**CLINICAL VIGNETTE**

# Recurrent Osteoarticular Sporothrix Schenckii

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## *Introduction*

Sporothrix Schenckii is a dimorphic fungus that causes a rare infection called Sporotrichosis, colloquially known as Rose-Gardener's Disease. Transmitted through plants and zoonotic infections, it is typically introduced underneath the skin from physical trauma (ie. cuts on the thorns of rose bushes, tree bark, and other plants).[1,2] Sporotrichosis most commonly presents in its cutaneous form, limited to the skin, subcutaneous cellular tissue, and adjacent lymphatic vessels.[3] It can also present as pulmonary infection secondary to fungal spore inhalation, and rarely, if spread to the joints and/or bones, can develop into osteoarticular sporotrichosis, a type of disseminated sporotrichosis.[3] The clinical course can be influenced by the patient's immune status and the specific strain of Sporothrix.

Osteoarticular sporotrichosis can be challenging to diagnose due to its clinical mimicry of arthritis and osteomyelitis.[1] To avoid delays in diagnosis, physicians should have a high index of suspicion for fungal infections in cases of recurrent knee effusions and joint pain. We present a middle age male with recurrent left knee pain, effusion and osteoarthritis symptoms found to have *S. schenckii.* We review the relevant literature including guidelines for diagnosis and treatment.

## *Case Report*

History of Present Illness

A 47-year-old male with a past medical history of type 2 diabetes, hypertension, and hyperlipidemia presented with swelling and pain in his left knee. The patient had a 3-year history of recurrent knee pain and swelling, which was initially thought to be osteoarthritis. He had a negative evaluation for rheumatoid arthritis and prior management included three cortisone injections, as well as multiple fluid aspirations with temporary relief.

MRI of the left knee identified anterior and posterior soft tissue masses and bony erosions. Cultures grew moderate fungus, identified as Sporothrix Schenckii.

After testing positive for *S. schenckii*, the patient was referred to the infectious disease department and began a one-year course of 200 mg of Itraconazole, twice daily. Within 4 months the patient reported decreased knee pain and swelling. About 9 months into the course of the medication, the patient reported continued improvement, but persistent effusion and mild warmth, as well as an inability to kneel at work, despite normal inflammatory markers.

About one month after completing Itraconazole, the patient presented with recurrent worsening knee pain. Repeat MRI of the left knee was positive for fluid accumulation. Aspiration of the left knee grew *S. schenckii*, and the patient was restarted on 200 mg of Itraconazole, twice daily. He underwent incision & drainage, as well as synovectomy. There were pockets of white granular debris in the proximal synovium above the patella where effusion was the greatest. Following the synovectomy his Itraconazole dose was sub-therapeutic, and it was increased to 300 mg of Itraconazole, twice daily.

After one month on the higher dose of Itraconazole, the patient presented with worsening left knee pain, high fevers of 102, and purulence from the drain site. He was hospitalized for left knee septic arthritis. Labs included White blood cell count of 469,000 with 97% neutrophils, C-reactive protein was 29.4 and ESR was 39. Another MRI of the left knee without contrast, revealed extensive synovitis, most prominent in the supra-patellar recess, with a moderate joint effusion and erosions of the knee joint. The knee was washed out and a Tobramycin-impregnated cement spacer was placed.

He was started on piperacillin/tazobactam with vancomycin and his Itraconazole dose was increased again, to 400 mg, twice daily. Aspiration of the knee joint was sent for DNA analysis and detected both *E. coli* and *S. schenckii*. Susceptibility testing determined the isolate was resistant to Itraconazole (> 16 mcg/ml), but sensitive to Posaconazole (1 mcg/ml). The patient started Posaconazole 300 mg daily which was continued for 13 months. The patient recovered although he continues to have mild pain in the anterior aspect of his knee, especially when climbing ladders and stairs. His complete recovery from sporotrichosis took approximately 2.5 years after initial culture grew *S. schenckii*.

