DEKA IN MEDICINE

Case report

Chronic osteomyelitis in systemic lupus erythematosus: Diagnostic and therapeutic pitfalls

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ABSTRACT

BACKGROUND: Chronic osteomyelitis is a recalcitrant and difficult-to-treat bone infection, particularly in immunocompromised individuals such as patients with Systemic Lupus Erythematosus (SLE). The coexistence of chronic osteomyelitis with SLE and malnutrition is clinically rare. This article aims to describe the diagnostic approach and conservative management of chronic osteomyelitis in a patient with SLE.

CASE: A 19-year-old female presented with a two-week history of medial left knee pain, progressive swelling, and difficulty walking. The symptoms had recurred intermittently since November 2020, initially beginning with swelling and ulceration, and later developing into purulent discharge. Physical examination revealed swelling from the medial to posterior aspect of the left knee, tenderness, and reduced range of motion. Radiographic imaging demonstrated bone destruction in the proximal third of the left tibia, consistent with chronic osteomyelitis. A previous wound culture showed growth of antibiotic-sensitive bacteria. The patient was also diagnosed with SLE in remission, malnutrition (BMI <18), and an asymptomatic urinary tract infection. She was treated conservatively with oral antibiotics based on culture results, nutritional supplementation, and continued immunosuppressive therapy. Follow-up demonstrated clinical improvement without systemic infection or new local complications.

CONCLUSION: Chronic osteomyelitis in malnourished patients with SLE can be successfully managed with a conservative treatment approach. Comprehensive evaluation and long-term follow-up are essential to minimize the risk of recurrence and complications.

KEYWORDS: Chronic osteomyelitis; systemic lupus erythematosus; immunosuppression; malnutrition.

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INTRODUCTION

Musculoskeletal infections such as chronic osteomyelitis remain among the most formidable challenges in orthopedic and infectious disease practice due to their complex, multidisciplinary management and the prolonged commitment required from both patients and clinicians.[1] Although less frequent than systemic infections, chronic osteomyelitis can lead to devastating consequences, including long-term disability, bone deformity, and significant functional impairment. This condition is more prevalent in individuals with underlying risk factors such as diabetes mellitus, chronic kidney disease, open trauma, orthopedic surgery, and immunosuppressive disorders.[2] These conditions compromise both innate and adaptive immunity, thereby increasing susceptibility to infection. Among them, autoimmune diseases—particularly Systemic Lupus Erythematosus (SLE)—represent a significant risk factor due to the synergistic effects of immune dysregulation, prolonged immunosuppressive therapy, and malnutrition. Collectively, these elements create a chronic pro-

inflammatory and immunocompromised state that predisposes patients to persistent or recurrent infections.[3]

SLE is a complex autoimmune disorder characterized by immune system dysregulation, including the production of autoantibodies, complement deficiencies, and dysfunction of immune cells such as B and T lymphocytes, macrophages, and neutrophils. This immunologic imbalance increases the risk of both acute and chronic infections.[4] Furthermore, the long-term use of immunosuppressive agents—such as corticosteroids, azathioprine, and hydroxychloroquine—impairs the body's ability to mount an effective inflammatory response.[5] Epidemiological studies indicate that patients with SLE have a 2- to 5-fold increased risk of infection compared to the general population, with serious infections such as pneumonia, tuberculosis, and bone infections like osteomyelitis occurring more frequently.[6,7] Malnutrition, which is often observed in patients with chronic autoimmune diseases, further compromises immune defenses and increases vulnerability to infection.[8] Although the mechanistic link between SLE and osteomyelitis remains incompletely understood, chronic bone infections in SLE patients—particularly in the absence of trauma or other identifiable comorbidities—are rarely reported in the literature. This paucity of documentation underscores the need for further case reports to better define clinical features, treatment responses, and prognostic factors.[7]

This case report describes a 19-year-old female with chronic osteomyelitis of the proximal left tibia, presenting with recurrent inflammatory episodes in the left knee, in the context of clinically quiescent SLE, malnutrition, and an asymptomatic urinary tract infection. The objective of this report is to highlight the role of individualized, conservative treatment strategies tailored to the patient's immunologic and nutritional status and to contribute to the limited literature on osteomyelitis management in SLE. Furthermore, this case may provide a foundation for future research exploring the underlying mechanisms and long-term outcomes of non-surgical approaches in managing musculoskeletal infections in immunocompromised populations.

