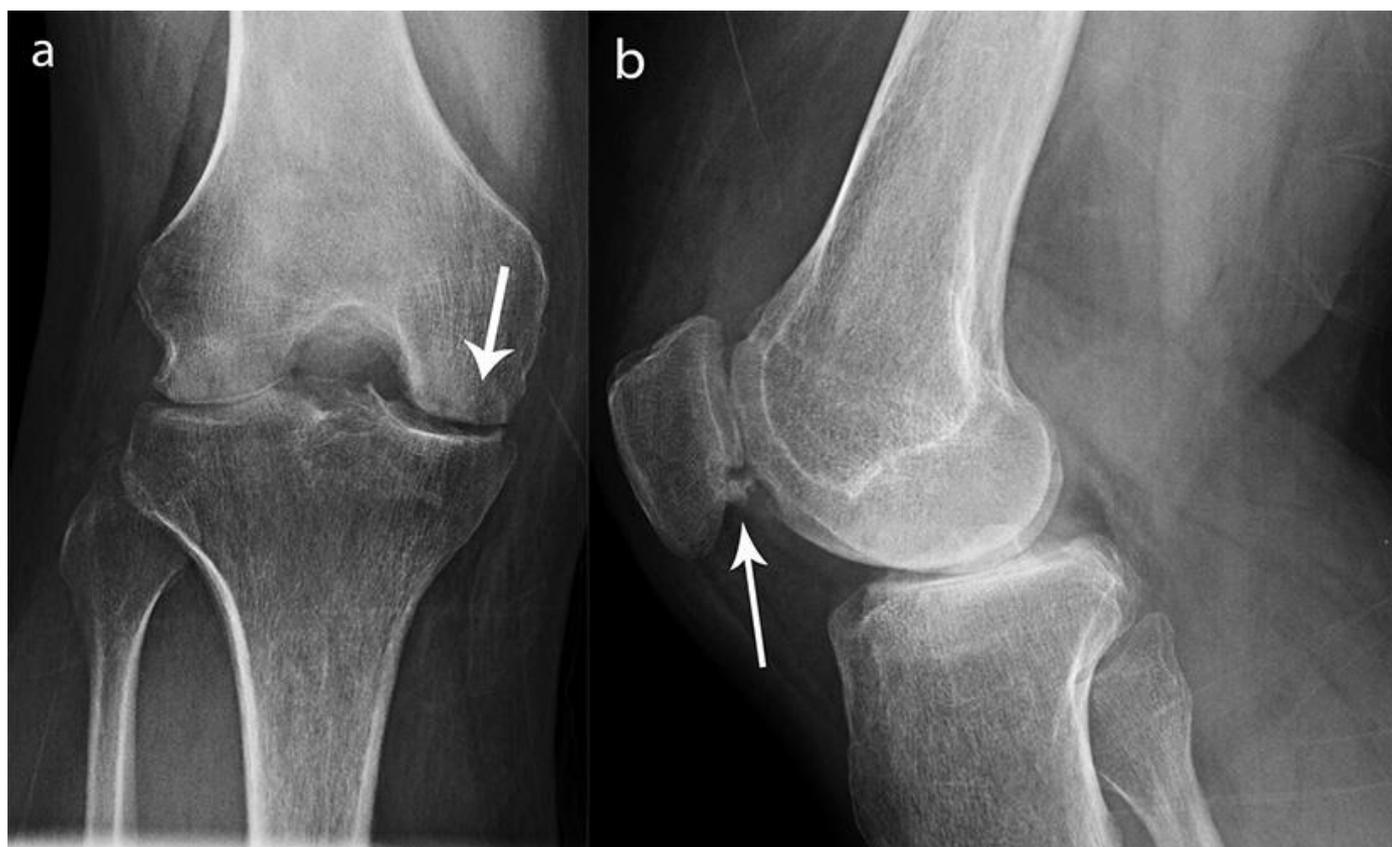
FIGURES



**Figure 1:** 41-year-old male with right knee pain due to sporotrichosis osteoarticular infection.  
**FINDINGS:** Posteroanterior (a), lateral (b) and tangential patella (c) radiographs of the knee demonstrate soft tissue density mass at the posterior medial aspect of the knee (arrows), which was thought to represent hematoma, bursal collection, or soft tissue mass. There is also erosion of the tibial spines on the posteroanterior radiograph (arrowhead) and erosion at the medial aspect of the patella (thick arrow), which was thought to be related to the infectious or inflammatory in etiology.



