






The Management of Patients with a Acute Septic Arthritis: An Epidemiological Study

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ABSTRACT

Aim: The aim of this study is to evaluate the causative agents, diagnosis, treatment, and outcomes of acute septic arthritis cases.

Material and Methods: In this retrospective, single-center study, patients over 18 years of age diagnosed with acute septic arthritis were searched from the hospital database between January 2015 and April 2021. Demographic characteristics, diagnostic procedures, therapeutic management, and outcomes were recorded.

Results: A total of 59 patients and 60 septic joints were included in the study. The causative microorganisms were isolated in 52.54% of the cases. *Staphylococcus aureus* grew in 70.96% of the cases and among these, 31.82% were methicillin-resistant. The most frequently affected body part was the knee (73.33%). The cases were found to have fever at a rate of 42.37%. Diabetes was the most common comorbidity (30.51%), and immunosuppression was found in 39% of the cases. Arthrotomy was the most commonly used surgical method for the management of septic arthritis (43.55%). The mortality rate was 6.78%. The cases were categorized as groups with and without microorganisms isolated in culture. When these two groups were compared, no statistically significant difference was found except for the duration of hospitalization (p=0.001).

Conclusion: Septic arthritis should be considered in the differential diagnoses of a warm and swollen single joint, especially in the presence of risk factors, until it is excluded. Knowledge of regional epidemiological data is essential in planning treatment approaches.

Keywords: Risk factors; septic arthritis; staphylococcus aureus; treatment.

Akut Septik Artritli Hastaların Yönetimi: Epidemiyolojik Bir Çalışma

ÖZ

Amaç: Bu çalışmada akut bakteriyel septik artrit vakalarında etken, tanı ve tedavi sonuçlarının irdelenmesi amaçlandı.

Gereç ve Yöntemler: Bu retrospektif, tek merkezli yürütülen çalışmada, Ocak 2015 ile Nisan 2021 tarihleri arasında, akut septik artrit tanısı ile izlenen 18 yaş ve üzerindeki hastalar, hastane veri tabanından taranarak belirlendi. Bu hastaların demografik özellikleri, tanı konulma prosedürleri, tedavi yönetimi ve sonuçları dosyalara kaydedildi.

Bulgular: Çalışmaya toplam 59 hasta, 60 eklem septik aritri dahil edildi. Olguların %52,54'ünde etken mikroorganizma izole edildi. Vakaların %70,96'sında *Staphylococcus aureus* üredi ve bunların %31,82'i metisiline dirençli idi. En fazla tutulan eklem, diz eklemi olarak saptandı (%73,33). Olguların %42,37'sinde ateş yüksekliği tespit edildi. Komorbiditeler arasında en sık diyabet yer almakta olup (%30,51), olguların %39'unda immun supresyona yol açacak bir neden saptandı. Septik artrit tedavi yönetiminde en sık kullanılan cerrahi yöntem artrotomi idi (%43,55). Tedavi sonuçları değerlendirildiğinde ölüm oranı %6,78 olarak tespit edildi. Olgular kültürde mikroorganizma izole edilen ve edilmeyen grup olarak kategorize edildi. Bu iki grup karşılaştırıldığında hastanede yatış süreleri dışında istatistiksel olarak anlamlı bir fark saptanmadı (p=0,001).

Sonuç: Sadece bir eklemde ısı artışı ve şişlik olması durumunda, özellikle risk faktörleri varlığında, ayırıcı tanıda aksi kanıtlanana kadar septik artrit tanısı öncelikle yer almalıdır. Tedavi yaklaşımlarının planlanmasında, bölgesel epidemiyolojik verilerin bilgisi esastır.

Anahtar Kelimeler: Risk faktörleri; septik artrit; staphylococcus aureus; tedavi.

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INTRODUCTION

Acute septic arthritis is an orthopedic emergency that requires prompt diagnosis and treatment to avoid serious complications, morbidity, and mortality (1-4). Delayed or inadequate treatment can cause irreversible joint destruction with an estimated mortality rate of approximately 11% (3,5). The incidence of septic arthritis has been reported as 2-6 cases per 100.000 persons per year in the general population (2,4,6,7). Although infection may be observed at any age, it is more common in young children and elderly individuals (2,3). Risk factors for septic arthritis include previous joint pathologies such as rheumatoid arthritis and crystal arthropathy, joint prosthesis, low socioeconomic status, and diabetes. Additionally, intravenous substance abuse, alcoholism, intra-articular corticosteroid injection, and the presence of cutaneous ulcers increase the risk of septic arthritis development (1,2,6-8).