## *Discussion*

Sporothrix Schenckii was discovered in 1896, when Benjamin Schenck isolated a culture from an abscess on the right hand and arm of a 36-year old male patient.[3] The mycologist Erwin Smith then studied the isolate and determined it to be Sporothrix Schenckii.[3] The gold standard for diagnosis of *S. schenckii* is positive culture of the tissue, pus, joint fluid, or

secretions in the infected area. As a dimorphic fungus, it will grow mold with branching hyphae and spores when incubated at room temperature (around 20 degrees Celsius), and will grow yeast in the human body (at 37 degrees Celsius).[4] Conversion to the yeast form is required for definitive diagnosis, where cigar-shaped budding yeasts may be visible on microscopy.[4]

To avoid progression to severe sporotrichosis, physicians should have a high degree of suspicion in patient with recurrent knee effusions. Osteoarticular sporotrichosis has a mean interval of disease onset to diagnosis of about 17 months.[5] The frequent delay in diagnosis can be attributed to the rarity of the infection, its indolent nature, and patients not seeking early medical attention.[5] It also mimics other forms of arthritis and osteomyelitis, making it difficult to suspect and efficiently diagnose. A unique feature of osteoarticular sporotrichosis however, is that it remains confined to the joints it initially infects.[5] Additionally, unlike rheumatoid arthritis, it does not cause joint subluxations.[5] Surgical procedures, such as a synovectomy, can assist in the diagnosis of the infection.[4] Treatment should be started immediately following diagnosis.

Affordable and effective treatment for *S. schenckii* was needed at the beginning of the 20th century, after Sporotrichosis became a common infection in France. Sabouraud suggested treating the fungus with Potassium Iodide and this quickly became a mainstay of treatment that is still used, particularly in developing countries.[6] However, depending on the type of infection, the strain, and severity of the infection, there are several other treatment options. Current first-line treatment is itraconazole, which has less adverse effects than Potassium iodide and is well tolerated.[7] The Infectious Diseases Society of America published guidelines in 2007 outlining the medical treatment for various forms of sporotrichosis. Despite clear guidelines, it can be challenging to treat *S. schenckii* because of resistance to various antifungals.[7] For this reason, it is imperative that sensitivity testing be done in all cases of recurrent sporotrichosis.

For cutaneous and lymphocutaneous sporotrichosis, the recommended treatment is with itraconazole 200 mg orally daily for 2-4 weeks after all lesions have resolved, and for a minimum of 3 months.[4] If patients do not respond to treatment, the guidelines recommend prescribing a higher dose of itraconazole or switching to a dosage of 500 mg of Terbinafine orally.[4] An alternative to Itraconazole and Terbinafine, for patients that cannot tolerate them, is Fluconazole, although it has been found to be less effective.[6]

Extracutaneous forms of sporotrichosis have more aggressive treatment guidelines. For both disseminated and/or pulmonary sporotrichosis, the recommendation is Amphotericin B, given as a lipid formulation at a dosage of 3–5 mg/kg daily, until the patient shows objective improvement, at which time, can switch to 200 mg twice daily, for a total of at least 12 months of treatment.[4] For osteoarticular sporotrichosis, Amphotericin B can be used in the initial management, but the mainstay of treatment remains Itraconazole, at a regimen of 200 mg twice daily for a minimum total of 12 months of treatment.[4] Posaconazole is a newer antifungal that can be active against *S. schenckii*, however, limited studies have proven its efficacy as an alternative to Itraconazole and Amphotericin B in patients with osteoarticular sporotrichosis.[8]

In addition to medical therapy, osteoarticular sporotrichosis may require surgical management. Drainage, effusion, and washout can necessary to prevent joint loss and deformity. A comprehensive literature review identified immunosuppression and alcohol use as possible risk factors for development of osteoarticular sporotrichosis.[1] The review reported it was more common in males and individuals working with soil or plants, such as farmers or horticultural workers.[9] Education efforts for individuals at high risk of recurrent sporotrichosis can help reduce rates of refractory cases by targeting lifestyle factors and risky behaviors. With effective treatment, management, and education, most patients will recover completely after 1 course of empiric treatment.

### *Conclusion*

We report a case of recurrent osteoarticular sporotrichosis in a patient that was previously believed to have osteoarthritis. Despite intensive treatment and consistent follow up, the infection recurred several times over three years before ultimately resolving. This highlights the importance of sensitivity testing in recurrent knee effusions and having a high degree of suspicion for Sporothrix Schenckii. Treatment should be guided by the details of each individual case including factors like the strain, sensitivity, patient's presentation and risk factors.

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