**Figure 2:** 41-year-old male with right knee pain and soft tissue mass due to sporotrichosis osteoarticular infection.  
**FINDINGS:** 3 Tesla MRI without contrast demonstrates large fluid collection. Axial T2 FS sequence (a) demonstrates fluid collection that communicates with a parameniscal cyst (long white arrow) and contains synovial thickening (black arrowheads). Coronal T1 (b) and coronal T2 FS (c) sequences demonstrate the large fluid collection with erosions of the tibia and femur (short white arrows). Axial T2 FS, Coronal T1, and Coronal T2 FS sequences also demonstrate complex tear of the menisci with large meniscal defect through which the parameniscal cyst communicates with the joint. MRI Technique: 3T Axial T2 with fat saturation (TR: 5742, TE: 51.52); 3T Coronal T2 with fat saturation (TR: 4796, TE: 39.1); 3T Coronal T1 (TR: 617, TE 10.66); no intravenous contrast.



**Figure 3:** 41-year-old male with right knee pain and soft tissue mass due to sporotrichosis osteoarticular infection. **FINDINGS:** Anteroposterior (a) and lateral (b) radiographs of the knee obtained thirteen months after the initial presentation, demonstrate moderate narrowing of the medial and lateral femorotibial compartments, progressed from the prior exam. Previously noted posterior soft tissue mass and swelling have resolved. Distinct erosions with sclerotic margins are noted at the patella and medial femoral condyle (arrows), consistent with the prior infection.

<b>Etiology</b>	Infection with the fungal organism <i>Sporothrix schenckii</i> via direct inoculation, involving infected plant material or zoonotic transmission. Osteoarticular involvement occurs via direct or hematogenous spread from the site of primary inoculation.
<b>Incidence</b>	Osteoarticular disease in sporotrichal infection is uncommon, with a reported 3-4% of sporotrichal infection cases involving the joints
<b>Gender Ratio</b>	Men and women are both affected, with gender predilections varying by country report.
<b>Age Predilection</b>	Children and adults are both affected, however most papers report most patients are age >40-50 years old.
<b>Risk Factors</b>	Occupational and recreational exposures to plant or animal material are risk factors for infection. Immunosuppression, commonly related to alcoholism and AIDS, are risk factors for osteoarticular involvement.
<b>Treatment</b>	First line therapy is Itraconazole 200mg PO BID, which has a 60-80% success rate. Amphotericin B may also be considered if itraconazole is not effective or if the patient has disseminated disease.
<b>Prognosis</b>	Due to delayed diagnosis, there is often extensive joint destruction and therefore the functional prognosis is poor.
<b>Findings on Imaging</b>	Radiograph: may demonstrate effusion and osseous erosions MRI: demonstrates effusion and synovial thickening, may demonstrate osseous erosions

