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A Large, Inflamed Knee, Pulling down the Wolf Mask

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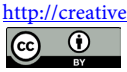

Abstract

Introduction: Joint manifestations are common in systemic lupus, affecting multiple joints or just one. These manifestations are present in 95% of patients. Pseudo-septic arthritis is a subset of systemic lupus that mimics septic arthritis caused by the deposition of lipid droplets in the joint. We present the case of a patient hospitalized for mono-arthritis, which revealed systemic lupus. **Observation:** The patient is a 19-year-old woman, single, without children, and with no previous medical history, who was hospitalized for fever and inflammatory polyarthralgia. The clinical examination revealed an inflammatory swelling of the right knee with patellar ballottement, yellow citrine synovial fluid, an inflammatory tumor on the left arm, which was round, mobile, and fluctuating with purulent content, edema of the lower limbs, and facial puffiness, along with a systemic inflammatory response syndrome. Paraclinical examination showed hyperleukocytosis with neutrophil predominance, microcytic anemia, thrombocytopenia, antistreptolysin O (ASLO) < 200, elevated C-reactive protein (26.33 mg/L), three negative blood cultures, negative bacteriology on the joint fluid, and proteinuria at 923 mg/24h. The cardiac ultrasound revealed a pericardial effusion and the ultrasound of the left arm showed signs of infected myositis in the collection phase. Septic arthritis associated with suppurative myositis and systemic lupus were suspected. A non-specific treatment was initiated. She returned three months later with evening fever and inflammatory pain in her right knee. On clinical examination, we observed a deterioration of her general condition, right knee arthritis with functional impairment of the right lower limb, and a systemic inflammatory

response syndrome. Joint aspiration revealed purulent fluid. Blood tests showed normocytic anemia with hemoglobin at 7.6 g/dL and elevated C-reactive protein at 90.9 mg/L. Cytobacteriological examination of the joint fluid revealed an exudate with a protein level of 53.7 mg/L and leukocytes at 185 elements/mm^3, suggesting inflammatory arthritis. Bacteriological tests did not isolate any pathogens. An arthrotomy with synovial biopsy was performed, and the histopathological examination supported non-specific synovitis. A joint ultrasound showed signs of arthritis with a septic appearance. During the third hospitalization for persistent fever, she presented with facial puffiness, anemia syndrome, systemic inflammatory response syndrome, and a malar rash across the bridge of the nose. Antinuclear antibodies returned positive with a titer of 1280 and a speckled fluorescence pattern, and anti-native DNA antibodies were positive at 60.1 (normal < 30). The ACR/EULAR 2019 classification was estimated at 33 points. We noted a good clinical outcome with treatment: prednisone 0.5 mg/kg and adjuvant therapy, hydroxychloroquine 200 mg × 2/day. **Conclusion:** Pseudo-septic arthritis is a feature of lupus that can mimic septic arthritis. Monoarticular involvement is rare but possible. The absence of pathogens and the inflammatory nature of the synovial fluid should prompt consideration of a lupus-related etiology.

Keywords

Systemic Lupus Erythematosus (SLE), Pseudo-Septic Arthritis, Monoarthritis, Autoantibodies, Synovitis

1. Introduction

Joint involvements are common in systemic lupus with multiple joints or a single joint affected. These occur in 95% of patients (Naudion P, 2017) [1].

These manifestations and asthenia are the most common in systemic lupus. They can be observed at the onset or during the course of the disease. Although long considered benign, they can quickly affect functional prognosis. They are protean, oligo-articular, mono-articular or polyarticular. Inflammatory involvement may be peripheral or axial (De Bandt M, 2015) [2]. They are non-specific, and monoarticular manifestations are particularly challenging to diagnose, especially if the synovial fluid is purulent, mimicking septic arthritis There are few publications on this clinical form. Most patients are followed up in other medical-surgical departments. The ACR/EULAR 2019 AND SLICC 2012 classification criteria, based on clinical and biological arguments, allow the diagnosis of systemic lupus to be accepted in most patients (Godeau P, 1977; Roussel ME, 2004) [3] [4]. We will present the case of a patient with isolated pseudo-septic gonarthritis revealing systemic lupus.

