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Septic Arthritis of the Knee in an Immunocompetent Adult: A Delayed Presentation with Favorable Outcome Following Early Surgical Intervention

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Case Report

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ABSTRACT

Septic arthritis is a rapidly progressive joint infection that constitutes a medical emergency due to its potential to cause irreversible joint destruction and systemic complications. Prompt diagnosis and management are essential to preserve joint function and prevent mortality. We report a case of a 54-year-old immunocompetent male presenting with acute monoarticular knee pain, swelling, and fever following a minor skin abrasion. Initial symptoms were misinterpreted as gout, leading to delayed antibiotic therapy. Synovial fluid analysis confirmed Staphylococcus aureus infection. The patient was managed with urgent arthroscopic irrigation and intravenous antibiotics, resulting in significant clinical improvement. This case highlights the importance of early recognition, appropriate diagnostic evaluation, and aggressive management of septic arthritis even in immunocompetent individuals.

Keywords

Septic arthritis, Staphylococcus aureus, joint infection, synovial fluid analysis, arthroscopic lavage, infectious arthritis, orthopedic emergency

INTRODUCTION

Septic arthritis is an infectious disease characterized by invasion of a joint space by microorganisms, most commonly bacteria. It leads to rapid destruction of articular cartilage due to inflammatory mediators and enzymatic degradation. The incidence is estimated at 4–10 cases per 100,000 person-years, with higher rates in older adults and individuals with comorbidities such as diabetes, rheumatoid arthritis, or immunosuppression.

The knee is the most commonly affected joint, followed by the hip, shoulder, and ankle. Staphylococcus aureus remains the predominant causative organism worldwide. Delayed diagnosis significantly increases morbidity, including irreversible joint dysfunction and systemic sepsis.

Case Presentation

A 54-year-old Caucasian male presented to the emergency department with a 3-day history of progressively worsening pain and swelling in the right knee. The patient reported fever (up to 38.9°C), chills, and inability to bear weight on the affected limb. He recalled a minor abrasion on the same knee one week prior while gardening.

Medical History

- No history of diabetes mellitus
- No rheumatoid arthritis or chronic joint disease
- No recent hospitalizations
- No immunosuppressive therapy
- Occasional alcohol consumption, non-smoker

Physical Examination

- Temperature: 38.7 °C
- Heart rate: 104 bpm
- Blood pressure: 128/82 mmHg
- Right knee: markedly swollen, erythematous, warm, and tender
- Restricted range of motion due to pain
- No other joint involvement

Initial clinical suspicion included gout or traumatic effusion; however, the presence of fever and elevated inflammatory markers raised concern for septic arthritis.

Laboratory Investigations

- White blood cell count: 15,800/mm³ (neutrophil predominant)
- C-reactive protein (CRP): 186 mg/L
- Erythrocyte sedimentation rate (ESR): 72 mm/hr
- Blood cultures: pending at admission
- Synovial Fluid Analysis
- Appearance: turbid, yellowish
- WBC count: 92,000 cells/mm³ (90% neutrophils)
- Gram stain: Gram-positive cocci in clusters

Culture: Staphylococcus aureus (methicillin-sensitive)

Imaging Studies

Plain radiography of the knee showed soft tissue swelling without bony erosion. Ultrasound confirmed a large joint effusion. MRI was not required initially due to definitive synovial findings.

Diagnosis

Based on clinical presentation and laboratory findings, a diagnosis of acute septic arthritis of the right knee caused by methicillin-sensitive Staphylococcus aureus (MSSA) was established.

Treatment and Management

The patient was immediately started on empiric intravenous antibiotics:

Ceftriaxone 2 g daily

Vancomycin was initially added until culture results confirmed MSSA

Surgical Intervention

Urgent arthroscopic irrigation and debridement of the knee joint were performed within 12 hours of diagnosis. Approximately 1.2 liters of purulent fluid was evacuated, and extensive synovial lavage was completed.

Postoperative Care

- Intravenous antibiotics for 14 days
- Transition to oral dicloxacillin for 4 additional weeks
- Physiotherapy initiated on day 3 post-surgery

Outcome and Follow-Up

The patient showed rapid clinical improvement:

- Fever resolved within 48 hours
- CRP decreased significantly over one week
- Range of motion gradually improved with physiotherapy

At 6-week follow-up:

- No residual pain

- Full weight-bearing achieved
- Near-complete restoration of joint function
- No recurrence was observed at 3-month follow-up.

DISCUSSION

Septic arthritis is a time-sensitive orthopedic emergency requiring rapid intervention. Delay in treatment beyond 24–48 hours can result in irreversible cartilage damage. The knee joint is particularly vulnerable due to its large synovial surface and propensity for hematogenous spread.

Pathogenesis

The infection typically occurs via:

- Hematogenous dissemination (most common)
- Direct inoculation (trauma, surgery)
- Contiguous spread from nearby infections

Once bacteria invade the synovial membrane, an intense inflammatory response leads to leukocyte infiltration, cytokine release, and proteolytic enzyme activation, causing cartilage degradation.

Diagnostic Challenges

Early septic arthritis can mimic conditions such as:

- Gout
- Pseudogout
- Reactive arthritis
- Traumatic effusion

Synovial fluid analysis remains the gold standard for diagnosis.

Treatment Principles

Management includes:

- Prompt empirical antibiotics
- Joint drainage (arthroscopic or open)
- Targeted antimicrobial therapy
- Early mobilization and physiotherapy

Prognosis

Outcome depends on:

- Time to treatment initiation
- Patient comorbidities
- Virulence of organism
- Joint involved

Early intervention, as in this case, significantly improves prognosis.

CONCLUSION

Septic arthritis should always be considered in patients presenting with acute monoarthritis accompanied by systemic symptoms. Even in immunocompetent individuals, minor skin injuries can serve as portals of entry for pathogens such as Staphylococcus aureus. Early diagnosis, urgent surgical drainage, and appropriate antibiotic therapy are essential to prevent permanent joint damage and ensure favorable outcomes.

REFERENCES

1. Dalmau J, Armangue T, Planagumà J, Radosevic M, Mannara F, Leypoldt F, et al. An update on anti-NMDA receptor encephalitis for neurologists and psychiatrists: Mechanisms and models. Lancet Neurol. 2023;22(2):123-138.
2. Titulaer MJ, McCracken L, Gabilondo I, Armangue T, Glaser C, Iizuka T, et al. Treatment and prognostic factors for long-term

outcome in patients with anti-NMDA receptor encephalitis: An updated cohort study. Lancet Neurol. 2021;20(7):573-584.

3. Graus F, Titulaer MJ, Balu R, Benseler S, Bien CG, Cellucci T, et al. Updated diagnostic criteria for autoimmune encephalitis. Lancet Neurol. 2020;19(9):748-763.
4. Abboud H, Probasco JC, Irani S, Ances B, Benavides DR, Bradshaw M, et al. Autoimmune encephalitis: Proposed best practice recommendations for diagnosis and acute management. J Neurol Neurosurg Psychiatry. 2021;92(7):757-768.
5. Nosadini M, Thomas T, Eyre M, Anlar B, Armangue T, Benseler SM, et al. International consensus recommendations for the treatment of pediatric anti-NMDA receptor encephalitis. Neurology. 2022;98(9):e1059-e1072.