

## A case of *aspergillus flavus* septic arthritis in the knee joint in a non-immunosuppressed patient

Cihan Yazar<sup>1\*</sup> , Emin Özkul<sup>1</sup> , Kübra Yazar<sup>2</sup> 

<sup>1</sup> Dicle University, Faculty of Medicine, Department of Orthopedics and Traumatology, Diyarbakir, TÜRKİYE

<sup>2</sup> Gazi Yaşargil Training and Research Hospital, Department of Internal Medicine, Diyarbakir, TÜRKİYE

### ABSTRACT

Hyphal aspergillus fungi, which are widespread in nature, usually cause lung infections in immunosuppressed patients. Musculoskeletal involvement of these fungi is not well defined. Joint infection due to aspergillus species is called invasive aspergillosis. This systemic infection is associated with high mortality and morbidity. In this article, we report a case of septic arthritis due to aspergillus in the knee joint in a young non-immunosuppressed patient, which is very rare in the literature.

**Keywords:** *aspergillus flavus*, septic arthritis, knee joint

### Correspondence:

Cihan Yazar, MD

**Address:** Department of Orthopedics and Traumatology, Faculty of Medicine, Dicle University, Diyarbakir, 21280, TÜRKİYE

**Email:** [drcihan.yazar@gmail.com](mailto:drcihan.yazar@gmail.com)

### INTRODUCTION

Septic arthritis is an orthopedic emergency that can lead to joint destruction and can be fatal even in the hands of experienced surgeons, causing high mortality and morbidity. The knee joint is most commonly involved in septic arthritis [1]. In cases where the pathogen is an aspergillus species, the hip joint is most commonly involved. This is followed by the knee, wrist and ankle [2]. Fungal joint infection is a rare form of septic arthritis and can be difficult for clinicians to diagnose and treat [3, 4]. Symptoms such as fever, pain, swelling, joint tenderness should be taken into consideration and the etiology of septic arthritis should be determined urgently. Early diagnosis plays an important role in reducing mortality and morbidity [2, 4]. Late diagnosis of cases can cause death.

We report a rare case of septic arthritis of the knee joint caused by the fungus aspergillus in a young, non-immunosuppressed patient with no chronic disease. This case describes a very rare clinical condition and shows the importance of early surgical intervention.

### CASE REPORT

A male patient living in a rural area with no known disease and no history of drug use

received medical treatment for knee pain that started about 6 months ago without any direct trauma. The patient was admitted to our clinic after the pain intensified and swelling and erythema were added to the symptoms. Physical examination revealed swelling, limitation of movement, erythema and increased temperature in the knee joint.

C-reactive protein on admission: 296 mg/l, leukocyte count:  $9.64 \times 10^3/\text{ul}$ , neutrophil count:  $7.27 \times 10^3/\text{ul}$ , sedimentation: 41 mm/hour. Knee radiography, ultrasonography, computed tomography and magnetic resonance imaging (MRI) were performed, respectively. Plain radiographs and computed tomography showed bone destruction in the distal femur (**Figure 1**).

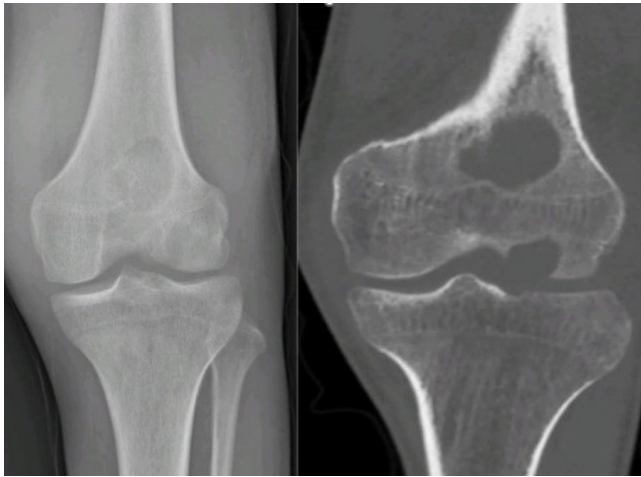
MRI scan revealed knee joint effusion, osteolysis in the distal bone of the femur and findings compatible with osteomyelitis (**Figure 2**).

Septic arthritis on the basis of osteomyelitis was suspected based on physical examination findings, imaging and laboratory results. Joint aspiration was performed; arthroscopic joint debridement was performed when leucocyte count was  $12.1 \times 10^3/\mu\text{L}$  and neutrophil count was  $11.4 \times 10^3/\mu\text{L}$ . Intraoperative joint fluid sample and biopsy were taken under scope.