2. Observation

The patient is a 19-year-old woman, single with no children and no significant

medical history, who was hospitalized from 12/23/2020 to 01/11/2021 for fever and inflammatory polyarthralgia. On examination, she presented with an inflammatory swelling of the right knee with patellar ballottement and yellow citrine synovial fluid, an inflammatory swelling of the left arm that was round, mobile, fluctuating with purulent content, edema on the dorsum of the feet, facial puffiness, and a systemic inflammatory response syndrome with fever and regular tachycardia without additional heart sounds.

Paraclinical examinations revealed hyperleukocytosis at 15,000 cells/mm^3 with neutrophil predominance, microcytic anemia with hemoglobin at 6.9 g/dL, thrombocytopenia at 113,000 cells/μL, ASLO < 200 IU, and elevated C-reactive protein at 26.33 mg/L.

Blood cultures were sterile, and the thick blood smear and bacteriology on the joint fluid were negative. The 24-hour proteinuria was measured at 923 mg. Cardiac ultrasound revealed a pericardial effusion without cardiac chamber dysfunction or myocardial motion abnormalities, and the ultrasound of the left arm showed signs of infectious myositis in the collection phase. Septic arthritis associated with suppurative myositis and lupus were considered.

Cytobacteriological examinations did not reveal any pathogens, and empirical antibiotic therapy did not satisfactorily resolve the symptoms. Subsequently, based on clinical and biological signs, there was a strong suspicion of lupus disease. Corticosteroid therapy at a dose of 0.5 mg/kg resulted in a good remission of symptoms. The patient was discharged from the hospital at her request, and the autoantibody tests were requested for outpatient follow-up.

She returned three months later with evening and nighttime fever and inflammatory pain in the right knee. On clinical examination, she presented with a deterioration in general condition, classified as WHO stage II, right knee arthritis with functional impairment of the right lower limb and a systemic inflammatory response syndrome.

Joint aspiration revealed an inflammatory, macroscopically purulent fluid. Laboratory results showed normocytic anemia with hemoglobin at 7.6 g/dL, normal leukocyte and platelet counts, and elevated C-reactive protein at 90.9 mg/L. The Emmel test and retroviral serology were negative.

Blood cultures were repeated and returned negative. Cytobacteriological examination of the joint fluid revealed an exudate with a protein level of 53.7 mg/L and leukocytes estimated at 185 cells/mm^3, indicating inflammatory arthritis.

According to the radiologist, joint ultrasound showed images suggestive of septic arthritis. Bacteriology performed on the joint fluid did not isolate any pathogens. An arthrotomy with synovial biopsy was performed in the operating room. The histopathological examination supported a diagnosis of non-specific synovitis.

During the third hospitalization for persistent fever, she presented with facial puffiness, anemia syndrome, systemic inflammatory response syndrome, and a malar rash across the bridge of the nose (see **Figure 1**).

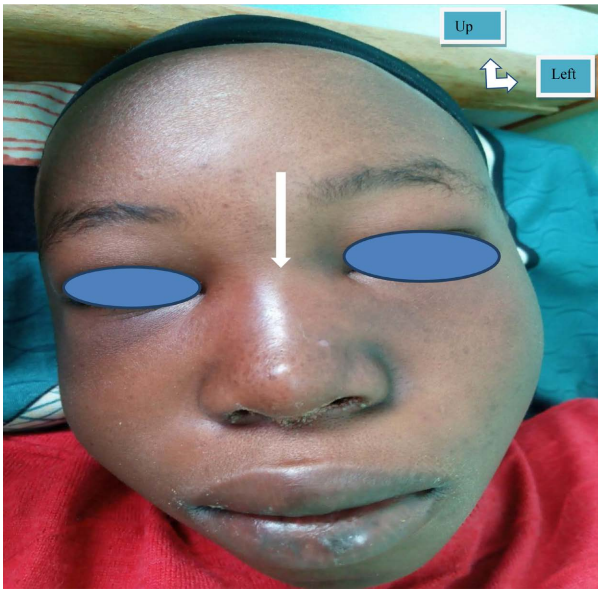

Figure 1. Acute lupus skin lesions with erythema on black skin predominantly on the root of the nose and face (white arrow).