**Table 1:** Summary table of sporotrichal osteoarticular infection.

	<b>Radiography</b>	<b>Computed Tomography (CT)</b>	<b>MRI</b>	<b>Ultrasound (US)</b>
<b>Sporotrichal Osteoarticular Infection</b>	<ul style="list-style-type: none"> <li>Joint effusion</li> <li>Osseous erosions</li> <li>Juxta-articular osseous erosions</li> <li>Osteopenia</li> <li>May see loss of joint space</li> </ul>	<ul style="list-style-type: none"> <li>Similar findings to radiographs, with better visualization of joint effusion and osseous erosions</li> </ul>	<ul style="list-style-type: none"> <li>Joint effusion</li> <li>Synovial thickening – marked synovial hypertrophy may be the seen</li> <li>Osseous erosions may be present</li> </ul>	<ul style="list-style-type: none"> <li>Joint effusion</li> <li>Hyperechoic synovial proliferation</li> </ul>
<b>Pigmented Villonodular Synovitis</b>	<ul style="list-style-type: none"> <li>Joint effusion (may be high density due to blood products)</li> <li>Cortical erosions are less common (25%)</li> </ul>	<ul style="list-style-type: none"> <li>Similar findings to radiographs, with better visualization of joint effusion (may be high density due to blood products)</li> <li>Cortical erosions</li> </ul>	<ul style="list-style-type: none"> <li>Gradient echo (GRE) weighted sequences will demonstrate magnetic susceptibility artifact, consistent with hemosiderin</li> <li>T1/T2 hypointense synovial based mass</li> <li>Synovial enhancement on T1 postcontrast images (variable)</li> </ul>	<ul style="list-style-type: none"> <li>Non-specific findings, which may include:</li> <li>Hypoechoic intraarticular or extraarticular synovial based mass</li> </ul>
<b>Synovial Chondromatosis</b>	<ul style="list-style-type: none"> <li>Multiple intra-articular calcifications</li> <li>Chondroid type mineralization (ring-and-arc pattern)</li> </ul>	<ul style="list-style-type: none"> <li>Similar findings to radiography, with better evaluation of mineralization pattern</li> <li>Optimal imaging modality to completely characterize pattern of mineralization</li> </ul>	<ul style="list-style-type: none"> <li>Chondral bodies appear lobulated, uniform on all sequences</li> <li>T1 intermediate signal intensity</li> <li>T2 high signal intensity</li> <li>Areas of calcification will be hypointense on all sequences</li> </ul>	<ul style="list-style-type: none"> <li>Nonspecific findings, which may include:</li> <li>Hyperechoic, heterogeneous mass</li> <li>Posterior acoustic shadowing if mineralization is present throughout the mass</li> </ul>
<b>Hemophilia</b>	<ul style="list-style-type: none"> <li>Joint effusion is the most common finding</li> <li>Juxta-articular osteopenia</li> <li>Epiphyseal enlargement</li> <li>Widened intercondylar notch at the knee</li> <li>Symmetric joint space narrowing</li> </ul>	<ul style="list-style-type: none"> <li>Joint effusion is most common finding (may be high density due to blood products)</li> </ul>	<ul style="list-style-type: none"> <li>GRE weighted sequences will demonstrate magnetic susceptibility artifact, consistent with hemosiderin</li> <li>Joint effusion</li> <li>Synovial thickening</li> <li>Low signal intensity within the effusion from blood products</li> </ul>	<ul style="list-style-type: none"> <li>Joint effusion</li> <li>Hyperechoic synovial proliferation</li> <li>Hypoechoic areas of hemosiderin within the joint</li> </ul>
<b>Rheumatoid Arthritis</b>	<ul style="list-style-type: none"> <li>Joint effusion</li> <li>Symmetric joint space narrowing</li> <li>Juxta-articular osteopenia</li> <li>Cortical erosions</li> </ul>	<ul style="list-style-type: none"> <li>Similar findings to radiography, with better evaluation of cortical erosions</li> </ul>	<ul style="list-style-type: none"> <li>Chondral thinning</li> <li>Juxta-articular T2 hyperintense pre-erosions/subchondral cysts</li> <li>T1/T2 hypointense Rice bodies</li> <li>T1 postcontrast images demonstrate thickened and hyperemic, enhancing synovium</li> </ul>	<ul style="list-style-type: none"> <li>Irregularity of, focal defects in, or heterogeneity of the usual smooth hypoechoic cartilage</li> <li>Nodular proliferation of synovium with hypervascularity on Power Doppler</li> </ul>

**Table 2:** Differential diagnoses table for sporotrichal osteoarticular infection.

#### ABBREVIATIONS

AIDS = acquired immunodeficiency syndrome  
BID = bis in die; twice a day  
CRP = C-reactive protein  
CT = computed tomography  
ESR = erythrocyte sedimentation rate  
GRE = gradient echo  
MRI = magnetic resonance imaging  
NSAIDs = non-steroidal anti-inflammatory drugs  
PO = per os  
RBC = red blood cell  
US = ultrasound  
WBC = white blood cell

#### KEYWORDS

Sporothrix schenckii; sporotrichosis; fungal; fungal arthropathy; fungal arthritis; chronic monoarthritis; chronic osteomyelitis; synovitis; chronic synovitis; knee; lower extremity; radiographs; MRI

#### Online access

This publication is online available at:  
[www.radiologycases.com/index.php/radiologycases/article/view/3520](http://www.radiologycases.com/index.php/radiologycases/article/view/3520)

#### Peer discussion

Discuss this manuscript in our protected discussion forum at:  
[www.radiopolis.com/forums/JRCR](http://www.radiopolis.com/forums/JRCR)

#### Interactivity

This publication is available as an interactive article with scroll, window/level, magnify and more features.  
Available online at [www.RadiologyCases.com](http://www.RadiologyCases.com)

Published by EduRad



[www.EduRad.org](http://www.EduRad.org)