ORIGINAL ARTICLE

Postpartum Septic Osteoarthritis: A case series study

Ostéoarthrite septique du post-partum: Une étude de série de cas

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Abstract

Introduction-Aim: Postpartum septic osteoarthritis is a rare but serious condition often misdiagnosed due to overlap with common postpartum symptoms like pelvic pain and joint stiffness. This case series aims to describe the clinical, bacteriological, and radiological characteristics of postpartum septic osteoarthritis, as well as the treatment approaches and patient outcomes.

Methods: A retrospective case series was conducted at Farhat Hached University Hospital, from 2006 to 2022, involving patients with confirmed postpartum septic osteoarthritis. Clinical data, laboratory findings, imaging results, treatments, and outcomes were analyzed

Results: The mean age of the seven patients was 31.4 years. All patients presented with joint pain, with fever and functional impairment where each was observed in 85.7% of cases. The average diagnostic delay was 17 days. MRI findings revealed bone marrow edema in all patients, Abscesses in 28.5% of cases, periarticular soft tissue edema, and intra-articular effusions in 71.4% of cases. The pubic symphysis was the most commonly affected site (57.1%), followed by the sacroiliac joints (28.6%). Only one pathogen, Streptococcus pyogenes, was isolated. Nearly all patients received dual antibiotic therapy for an average duration of 4 to 6 weeks. Satisfactory clinical progress without sequelae was noted and maintained after an average follow-up of 5 to 6 months.

Conclusion: Our results revealed that postpartum septic osteoarthritis requires prompt diagnosis and early treatment to prevent severe complications. MRI plays a critical role in early detection, while timely antibiotic therapy leads to favorable long-term outcomes

Key words: Postpartum, septic osteoarthritis, MRI, treatment, outcome, diagnosis

Résumé

Introduction-Objectif: L'ostéoarthrite septique postpartum est une affection rare mais grave, souvent mal diagnostiquée en raison de son chevauchement avec des symptômes postpartum courants tels que la douleur pelvienne et la raideur articulaire. Cette série de cas vise à décrire les caractéristiques cliniques, bactériologiques et radiologiques de l'ostéoarthrite septique postpartum, ainsi que les approches de traitement et les résultats des patients.

Méthodes: Une série de cas rétrospective a été menée au Centre Hospitalier Universitaire Farhat Hached, de 2006 à 2022, impliquant des patientes ayant un diagnostic confirmé d'ostéoarthrite septique postpartum. Les données cliniques, les résultats de laboratoire et d'imagerie, les traitements et les résultats ont été analysés.

Résultats: L'âge moyen des sept patientes était de 31,4 ans. Toutes se sont présentés avec des douleurs articulaires, avec de la fièvre et une incapacité fonctionnelle observées chacune dans 85,7 % des cas. Le délai moyen de diagnostic était de 17 jours. Les résultats de l'IRM ont révélé un œdème de la moelle osseuse chez tous les patients, des abcès dans 28.5% des cas, un œdème des tissus mous périarticulaires, et des épanchements intra-articulaires dans 71,4 % des cas. La symphyse pubienne était le site le plus souvent affecté (57,1 %), suivie des articulations sacro-iliaques (28,6 %). Seul le Streptococcus pyogene, a été isolé dans un cas. Près de toutes les patientes ont reçu une antibiothérapie double pour une durée moyenne de 4 à 6 semaines. Des progrès cliniques satisfaisants sans séquelles sont notés et maintenus après un suivi moyen de 5 à 6 mois.

Conclusion: Nos résultats ont prouvé que l'ostéoarthrite septique post-partum nécessite un diagnostic rapide et un traitement précoce pour éviter des complications graves. L'IRM joue un rôle crucial dans la détection précoce, tandis qu'une antibiothérapie appropriée conduit à des résultats cliniques favorables à long terme.

Mots clés: Post-partum, ostéoarthrite septique, IRM, traitement, évolution, diagnostic

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Introduction

Septic osteoarthritis in the postpartum period is a rare but potentially severe condition that remains underreported in the medical literature (1-3). Diagnosing this infection presents significant challenges due to its clinical overlap with common postpartum symptoms such as arthralgia and pelvic pain, which are often attributed to physiological changes associated with pregnancy, particularly the increased laxity of pelvic joints resulting from estrogenic effects on fibrocartilage (4).