On laboratory tests, we found normochromic normocytic anemia with hemoglobin at 8.2 g/dL and thrombocytopenia at 39,000 cells/mm^3; elevated C-reactive protein at 56.1 mg/L; urea and creatinine levels were normal. A cytobacteriological examination of the urine revealed a urinary tract infection caused by Escherichia coli, which is sensitive to fluoroquinolones. The albumin-to-creatinine ratio was elevated at 45 (normal value < 15). Antinuclear antibodies returned positive with a titer estimated at 1280 and a speckled fluorescence pattern. Anti-native DNA antibodies were positive at 60.1 (normal value < 30 IU). The various biological anomalies found in our patient are listed in **Table 1**.

Table 1. Description of the various biological abnormalities found during follow-up and different hospitalizations.

1st hospitalization	2nd hospitalization	3rd hospitalization
hyperleukocytosis		
Anémie microcytaire HGB = 6 g/dL	Normocytic anemia, HGB: 7.6 g/dL	Normocytic anemia
Thrombopenia	C reactive protein 90.9 mg/L	Thrombocytopenia at 39,000 cells/mm^3
C reactive protein: 26.33 mg/L	Exsudate joint fluid, protein = 53.7 mg/L	C-reactive protein increased to 56.1 mg/L
proteinuria: 923 mg		Albuminuria to creatinuria ratio: 45
		Positive antinuclear antibodies: 1280 with speckled fluorescence
		Positive anti-native DNA antibodies: at 60.1

Imaging revealed a small pericardial effusion on cardiac ultrasound, mild ascites on abdominal ultrasound, and joint X-rays showed images of chronic arthritis (Figure 2).

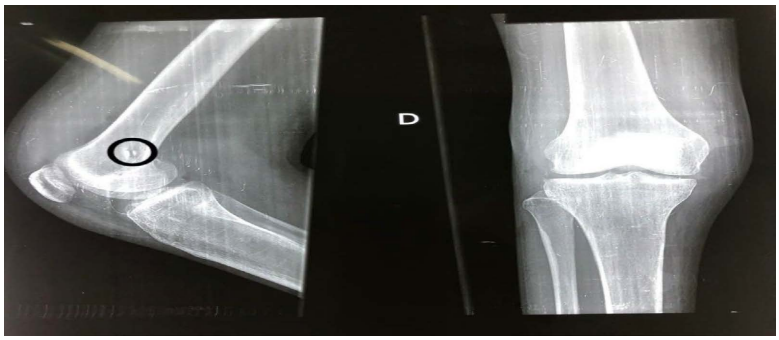

Figure 2. Images suggestive of the stigmata of chronic arthritis (framed in black).

The 2019 ACR/EULAR classification score was estimated at 33 points. Clinical improvement was noted under treatment with prednisolone 0.5 mg/kg, adjuvant therapies, hydroxychloroquine 200 mg twice daily, and ciprofloxacin for the urinary tract infection. We noted a good clinical evolution with regression of joint symptoms and disappearance of urinary signs. The blood count and CRP were normalized after one month of treatment.

3. Discussion

Lupus arthritis can present as bilateral and symmetrical polyarthritis or as oligoarthritis, as in our case. It often accompanies the disease with visceral involvement and prominent general symptoms, as seen in our patient. It is a disabling but non-deforming arthritis. Mono-articular involvement is described but rare in lupus, as it tends to suggest septic arthritis (Godeau P, 1977) [3].

Monoarticular involvement has been described but is rare in lupus disease, as it is more likely to be associated with septic arthritis.

The literature reports cases of pseudo-septic arthritis linked to acute lipo arthrosis, with macroscopically purulent joint fluid but no isolated pathogen. Empirical treatment for septic arthritis remains indicated until a more precise explanation is available. Several conditions have been described under this term (Roussel ME, 2004) [4].

