fortune Journals

Case Report

FORTUNE JOURNAL OF HEALTH SCIENCES

ISSN: 2644-2906

A Case of Polyarthritis Secondary to Gout with Coexisting Lyme Disease

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Abstract

This case report details a rare instance of polyarthritis arising from the simultaneous presence of gout and Lyme disease, underscoring the challenges of diagnosing overlapping medical conditions. The patient, a 61-year-old male with a background of chronic health issues, presented with acute pain and swelling in multiple joints. Initial evaluations indicated hyperuricemia, which pointed towards a diagnosis of gout; however, subsequent serological tests confirmed the concurrent existence of Lyme disease. The clinical picture was complicated by the patient's symptoms, which included migratory polyarthritis and elevated inflammatory markers, making diagnosis particularly challenging. The overlapping manifestations of these two distinct conditions required careful consideration to avoid misdiagnosis.

Management of the patient involved the administration of anti-inflammatory medications to address the gout, alongside antibiotic therapy for Lyme disease. Remarkably, the patient showed substantial improvement following the initiation of treatment. This case highlights the necessity of considering dual pathologies, especially in regions where both conditions are prevalent. When common diagnoses such as gout do not fully account for the clinical presentation, it is crucial to explore other potential underlying causes. Timely recognition and targeted treatment are vital for alleviating symptoms and preventing further complications. This report serves as a reminder for clinicians to maintain a broad differential diagnosis and remain vigilant for coexisting conditions in patients presenting with complex symptomatology.

Keywords: Lyme disease, Borrelia burgdorferi, chronic obstructive pulmonary disease (COPD), gastroesophageal reflux disease (GERD)

Introduction

Gout is a specific type of inflammatory arthritis that arises from elevated serum uric acid levels, which can result in the deposition of monosodium urate crystals in the joints and surrounding tissues. This crystal accumulation triggers an acute inflammatory response, leading to episodes of severe pain, swelling, and redness in the affected joints. Gout typically presents with sudden onset attacks, often affecting the first metatarsophalangeal joint (the big toe), but it can involve other joints as well. Chronic gout can result in joint damage and the formation of tophi, which are nodular deposits of urate crystals that can develop under the skin and around joints. Effective management of gout involves not only the treatment of acute attacks but also long-term strategies to lower serum uric acid levels and prevent future episodes [1]. Building upon the complexities of gout as a form of inflammatory arthritis, it is important to recognize that other infections, such as Lyme disease, can similarly

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Citation: Warsha Ahuja, Supriya Peshin, FNU Vineesha, Dilpat Kumar, Ramsha sohail. A Case of Polyarthritis Secondary to Gout with Coexisting Lyme Disease. Fortune Journal of Health Sciences. 7 (2024): 644-647.

Received: October 19, 2024
Accepted: October 25, 2024
Published: November 04, 2024

present with joint involvement and complicate the diagnostic landscape. Lyme disease, caused by the spirochete *Borrelia burgdorferi* and transmitted through the bites of infected ticks, often manifests with symptoms that can mimic or overlap with other forms of arthritis, including gout. Patients may experience joint pain, swelling, and stiffness, particularly in the knees and other large joints, which can lead to misdiagnosis if a thorough clinical evaluation is not conducted. The inflammatory response triggered by Lyme disease can result in a migratory pattern of arthritis, characterized by joint symptoms that shift from one area to another, further complicating the diagnostic process. Additionally, the absence of distinctive cutaneous findings, such as the characteristic erythema migrans rash, in some patients can make it challenging to suspect Lyme disease. Clinicians must maintain a high index of suspicion for Lyme disease in endemic areas, especially when presented with polyarthritic symptoms, as early recognition and appropriate treatment are crucial for preventing potential long-term complications. Consequently, a comprehensive approach to differential diagnosis is essential to ensure accurate identification and management of these overlapping conditions [2]. Continuing from the complexities of diagnosing Lyme disease and gout, the co-occurrence of polyarthritis stemming from both conditions is relatively uncommon yet can present significant diagnostic challenges for clinicians. When a patient exhibits symptoms characteristic of both gout and Lyme disease, such as joint pain, swelling, and inflammation, it may be difficult to determine the underlying cause without thorough clinical evaluation and laboratory testing. The overlapping symptoms can lead to confusion, as both conditions can present with acute inflammatory arthritis and elevated inflammatory markers.