CASE PRESENTATION

A 19-year-old female presented to the orthopedic outpatient clinic with a primary complaint of medial left knee pain that had progressively worsened over the past two weeks. The pain intensified with ambulation, prompting the use of a walking aid. She also reported gradually increasing swelling in the same area over several days. There was no history of trauma, fever, or weight loss. Notably, the patient had experienced a similar episode in November 2020, characterized by medial knee swelling that progressively extended posteriorly, eventually forming a mass that ulcerated and discharged purulent material by December 2020. She was initially evaluated at the Rheumatology Clinic of Dr. Saiful Anwar General Hospital and subsequently referred to the Orthopedic Department for further assessment. That episode lasted approximately one month. She had no history of systemic illnesses such as diabetes mellitus or tuberculosis, and no relevant family history.

On physical examination, swelling was observed over the medial to posterior aspect of the left knee, with indistinct borders, localized tenderness, and restricted range of motion in both active and passive movements. The overlying skin appeared erythematous and warm to the touch (Figure 1). There were no systemic signs of infection such as fever or tachycardia. Although there was no active purulent drainage at the time of presentation, the patient reported that a previously draining lesion had closed spontaneously.

Plain radiographs of the left knee (anteroposterior and lateral views) revealed cortical destruction and areas of altered bone density, findings consistent with chronic osteomyelitis (Figure 2). A previous wound culture had demonstrated the growth of antibiotic-sensitive bacteria, although specific pathogens and antibiotic sensitivities were not documented in this report. Other laboratory investigations, including complete blood count and erythrocyte sedimentation rate (ESR), were not provided. However, the clinical course suggested localized chronic inflammation without systemic involvement.