The postpartum period, defined as the six weeks following childbirth, is a critical time during which women are particularly vulnerable to various complications, including infections. During this period, infections are relatively common, affecting an estimated 5% to 7% of women, with 1.2% requiring hospital readmission (5, 6). Although postpartum septic osteoarthritis is rare, it can have severe consequences if not promptly diagnosed and managed. Delays in diagnosis can lead to irreversible joint damage, life-threatening septic complications, and long-term functional impairment (1-3). The overall prevalence of postpartum infections underscores the need for heightened clinical vigilance. While serious infection-related complications are uncommon, their impact on maternal health can be substantial.

Magnetic resonance imaging (MRI) has proven to be an invaluable tool in facilitating early suspicion and diagnosis of this condition. MRI not only aids in the early detection of septic osteoarthritis but also guides subsequent imaging modalities, such as ultrasound or computed tomography (CT), for joint aspiration and confirmation of the diagnosis (7, 8).

The aims of our study were to evaluate the clinical, bacteriological, and radiological features of postpartum septic osteoarthritis, as well as to examine the management strategies and the disease's evolutionary course.

Methods

This retrospective cohort study was conducted at the Rheumatology and Infectious Diseases Departments of Farhat Hached University Hospital Center (CHU) in Sousse, Tunisia. The study period spanned from 2006 to 2022, during which patients with confirmed diagnoses of postpartum septic osteoarthritis were identified and included in the analysis.

Patients were eligible for inclusion if they had a confirmed diagnosis of postpartum septic osteoarthritis, defined as a joint infection occurring within the postpartum period. The diagnosis was confirmed through a comprehensive assessment, incorporating clinical, biological, radiological, and bacteriological findings.Patients with incomplete medical records or missing data relevant to the study were excluded to ensure the reliability of the findings.

For the purpose of this study, the postpartum period was defined as the six weeks following childbirth, during which women are particularly susceptible to infections. Key hematological parameters were defined as follows: leukocytosis (WBC count >10,000 cells/mm^3), leukopenia (WBC count <4,000 cells/mm^3), elevated C-Reactive Protein (CRP >6 mg/L), and accelerated Erythrocyte Sedimentation Rate (ESR >30 mm/hr).

Data were systematically collected using a standardized form designed to capture detailed epidemiological, clinical, and paraclinical information. This included variables such as age, and potential risk factors. Medical and surgical history, obstetric and gynecological history, mode of delivery, presenting symptoms, physical examination findings, and the time interval from symptom onset to diagnosis were also recorded. Biological data included results from complete blood counts (CBC), ESR, CRP levels, tests for Mycobacterium tuberculosis, Wright's serology, blood cultures, and bacteriological analyses of joint fluid or soft tissue samples. Diagnostic imaging techniques such as plain radiography, computed tomography (CT), and magnetic resonance imaging (MRI) were employed to evaluate joint integrity and soft tissue involvement.

Data analysis was performed using the Statistical Package for Social Sciences (SPSS) software, version 26. Categorical variables were summarized as frequencies and percentages, while continuous variables were expressed as means with standard deviations for normally distributed data, or as medians with interquartile ranges for non-normally distributed data. The Shapiro-Wilk test was used to assess the normality of the distribution for continuous variables.

Results

Over the course of our 12-year study, seven cases of postpartum septic osteoarthritis were confirmed. The average age of the patients was 31.4 years, ranging from 21 to 42 years. Two patients were nulliparous, and five were multiparous. Only one patient had a significant medical history, including asthma and arrhythmia, while the others reported no notable medical histories. Notably, no factors indicative of immunodeficiency were identified.

The mode of delivery varied: one patient underwent a cesarean section, while six patients (85.7%) had vaginal deliveries. Among these, two cases involved fetal dystocia, necessitating the use of forceps. All cases exhibited an acute onset, with symptoms appearing on average three days postpartum (range: 1-6 days). The average duration between symptom onset and diagnosis was 17 days, with a range of 11 to 20 days.

Pain was a universal symptom, observed in all patients. Fever and functional impairment were each noted in six cases (85.7%). Osteoarticular examination revealed tenderness on palpation of the sacroiliac joints and pain during specific maneuvers (Patrick, Mennell, and Fabere tests) in three patients (42.9%). Tenderness over the pubic symphysis was noted in four patients (57.1%), and pain on hip mobility was observed in two patients (28.6%).

Results of the biological assessment and bacteriological investigation are summarized in Table 1.