Furthermore, the presence of elevated serum uric acid levels may suggest gout, while positive serological tests for *Borrelia burgdorferi* can indicate Lyme disease. This dual pathology requires careful consideration, as misdiagnosis may result in inadequate treatment, prolonged suffering, or potential complications such as chronic joint damage. Additionally, factors such as patient history, geographical location, and recent exposures play crucial roles in guiding the diagnostic process. Thus, a comprehensive assessment that includes a detailed medical history, physical examination, and appropriate laboratory investigations is essential for distinguishing between these two conditions. Timely recognition of both gout and Lyme disease is critical to implement effective management strategies, alleviate symptoms, and prevent long-term sequelae. This case highlights the importance of considering multiple etiologies in patients presenting with complex polyarthritis symptoms, especially in endemic regions [3]. Building on the complexities of diagnosing concurrent conditions such as gout and Lyme disease, this case highlights the clinical presentation, diagnostic workup, and management strategies employed for a 61-year-old male who presented with sudden onset polyarthritis. The patient's symptoms included acute pain and swelling in multiple joints, which initially suggested a singular inflammatory condition. However, a comprehensive evaluation ultimately led to the diagnosis of both gout and Lyme disease, underscoring the necessity of considering overlapping pathologies in cases of inflammatory arthritis. The patient's clinical presentation was characterized by significant joint discomfort and swelling, prompting a thorough investigation that included laboratory tests and imaging studies. This approach not only confirmed elevated serum uric acid levels indicative of gout but also identified positive serological markers for Lyme disease. The dual diagnosis posed unique challenges in terms of management, necessitating a tailored treatment plan that addressed both conditions simultaneously. In managing the patient, the medical team employed a combination of anti-inflammatory agents to alleviate the gout symptoms while initiating appropriate antibiotic therapy for Lyme disease. This case serves as a vital reminder of the importance of a meticulous and broad differential diagnosis in patients presenting with polyarthritis, particularly in endemic regions where both gout and Lyme disease may be prevalent. By ensuring timely and effective intervention, clinicians can significantly improve patient outcomes and prevent potential complications associated with these overlapping conditions.

Case Presentation

A 61-year-old male with a significant medical history, including chronic obstructive pulmonary disease (COPD), heart failure with preserved ejection fraction (HFpEF), gastroesophageal reflux disease (GERD), and chronic neuropathy, presented to the emergency department with a sudden onset of pain and swelling in multiple joints. The symptoms began three days prior, initially affecting both shoulder joints and subsequently involving the ankles, lower back, and right great toe metatarsophalangeal (MTP) joint. The patient described the pain as sharp and intermittent, rating its intensity at 8 out of 10. He also experienced morning stiffness that improved throughout the day. Over-the-counter medications, such as Tylenol and Aleve, failed to provide relief. Notably, this marked the patient's first episode of joint pain, and he denied any previous history of joint disease, autoimmune conditions, trauma, fever, rash, or recent viral infections. However, he did report dysuria, suprapubic pressure, and groin pain that had developed over the preceding two days. Upon examination, the patient was afebrile and hemodynamically stable. Significant swelling and tenderness were noted in the affected joints, particularly the shoulders, ankles, and right great toe, while other aspects of the physical exam, including cardiovascular, respiratory,

Peshin S, et al., Fortune J Health Sci 2024
DOI:10.26502/fjhs.232

and abdominal assessments, were unremarkable. No rashes or cutaneous findings suggestive of Lyme disease were evident. A urinalysis indicated a urinary tract infection (UTI), but blood cultures showed no growth. Imaging studies, including X-rays of the foot and lumbar spine, revealed diffuse soft tissue swelling and stable spondylosis, respectively.

The diagnostic workup demonstrated elevated uric acid levels at 18.8 mg/dL, suggesting gout, alongside significant inflammation indicated by a C-reactive protein (CRP) level of 224.5 mg/L, an elevated white blood cell count of 18.9 x 10^9/L, and an erythrocyte sedimentation rate (ESR) of 64 mm/hr. Additionally, renal function tests revealed acute kidney injury with a creatinine level of 2.20 mg/dL and elevated bilirubin levels. Importantly, while antinuclear antibody (ANA) and anti-cyclic citrullinated peptide (Anti-CCP) antibodies were negative, Lyme disease antibodies (IgG and IgM) were positive, leading to a diagnosis of coexisting Lyme disease (see Table *1*). During the hospital course, the patient was treated with intravenous Solumedrol 60 mg every six hours, colchicine 0.6 mg, and allopurinol 50 mg for gout management. Given the positive Lyme disease serology, oral doxycycline was also initiated. Following the commencement of antibiotic therapy, the patient reported significant improvement in joint pain and swelling. His UTI was treated with appropriate antibiotics as well. The acute kidney injury was managed with intravenous fluids and resolved during his hospitalization. The patient experienced no further complications and was discharged with a follow-up plan to monitor renal function, uric acid levels, and to assess for any recurrence of Lyme disease or gout symptoms. This case underscores the importance of recognizing and addressing dual pathologies in patients presenting with complex clinical presentations.