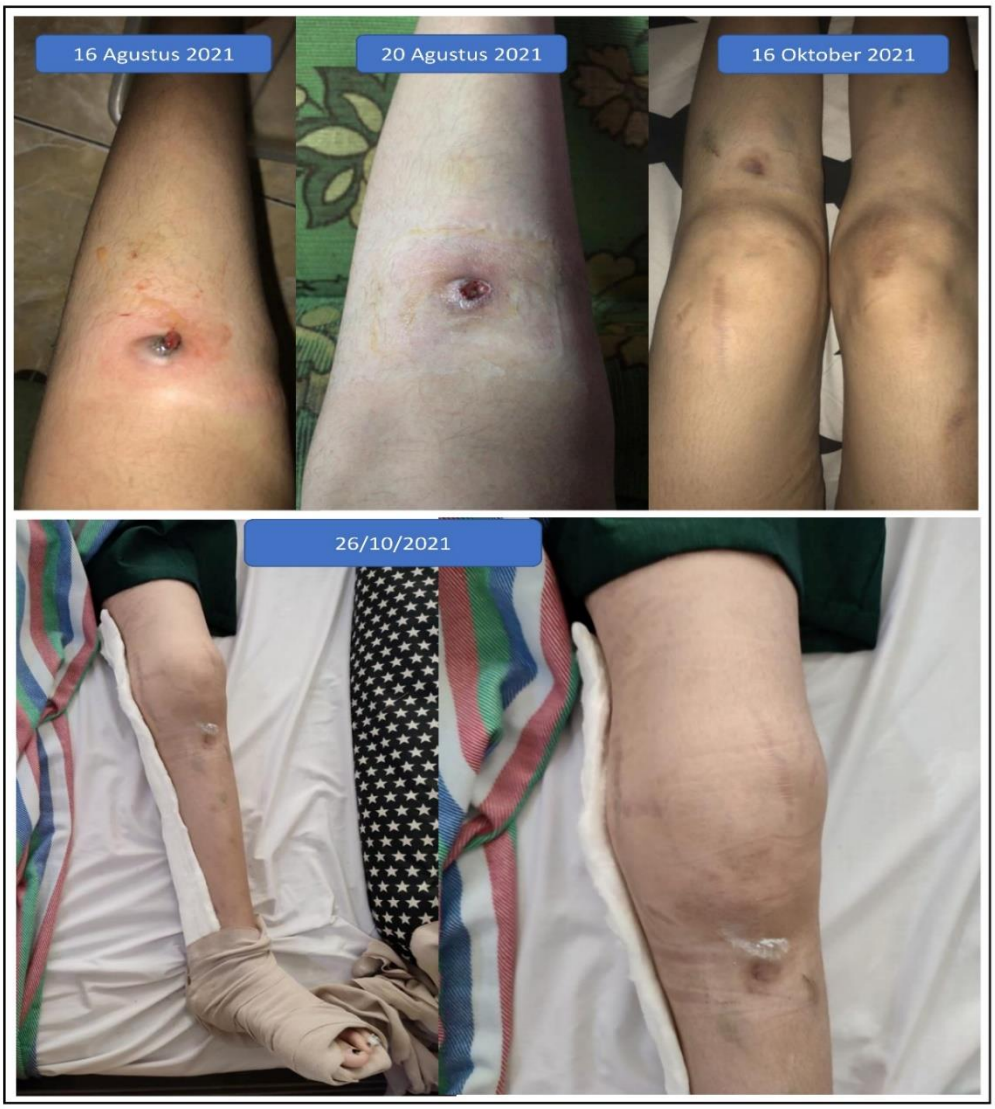

Figure 1. Clinical progression of chronic osteomyelitis in an SLE patient following treatment. Serial images show the lesion over the right lower leg from initial presentation to post-treatment healing. On August 16, 2021: visible skin ulceration with signs of local inflammation. August 20, 2021: ulcer becomes more defined with central necrosis. October 16, 2021: significant reduction in inflammation and wound closure noted. October 26, 2021: near-complete healing of the lesion with scar formation and minimal residual inflammation, following comprehensive treatment including surgical debridement.

During the initial episode, the patient was treated conservatively on an outpatient basis with oral antibiotics guided by culture results. Surgical intervention was not performed, as the wound showed progressive healing with medical therapy alone. By June 2021, follow-up evaluations showed marked improvement, including complete

wound closure, resolution of swelling, and radiographic evidence of bone healing (Figure 3). Continued outpatient monitoring was recommended.

Figure 2. Radiographic progression of chronic osteomyelitis in the left leg of a patient with systemic lupus erythematosus (SLE). A) Anteroposterior (AP) and lateral (L) views of the left knee (genu sinistra) taken on 22 December 2020 show normal joint alignment and bone structure without signs of osteomyelitis. B) AP and lateral views of the left lower leg (cruris sinistra) on 31 May 2021 reveal early signs of cortical irregularity and possible osteolytic lesions suggestive of developing osteomyelitis. C) Follow-up radiographs of the left lower leg on 23 September 2021 demonstrate progression of bone changes with cortical destruction and periosteal reaction consistent with chronic osteomyelitis.

In August 2021, the patient presented again with similar complaints—pain and swelling localized to the medial aspect of the left knee. Given the previous favorable response, the same antibiotic regimen was reinitiated. By September 2021, clinical improvement was again noted. The patient reported no adverse effects, and gradual restoration of limb function was observed, although long-term monitoring remained essential. Overall, the clinical course was consistent with chronic osteomyelitis of the proximal left tibia with intermittent acute exacerbations. The patient's favorable response to oral antibiotic therapy supported the feasibility of conservative, non-

surgical management in a systemically stable patient. However, the risk of recurrence necessitates vigilant follow-up and consideration of surgical intervention if the condition persists or worsens.