Infection can be caused by the hematogenous or direct inoculation of microorganisms from other foci in the body (1,2,7). *Staphylococcus aureus* is the most common causative microorganism among all ages and risk groups, followed by other Gram-positive bacteria such as *Streptococcus* spp. bacteria (2,6,9). Septic arthritis usually affects monoarticular joints and in about 50% of cases, peripheral large joints, such as the knees, are involved (8,9). Shoulder, hip, wrist, interphalangeal, and elbow joints may also be affected (6,10).

In the presence of acute joint disease signs and symptoms, septic arthritis diagnosis should be of primary consideration. Urgent diagnosis and treatment planning are important to regain normal function in the joints. The management of the disease involves a combination of antimicrobial therapy and joint drainage (10).

Due to an increase in the incidence of septic arthritis cases infected with resistant and rare microorganisms, knowledge of regional epidemiological data is important and necessary for planning treatment approaches. The aim of this study is to evaluate the epidemiological characteristics, diagnosis, and management of patients diagnosed with acute septic arthritis.

MATERIAL AND METHODS

This single-center retrospective cohort study was conducted at Istanbul Medeniyet University Goztepe Prof. Dr. Suleyman Yalcin City Hospital. Ethics committee approval of the study was obtained from Medeniyet University Goztepe Training and Research Hospital, with the decision dated 10.02.2021 and numbered 2021/0128.

In our study, patients diagnosed with acute septic arthritis were followed up from January 2015 to April 2021 retrospectively from the hospital databases. Patients diagnosed with acute native septic arthritis, from both sexes, who were over 18 years of age were included in the study. On the other hand, patients under 18 years of age, patients with joint prosthesis or history of prior joint surgery more than one year ago, and those diagnosed with tuberculosis or gonococcal septic arthritis were excluded from the study. We aimed to include all septic arthritis

patients who were followed up in our institution. Therefore, no sample size was calculated in this study.

Septic arthritis cases were evaluated according to the criteria defined by Newman: (11)

Newman A: Positive synovial fluid culture

Newman B: Negative synovial fluid culture and positive blood culture

Newman C: No organism isolated but

-histological or radiological evidence of infection

- turbid fluid aspirated from joint

After case identification, the age, sex, involved joint area(s), clinical symptoms and findings, comorbidities, time between the onset of symptoms and diagnosis, length of hospital stay, and systemic or joint complications were recorded in data collection forms. Furthermore, leukocyte counts in the synovial fluid and blood, Gram staining, culture results, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP) values, echocardiographic evaluations, surgical procedures applied for drainage, number of drainage procedures, administered antibiotics, and durations of treatment were also recorded.

Statistical Analysis

The continuous data are presented as mean±standard deviation (SD) for the normally distributed variables. The non-normally distributed variables, which are presented as median (minimum-maximum) values, were compared using the Mann-Whitney U test. Normal distribution was assessed with the Shapiro-Wilk test. We used Pearson's Chi-Squared test, Fisher's Exact test, or Fisher-Freeman Halton test to compare the qualitative data. Significance was considered at the level of $p < 0.05$. The NCSS (Number Cruncher Statistical System) Statistical Software (Utah, USA) was used for the statistical analyses.

RESULTS

Fifty-nine patients diagnosed with septic arthritis and 60 septic joints were included in the study. The mean age of the patients was 59.20 ± 20.08 (18-81) years, and 34 cases were males (57.63%).

Although bacteria were isolated from cultures for 31 cases (52.54%), they could not be isolated in 28 cases (47.46%).

According to the Newman classification, there was growth in the synovial fluid culture (Newman A) (regardless of blood culture positivity) in 26 (44.07%) cases. While blood culture positivity (Newman B) was detected in 5 of the patients (8.48%), there was no growth in the synovial fluid, and purulence was detected in the joint fluid in 28 cases (47.45%) without any bacterial isolation (Newman C). Diabetes was the most common comorbidity in 18 patients (30.51%), and 23 cases (39%) were immunosuppressed. The most common cause of immunosuppression was malignancy, observed in 9 (15.25%) patients. Pre-existing joint diseases were observed in 9 cases (15.25%), and the most common disease among these cases was rheumatoid arthritis (8.48%). The most commonly involved joint was the knee joint, observed in 44 cases (73.33%), and 58 (98.31%) of the cases were monoarticular (Table 1).