Pseudo-septic arthritis can be explained by the effusion of fat globules into the synovial cavity, making the fluid very viscous and mimicking purulent arthritis. This phenomenon was initially described in trauma cases, where fat droplets leaked into the joint fluid; however, it has been shown that this appearance is possible even in the absence of bone discontinuity, as in cases of pancreatic fat necrosis, osteonecrosis, or synovitis (Ike RW, 2009) [5]. Lipids are present in synovial fluids and may increase in cases of synovial inflammation.

Radiological examinations show periarticular demineralization. Ultrasound scans indicate synovitis of varying degrees but always without Doppler abnormalities or

bone lesions. Magnetic resonance imaging (MRI) reveals swelling and fluid presence without destructive lesions (Cronin ME, 1988) [6].

Joint aspiration is rarely performed, as lupus arthritis typically contains little fluid. When collected, the fluid is minimally inflammatory and may contain (if specifically tested) LE cells and autoantibodies (anti-DNA and antinuclear factors). The protein concentration in the fluid is variable, with both exudates and transudates observed. Synovial biopsy is non-specific and can reveal inflammatory signs, as seen in our patient (Roussel M, 2004; Cronin ME, 1988) [4] [6]. This presentation should prompt consideration of lupus arthritis in any case of arthritis with purulent-appearing fluid. This presentation should lead to the suspicion of lupus arthritis in all cases of arthritis with purulent fluid.

The literature reports cases of monoarthritis associated with a skin rash in women, consistent with our observation. Septic arthritis, which must be distinguished from pseudo-septic arthritis, has often been described in large joints (knee, etc.). The clinical presentation is usually pronounced but may be attenuated by high-dose corticosteroid therapy. The causative pathogen varies (Gram-positive or Gram-negative) (Mougeot-Martin, 1976) [7].

The clinical picture is generally vague, but may be alleviated by heavy corticosteroid therapy. The causative organism varies (Gram-positive or Gram-negative) (Ross JJ, 2017) [8].

Septic arthritis rarely occurs without joint-specific symptoms, raising concerns of immune deficiency and defective neutrophil phagocytosis in lupus. Evolution is usually fast, followed by early complications. The joint fluid is often purulent. It is exudative and very rich in predominantly neutrophilic polynuclear cells. Bacteriology may reveal the presence of bacteria. Synovial biopsy can help to differentiate. It often complicates an already weakened joint, whether due to synovitis, osteonecrosis, or systemic or local corticosteroid therapy, especially in the presence of osteosynthesis material (Khammasi M, 2015) [9].

Given its high endemicity, articular tuberculosis is the main differential diagnosis in our context. It is difficult to diagnose because tuberculoid granulomas are not always present, and the Koch bacillus is inconsistent. New molecular biology techniques can aid in the diagnosis (Del Puppo L, 2016) [10].

According to Dubois, the suppurative abscess in the arm may be related to lupus myositis, which presents with muscle pain in 48% of cases, along with changes in muscle enzymes and electromyographic tracings. Histology reveals either infiltration of mononuclear cells separating atrophied muscle fibers or a vacuolar myopathy appearance, where the role of antimalarial drugs has sometimes been suggested. The manifestations are non-specific, and several forms have been described (Ben-Yahya W, 2018) [11].

4. Conclusion

Systemic lupus erythematosus (SLE) is a complex and protean disease that can manifest in various ways, including rare presentations such as pseudo-septic

monoarthritis. This case demonstrates how lupus can mimic septic arthritis, leading to diagnostic challenges, especially when joint fluid appears purulent. Despite the absence of a pathogen and the inflammatory nature of the synovial fluid, lupus should always be considered in cases of monoarthritis associated with unexplained prolonged fever. Other systemic signs, such as malar rash, anemia, and elevated autoantibodies, further support the diagnosis of lupus. Early recognition and appropriate treatment, including corticosteroids and immunomodulatory therapy, are crucial for favorable patient outcomes.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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