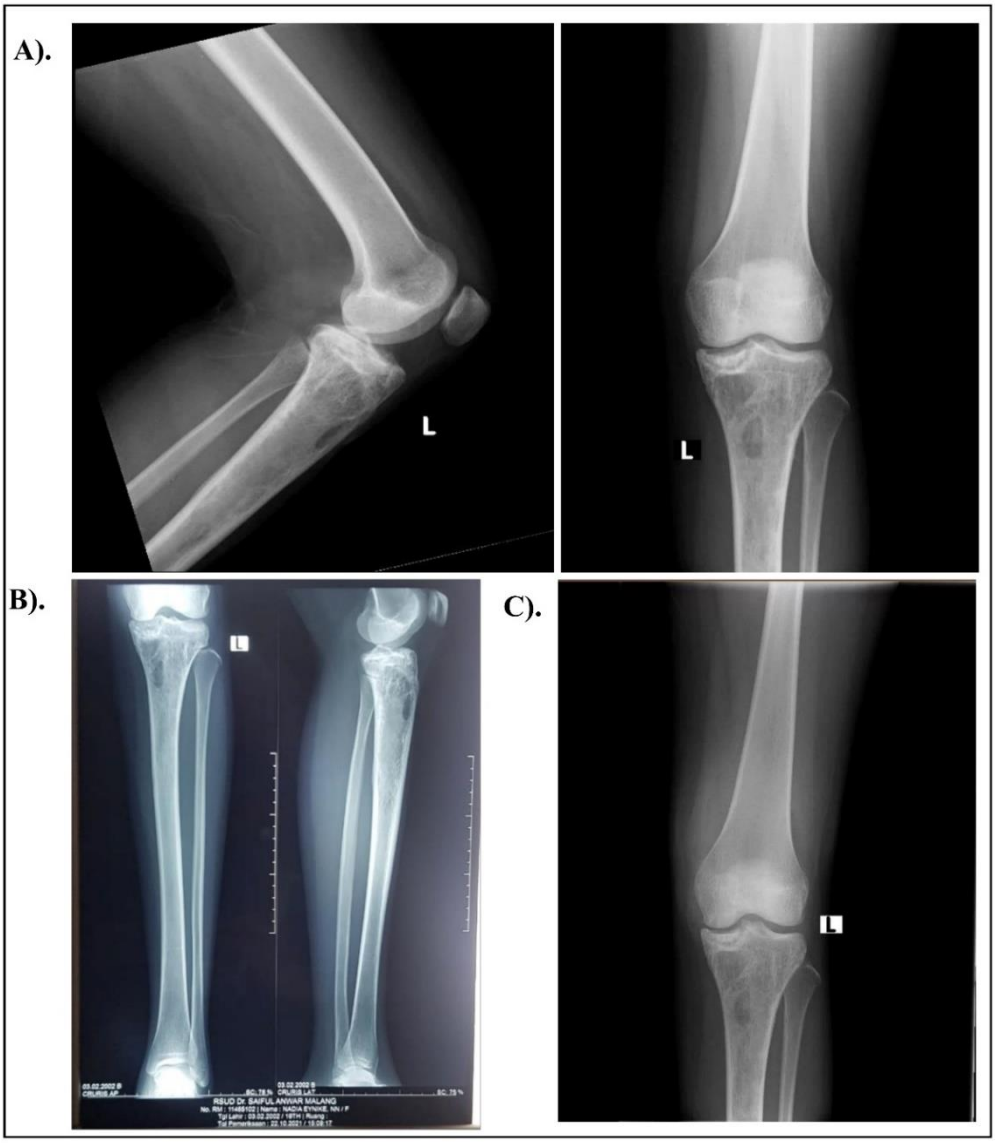

Figure 3. Follow-up radiographic evaluation of chronic osteomyelitis in the left lower extremity of an SLE patient. A) Anteroposterior (AP) and lateral (L) views of the left knee (genu sinistra) taken on 23 September 2021, showing irregular cortical margins and joint space narrowing suggestive of inflammatory involvement. B) AP and lateral views of the left lower leg (cruris sinistra) dated 22 October 2021, demonstrating persistent cortical thickening and periosteal reaction consistent with chronic osteomyelitis. C) Repeat AP view of the left knee on 22 October 2021, showing stable bony changes with no new lytic or sclerotic lesions.

DISCUSSION

This case highlights a young patient with Systemic Lupus Erythematosus (SLE) who developed chronic osteomyelitis in the presence of multiple predisposing factors—most notably prolonged immunosuppressive therapy (hydroxychloroquine, azathioprine, and methylprednisolone) and malnutrition (BMI <18 kg/m²). SLE is characterized by profound immune dysregulation, including complement deficiencies and dysfunction of macrophages, neutrophils, and B lymphocytes, which collectively impair pathogen clearance. Immunosuppressive agents, particularly corticosteroids, further attenuate immune responses by suppressing cell-mediated immunity, reducing

monocyte/macrophage activation, and inhibiting the inflammatory cascade.[3] The risk of infection increases with corticosteroid dosage, with daily prednisone doses ≥15 mg associated with significantly higher infection rates.[9] Malnutrition adds an additional layer of immunosuppression by compromising both innate and adaptive immune responses. The relationship between malnutrition and infection is bidirectional: malnutrition increases vulnerability to infection, while ongoing infection exacerbates metabolic demands and nutrient depletion, worsening nutritional status.[8]

Clinically, the patient presented with progressive medial knee pain, localized swelling, and impaired ambulation. A prior episode had included a draining lesion, which had since closed spontaneously. Laboratory findings were notable for leukocytosis, neutrophilia, and elevated inflammatory markers (ESR and CRP). Radiographic imaging of the left knee and tibia revealed cortical destruction and decreased bone density, consistent with chronic osteomyelitis involving the proximal to mid-third of the tibia, with suspected involvement of the tibiofemoral joint. Based on the clinical, laboratory, and imaging data, a diagnosis of chronic osteomyelitis was established, with differential considerations including septic arthritis and osteoarticular tuberculosis.