Table 1. Results of Biological and Microbiological Assessments

Test/Examination	Number of Patients	Result
Complete Blood Count	7	- WBC within normal limits: 1 patient - Leukocytosis: 6 patients
Biological inflammatory syndrome	7	- CRP: Elevated in all cases, average 130 mg/l (range: 80-398). - ESR: Elevated in all cases average 80 mm/h1 (range: 45-137).
Blood Cultures	7	Positive (1 case) *Streptococcus pyogenes*, penicillin-sensitive
Tuberculin Skin Test (TST) and Search for Mycobacterium tuberculosis in the sputum and urine	4	Negative
Wright's Agglutination Test	4	Negative
Urine Cultures (UC)	5	Positive (1 case) *Escherichia coli* multi-sensitive
Vaginal Swabs	2	- *Klebsiella pneumoniae*: 1 patient - *Proteus mirabilis*: 1 patient
Surgical Wound Swab	1	Positive *Escherichia coli* multi-sensitive
Joint Aspiration	2	Cultures of aspirated fluid were negative

Plain pelvic radiographs were performed in six patients, with imaging conducted on average 7.5 days following symptom onset (range: 2 to 17 days). Radiographs were normal in two cases. Identified abnormalities included joint space widening in four patients, articular margin erosions in two patients, and periarticular soft tissue thickening in one patient.

Initial CT scans were conducted in four patients, on average 8.5 days after symptom onset (range: 5 to 18 days). It was performed in spiral mode with axial slices, with injection of iodinated contrast agent. Multi-planar reconstructions were used to evaluate the joint space, articular surfaces, subchondral bone plate, and periarticular soft tissues. CT findings were unremarkable in one case. Notable abnormalities included joint space widening in two patients, articular margin erosions in two patients, geodes/subchondral osteolysis in one patient, periarticular soft tissue swelling/infiltration in three patients, and a periarticular or intra-articular abscess in one patient.

Pelvic MRI, performed on average 17 days after symptom onset (range: 11 to 20 days), identified abnormalities in all cases. MRI findings revealed bone marrow edema in the articular margins in all patients, with periarticular soft tissue edema, synovial contrast enhancement, and intra-articular effusions observed in 71.4% of cases. Periarticular abscesses were present in 28.5% of cases (figures 1, 2 and 3). All MRI studies incorporated sequences such as axial T1-weighted and T1 FAT SAT before gadolinium injection, axial and coronal T2-weighted with fat saturation or STIR, and axial and coronal T1 FAT SAT after gadolinium injection. In all cases, the affected joints were located in the pelvis. The pubic symphysis was involved in four patients (57.1%), and the sacroiliac joints in two patients (28.6%), with one case of bilateral involvement and one case of unilateral involvement. Simultaneous involvement of both sacroiliac joints and the pubic symphysis was observed in one patient.

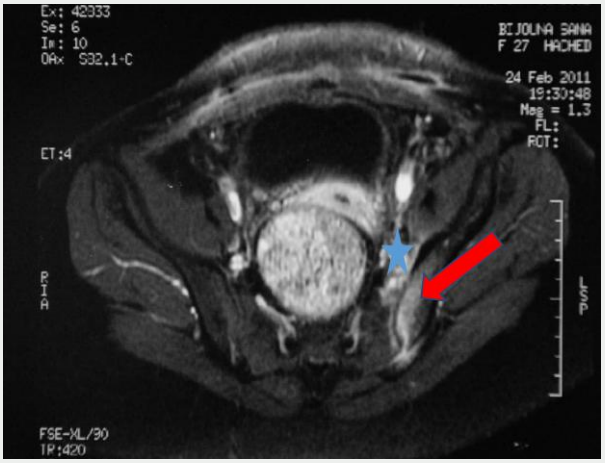

Figure 1. left sacroiliitis on MRI with bone edema ↘ and soft tissue edema ★

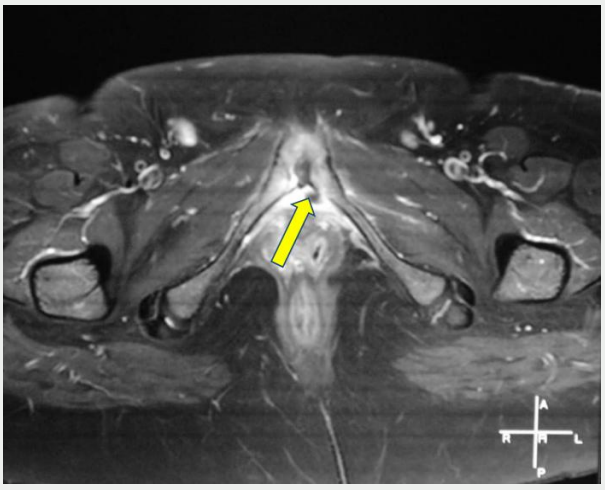

Figure 2. Pelvic MRI showing an intra-articular collection at the pubic symphysis