Discussion

This case presents the diagnostic challenges that arise when two distinct conditions, gout and Lyme disease, coexist. Gout is typically diagnosed based on clinical presentation, hyperuricemia, and the identification of monosodium urate crystals in the synovial fluid during arthrocentesis [4]. In this instance, although the patient had no prior history of gout, his markedly elevated uric acid levels, coupled with joint involvement—including classic podagra affecting the right great toe—strongly supported the diagnosis of gout [5]. The acute nature of his symptoms, characterized by polyarthritis, prompted a more extensive investigation into potential underlying causes. This led to the revelation of positive serologies for Lyme disease, a condition known for its potential to present with migratory arthritis that often targets large joints, particularly the knees [6][7]. In this patient, the simultaneous onset of polyarthritis alongside systemic symptoms raised suspicion for a dual pathology, necessitating a careful and nuanced approach to diagnosis and management [8].

While the coexistence of gout and Lyme disease is indeed rare, it should be considered in patients presenting with polyarthritis and systemic manifestations, especially in regions endemic to Lyme disease [9]. The recognition of this potential overlap is crucial for timely intervention and effective treatment. Management of both conditions involves the use of anti-inflammatory agents for gout, such as nonsteroidal anti-inflammatory drugs (NSAIDs) or colchicine, along with appropriate antibiotic therapy for Lyme disease, typically involving doxycycline or other suitable antibiotics [10].Moreover, the patient's elevated uric acid levels may have been exacerbated by factors such as acute

Table 1: Diagnostic Workup

Test	Result	Reference Range	Interpretation
Uric acid	18.8 mg/dL	3.5 - 7.2 mg/dL	Elevated (suggestive of gout)
C-reactive protein (CRP)	224.5 mg/L	< 5.0 mg/L	Elevated (inflammation)
White blood cell count (WBC)	18.9 x 10^9/L	4.0 - 11.0 x 10^9/L	Elevated (suggestive of infection)
Erythrocyte sedimentation rate (ESR)	64 mm/hr	< 20 mm/hr	Elevated (inflammation)
Creatinine	2.20 mg/dL	0.7 - 1.3 mg/dL	Elevated (acute kidney injury)
Total bilirubin	3.0 mg/dL	0.1 - 1.2 mg/dL	Elevated
Direct bilirubin	0.9 mg/dL	< 0.3 mg/dL	Elevated
Antinuclear antibody (ANA)	Negative	Negative	Normal
Anti-cyclic citrullinated peptide (Anti-CCP) antibody	Negative	Negative	Normal

mg/dL (milligrams per deciliter): Measures concentration in blood, commonly for glucose and cholesterol.
mm/hr (millimeters per hour): unit measures the rate of sedimentation of red blood cells in a blood sample, indicating inflammation in the body

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infection, dehydration, and the development of acute kidney injury (AKI), which further complicated the clinical picture [11]. The interplay of these conditions likely contributed to the severity of his symptoms and the difficulty in achieving a clear diagnosis. Treatment with intravenous fluids to address dehydration and careful management of the underlying infection played a significant role in the patient's overall improvement, illustrating the importance of a multifaceted approach to care [12]. This case underscores the need for clinicians to maintain a high level of suspicion for coexisting conditions when faced with atypical presentations of arthritis, ensuring comprehensive care and improved patient outcomes.

Conclusions

This case highlights the importance of considering multiple etiologies in patients presenting with acute polyarthritis. The coexistence of gout and Lyme disease can complicate the diagnostic process, making prompt recognition and treatment essential for symptom relief and preventing long-term complications. Clinicians should maintain a high index of suspicion for Lyme disease in endemic areas, even when initial presentations suggest gout or other diagnoses. Understanding the nuances of both conditions enables more effective management, as gout typically requires anti-inflammatory medications and urate-lowering therapies, while Lyme disease necessitates targeted antibiotics. A thorough history, physical examination, and appropriate laboratory tests are crucial in ensuring accurate diagnosis. This case serves as a reminder to adopt a broad differential diagnosis to improve patient outcomes in complex presentations of polyarthritis

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