Management was conservative and based on prior culture sensitivity, using systemic antibiotics without surgical intervention. This approach aligns with accepted practice in treating chronic osteomyelitis in systemically stable patients, particularly when the disease is localized and not associated with extensive necrosis or abscess formation.[10] Culture-directed antibiotic therapy remains essential for effective pathogen eradication and resistance prevention. The patient's positive clinical response—evidenced by pain reduction, swelling resolution, wound healing, and radiographic improvement—supports the efficacy of conservative management in selected cases.

The decision to avoid surgical intervention may have been influenced by the anatomical location of the lesion, its relatively limited extent, and the patient's overall stable condition. Nevertheless, recurrence of symptoms after initial improvement suggests that surgical intervention—such as debridement or bone resection—should be considered in cases of treatment failure, persistent infection, or progressive bone involvement. Chronic osteomyelitis is well known for its tendency to relapse, and failure to adequately manage the condition can lead to joint dysfunction, deformity, and long-term disability. Multidisciplinary collaboration involving orthopedic surgeons, infectious disease specialists, clinical microbiologists, nutritionists, and rehabilitation teams is crucial to optimizing outcomes in complex cases such as this.[11]

This case underscores the importance of individualized clinical decision-making, carefully balancing the risks and benefits of conservative versus surgical management. Furthermore, this report contributes meaningful clinical insight into the management of chronic osteomyelitis in a young, systemically stable patient without classical comorbidities such as diabetes or chronic kidney disease. It demonstrates that non-surgical treatment can be effective in such patients when accompanied by close monitoring and regular reassessment. Early detection of recurrence is critical to determining when surgical intervention becomes necessary.

However, this report is subject to several limitations. The lack of definitive diagnostic procedures—such as bone biopsy or joint aspiration—limits the ability to conclusively determine the etiology of the infection and to exclude other potential causes, such as tuberculous or pyogenic arthritis. Additionally, limited data regarding the specific

antibiotic regimen, treatment duration, and adherence hinder a comprehensive evaluation of therapeutic efficacy. Imaging was also restricted to plain radiographs, without the use of advanced modalities such as MRI or CT, which could have better characterized the extent of bone and soft tissue involvement. These limitations should be taken into account when interpreting the findings and applying them to broader clinical practice. Nonetheless, this case reinforces important principles in managing chronic osteomyelitis in immunocompromised hosts and emphasizes the need for more robust diagnostic, therapeutic, and follow-up protocols in similar scenarios.

CONCLUSION

This case illustrates the clinical complexity of managing chronic osteomyelitis in a 19-year-old female with remission-phase SLE, asymptomatic urinary tract infection, and malnutrition. Conservative management with culture-guided antibiotics, nutritional support, and continued immunosuppressive therapy led to favorable outcomes, including symptom resolution and absence of systemic complications. Effective management of osteomyelitis in immunocompromised patients requires a multidisciplinary approach that incorporates medical, surgical, and nutritional considerations. Long-term infection control depends not only on appropriate antimicrobial therapy but also on optimizing host factors such as immune competence and nutritional status. This case underscores the value of individualized, coordinated care in achieving remission and minimizing recurrence in chronic musculoskeletal infections.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The patient in this case report has provided informed consent for this publication.

CONFLICTS OF INTEREST

We have no conflict of interest.

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AUTHOR CONTRIBUTION

Conceptualization: MRI, PAR; Data Curation: MRI, PAR; Formal Analysis: MRI, PAR; Investigation: MRI, PAR; Project Administration: MRI; Resources: MRA; Methodology: MRI, PAR; Software: MRI; Visualization: MRI; Supervision: PAR; Validation: PAR; Writing – Original Draft Preparation: MRI; Writing – Review & Editing: PAR. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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