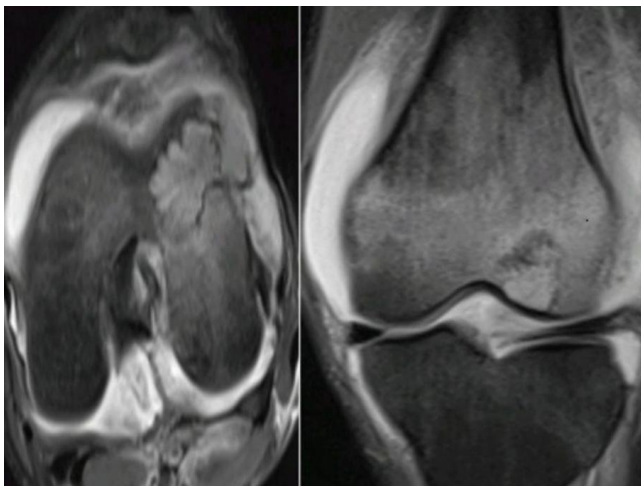
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**Figure 1.** Preoperative knee radiograph and computed tomography image showing osteolysis in the distal femur (Reprinted with permission of patient)



**Figure 1.** Magnetic resonance imaging shows effusion in the knee joint, bone marrow oedema in the distal femur, and osteolytic lesion in the distal femur (Reprinted with permission of patient)

Samples were sent to microbiology and pathology. According to the biopsy results, the presence of acute inflammation compatible with infection was confirmed.

Direct microscopic examination of the joint fluid was performed.

*Aspergillus flavus* was observed in the preparation prepared with lactophenol cotton blue from the growing colony (**Figure 3**).

Ceftriaxone 2×1 g and teicoplanin 2×800 mg loading +1×800 mg maintenance intravenous treatment was started with the recommendation of the infectious diseases and clinical microbiology specialist. No significant improvement was observed in clinical and infective parameters despite anti-biotherapy and debridement. On the 7<sup>th</sup> postoperative day, voriconazole 2×6 mg/kg loading +2×4 mg/kg maintenance intravenous treatment was started upon growth of *aspergillus flavus* in the culture and confirmation of the diagnosis. After antifungal treatment, clinical



**Figure 3.** Lactophenol cotton blue stain showing *aspergillus flavus* (Reprinted with permission of patient)

**Table 1.** Pre-treatment, follow-up, and post-treatment infection parameters of the patient

Parameters	Arrival	4 <sup>th</sup> day	10 <sup>th</sup> day	20 <sup>th</sup> day	45 <sup>th</sup> day
Leukocyte count (10 <sup>3</sup> /ul )	9.64	10.5	4.6	3.8	6.01
Sedimentation (mm/hour)	41	87	61	58	14
C-reactive protein (mg/l)	296	246	155	34	7.7

improvement and significant decrease in infective parameters were observed (**Table 1**).

On the 16<sup>th</sup> day of treatment, the leukocyte count falls below 2×10<sup>3</sup>/ul; hematology and internal medicine opinions were taken. Peripheral smear evaluation was performed. No atypical cells were observed in the peripheral smear. Hematological malignancy was not considered by the relevant specialists. It was stated that the low leukocyte count was secondary to acute viral infection. After 3 days, leukocyte count increased to 3.7×10<sup>3</sup>/ul and rose to normal limits.

The patient was screened for tuberculosis; chest radiography and chest tomography were performed. Chest diseases specialist opinion was obtained. Bronchoscopy bronchoalveolar lavage was recommended but the patient refused this procedure. Sputum cultures were obtained; there was no growth in the cultures. QuantiFERON test was performed; the test was negative, thus tuberculosis was not considered. Pain, erythema and swelling decreased with surgery, antibiotic and antifungal treatment. The patient was enrolled in a rehabilitation program. Joint movement limitations disappeared with the rehabilitation program. After the patient was mobilized comfortably, he was discharged on the 20<sup>th</sup> day of treatment with outpatient parenteral therapy with the recommendation of the infectious diseases and clinical microbiology specialist.

## DISCUSSION AND CONCLUSION

Although fungal infections are rare, especially *aspergillus* and *candida* are more common in immunocompromised patients [5]. The most common *aspergillus* species is *aspergillus fumigatus* [6]. The annual incidence of this uncommon fungal infection is 12/1.000.000 [7]. With the increase in the number of immunocompromised patients, the importance of fungal infections has recently increased [2].

In a review of 29 patients diagnosed with septic arthritis due to *aspergillus* in 2021, the predominant symptom was pain (62%), followed by local signs of inflammation (48.3%) and fever (41.4%). The most common *aspergillus* species isolated was *aspergillus fumigatus* (63.3%), followed by *aspergillus flavus* (16.6%) and *aspergillus terreus* (10% each). Most patients (75.9%) underwent debridement. The overall mortality rate was 24.1% but decreased to 11.8% after 2003 when voriconazole was introduced [8].

Treatment of septic arthritis due to this fungus involves debridement of the joint with administration of antifungal agents such as amphotericin B and voriconazole. There is no consensus on the use of amphotericin B or voriconazole for the treatment of joint aspergillosis [9]. We preferred voriconazole in our patient.

In conclusion, septic arthritis caused by *aspergillus* species is a very rare orthopedic emergency. It can be life-threatening if diagnosed late or not treated quickly, especially in patients with compromised immune systems. Although surgical debridement is required in the treatment of patients, antifungals are used in the treatment afterwards. Fungal pathogens should be suspected in cases of septic arthritis where bacterial and/or cocci cultures are negative, especially in immunocompromised patients. Even in individuals who are young, whose immune system is not suppressed, and who do not have any comorbidities, as in our case; If the culture is negative for bacteria and/or cocci, caution should be exercised in terms of fungal pathogens. Since such infections are very rare, the severity of symptoms, diagnosis, treatment and consequences should be kept in mind.

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