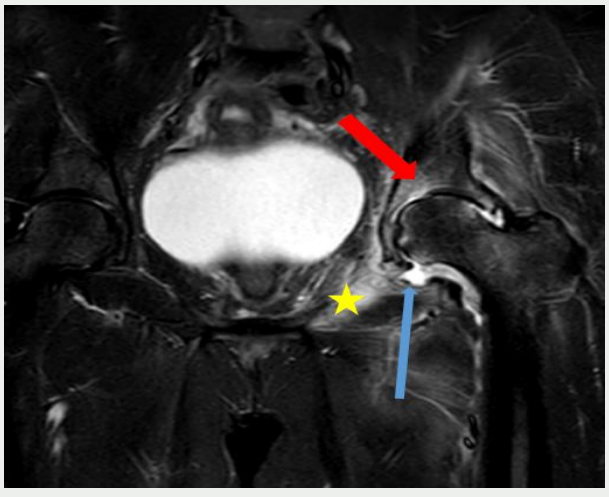

Figure 3. MRI showing coxitis with intra-articular effusion ↗, bone marrow edema ↘, soft tissue edema ☆ and joint space narrowing with irregularities of the articular surfaces

In our series, only one pathogen was isolated, Streptococcus pyogenes. Consequently, a broad-spectrum empirical antibiotic regimen targeting staphylococci and gram-negative bacteria was administered to four patients (42.9%), utilizing a combination of a third-generation cephalosporin and a fluoroquinolone. In addition, amoxicillin/clavulanic acid was prescribed to three patients (42.9%), administered alone in one instance and in conjunction with fluoroquinolones or lincosamides (Dalacin*) in the other two cases. The duration of antibiotic therapy ranged from 4 to 6 weeks, with an average of 15 days of intravenous administration.

The clinical and biological progression of the patients was satisfactory across all cases, characterized by rapid apyrexia achieved within 48 hours to one week, substantial pain reduction, and a gradual restoration of mobility. Initially, patients utilized a walker for ambulation, which subsequently evolved to independent walking, typically within an average timeframe of 7 days (ranging from 3 to 10 days). This positive trend was further supported by a progressive normalization of inflammatory biomarkers. Importantly, no sequelae were observed after an average follow-up period of 5 to 6 months.

Discussion

Over a 12-year period, we identified seven cases of this condition, underscoring the need for heightened clinical vigilance in postpartum women, especially those presenting with joint pain and systemic symptoms. The mean age of our cohort was 31.4 years, with a range from 21 to 42 years. Most patients had no significant medical history, consistent with existing literature (9).

In our cohort, the majority of patients (85.7%) delivered vaginally, with only one requiring a cesarean section. Notably, two of these vaginal deliveries were complicated by fetal dystocia, necessitating the use of forceps. Such complications can increase the risk of postpartum septic osteoarthritis due to mechanical stress and potential microtrauma to the pelvic joints, which may promote bacterial colonization at these sites. This risk is further amplified by altered venous return at the pubic symphysis, creating a more conducive environment for infection. Additionally, pregnancy-induced immunosuppression further predisposes these patients to infection (10). In contrast, cesarean sections may present a lower risk of direct trauma to the pelvic joints. These findings align with the existing literature and emphasize the importance of closely monitoring postpartum patients, particularly those with complicated vaginal deliveries, to ensure early detection and timely management of joint infections.

Despite the absence of identifiable risk factors in most cases, all patients presented with acute onset symptoms within seven days postpartum, highlighting the unpredictable nature of postpartum septic osteoarthritis. Pain was the predominant symptom, present in all cases. Fever and functional impairment, though frequent, were inconsistent, observed in 87.5% of our patients. These findings are consistent with other studies, where fever is noted in 69% to 74% of cases (3, 9, 11, 12). Musculoskeletal examination is crucial in guiding diagnosis and pinpointing affected joints. The average diagnostic delay of 17 days suggests that the nonspecific early presentation often leads to misdiagnosis or delayed intervention. This delay is concerning given the rapid progression of septic arthritis, which can result in irreversible joint destruction and long-term functional impairment. Based on a critical analysis of our cases and the literature, we propose that specific clinical signs should prompt early consideration of this diagnosis. These signs include the secondary appearance of pain not present in the early postpartum period, increasing intensity or atypical evolution of pain, as well as the presence of fever or functional impairment, particularly following a non-dystocic delivery.

The diagnostic process in our cohort revealed several key findings. Although leukocytosis was present in the majority of patients, it was not universally observed, indicating that a normal white blood cell count does not exclude septic arthritis. Elevated CRP and ESR levels were consistently observed in all cases, reinforcing their utility as reliable markers of inflammation. Blood cultures were positive in only one patient, consistent with literature showing a positivity rate of approximately 40% in cases of postpartum septic sacroiliitis, and a lower frequency in postpartum septic symphysitis and coxitis (13). According to the literature, the most common pathogens are S. aureus in all cases of postpartum septic osteoarthritis, followed by group A Streptococcus pyogenes, isolated from blood, urine, or vaginal specimens in sacro ilitis and commensal organisms from the urogenital tract in coxitis and symphysis (3, 9, 14). In our series, Streptococcus pyogenes was identified in blood culture, known for its aggressive course in septic arthritis. The isolation of additional pathogens, such as Escherichia coli, Klebsiella pneumoniae, and Proteus mirabilis from urine and vaginal cultures suggests the possibility of polymicrobial infections in postpartum women. However, the clinical relevance of these findings necessitates further investigation, highlighting the need for additional studies to assess their potential contributions to the pathogenesis of postpartum infections.

Imaging played a crucial role in diagnosis and management. Early plain radiographs often showed subtle changes such as joint space widening or periarticular soft tissue thickening, but this method lacks sensitivity and specificity (15, 16). CT scans provided additional details in some cases, particularly with the identification of geodes and subchondral osteolysis. However, caution is advised with CT, especially if performed within the first three days of symptom onset, as results are generally normal during this period (2). Conversely, MRI proved to be the most informative modality, revealing abnormalities in all patients. These abnormalities included bone marrow edema, soft tissue edema, and synovial enhancement with contrast. The presence of intra-articular effusions and periarticular collections in several cases supported the diagnosis of septic arthritis. Detailed imaging protocols, including fat-saturation sequences and gadolinium enhancement, were essential for ruling out differential diagnoses and detecting early, subtle changes. These findings are consistent with the literature and underscore

the value of MRI in early diagnosis (7, 8, 15, 17, 18).

Our results indicate that the sacroiliac joints and pubic symphysis are the most frequently affected sites in postpartum septic osteoarthritis, with hip involvement being less frequent but still significant, according to the literature, (19, 9,11, 12). The simultaneous involvement of multiple pelvic joints in a single patient suggests a potentially more severe or extensive pathological process, necessitating more aggressive management.

The recommended antibiotic treatment for infectious osteoarthritis during pregnancy and the postpartum period closely aligns with our findings, utilizing a two-drug intravenous regimen for a duration of 4 to 6 weeks (9). In our study, this approach demonstrated favorable clinical outcomes, characterized by rapid apyrexia and significant improvement in mobility (1,2, 13). Notably, the study also benefits from a well-defined patient cohort, consistent monitoring protocols, and comprehensive follow-up assessments, all of which enhance the robustness of our findings. Although surgical intervention to drain any abscess not responding to medical therapy is rarely necessary, it remains an option to consider in refractory cases. Whenever possible, the choice of antibiotics should be guided by the susceptibility profiles of the isolated pathogens, thereby reinforcing the need for targeted therapy (9). The overall prognosis for patients suffering from infectious osteoarthritis is generally favorable, primarily depending on early diagnosis and prompt treatment, as evidenced by our observations of the absence of sequelae during the follow-up period (1-3, 9). However, the study has several limitations, including a small sample size, which restricts the generalizability of the findings. Additionally, the retrospective nature of the study may introduce selection and recall biases, and the reliance on medical records could result in incomplete data capture. These factors should be considered when interpreting the results.

Conclusion

Our study underscores the critical need for prompt diagnosis and intervention in postpartum septic osteoarthritis to prevent severe complications. The findings highlight that the sacroiliac joints and pubic symphysis are the most frequently affected sites, with notable but less frequent involvement of the hips. MRI has proven to be an essential tool, revealing key abnormalities and guiding accurate diagnosis. Despite the absence of identifiable risk factors in many cases, early intervention remains crucial, as postpartum osteoarticular infections can occur without clear entry points or risk factors.

The recommended antibiotic treatment, utilizing a two-drug intravenous regimen for 4 to 6 weeks, has shown favorable clinical outcomes, including rapid apyrexia and significant improvement in mobility. Moreover, our observations indicate a generally positive prognosis, underscoring the importance of early diagnosis and timely intervention.

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