Table 1. Distribution of descriptive characteristics

Variable	n (%)
Age	
<50	19 (32.20)
50-69	19 (32.20)
≥70	21 (35.60)
Sex	
Female	25 (42.37)
Male	34 (57.63)
Classification	
NewmanA	26 (44.07)
NewmanB	5 (8.48)
NewmanC	28 (47.45)
Previous joint disease	
Rheumatoid arthritis	5 (8.48)
Behcet disease	2 (3.39)
Gout	1 (1.70)
Psoriasis	1 (1.70)
*Comorbidities	
Diabetes	18 (30.51)
Hypertension	14 (23.73)
*Immunosuppression	
Malignancy	9 (15.25)
Systemic steroid usage	7 (11.86)
Chronic renal failure	3 (5.09)
Chronic alcohol consumption	1 (1.70)
HIV infection without follow-up	1 (1.70)
Intravenous drug addiction	1 (1.70)
TNF alpha-blocker usage	1 (1.70)
*Other risk factor	
Cutaneous infection	6 (10.13)
Recent hospitalization	6 (10.13)
Intra-joint injection	2 (3.39)
Joint circumference operation	2 (3.39)
Trauma	1 (1.70)
Joint involvement	
Monoarticular	58 (98.31)
Polyarticular	1 (1.69)
Joint	
Ankle	2 (3.33)
Elbow	8 (13.34)
Knee	44 (73.33)
Hip	2 (3.33)
Shoulder	4 (6.67)

* More than one option ticked

The time between the onset of symptoms and the diagnosis ranged from 2 to 15 days, with a mean time of 6.36±3.58 days. The most common symptom at admission to the hospital was pain in 57 patients (96.61%). Additionally, leukocytosis (≥10.000/mm³) was found in 38 cases (64.41%), erythrocyte sedimentation rate (ESR) values were high (≥30/hour) in 52 cases (88.14%), and C-reactive protein (CRP) was high (>0.5gr/dl) in 57 cases (96.61%) at the time of admission to the hospital. The leukocyte counts in the synovial fluid among the patients ranged between 12.395 and 400.000/mm³, and the mean value was 83.527.92±78.332.52/mm³. The values were within the range of 50-100.000/mm³ in 30 cases (50.84%). In Gram staining, bacteria were detected in 20 patients (33.90%) (Table 2).

Table 2. Evaluation of symptoms and examination results

Variable	n (%)
*Symptom	
Pain	57 (96.61)
Fever	25 (42.37)
Temperature elevation	15 (25.42)
Rubescence	19 (32.20)
Blood Leukocyte	
<10.000	21 (35.59)
≥10.000	38 (64.41)
ESR	
<30	7 (11.86)
≥30	52 (88.14)
CRP	
≥0.5 g/dl	57 (96.61)
<0.5 g/dl	2 (3.39)
Synovial Fluid Leukocyte	
0-25.000	5 (8.48)
25-50.000	12 (20.34)
50-100.000	30 (50.84)
≥100.000	12 (20.34)
Gram staining	
Positive	20 (33.90)
Negative	39 (66.10)

* More than one option ticked

ESR: Erythrocyte sedimentation rate; CRP: C-reactive protein

Out of the 59 patients who were included in the study, bacterial growth was observed in the synovial fluid of 26 cases, in the blood cultures of 10 cases, and both the synovial fluid and blood cultures of 5 cases. In our cases of septic arthritis, *S. aureus* was found to be the most common microorganism isolated in culture, in a total of 22 patients (70.96%). Methicillin-resistant *S. aureus* (MRSA) was detected in 7 cases (31.82%) (Table 3).

Table 3. Culture results of the patients

Causative microorganisms	n (%)
Culture positive	
<i>Staphylococcus aureus</i>	31 (52.54)
MRSA	7 (31.82)
MSSA	15 (68.18)
<i>Streptococcus spp.</i>	4 (12.90)
<i>Enterococcus spp.</i>	2 (6.45)
CoNS	1 (3.23)
<i>Escherichia coli</i>	1 (3.23)
<i>Proteus mirabilis</i>	1 (3.23)
Culture negative	
	28 (47.46)

MRSA: Methicillin resistant *Staphylococcus aureus*; MSSA: Methicillin sensitive *Staphylococcus aureus*; CoNS: coagulase negative *Staphylococcus*

All patients were hospitalized and followed up for a mean hospital stay duration of 14.64±11.07 days (3-54). A combination of surgical drainage and antibiotic therapy was used for the management of septic arthritis. The surgical procedure for each patient was selected according to the preferences of the surgeon. Of the 62 surgical procedures performed, 27 (43.55%) were arthroscopy operations. Drainage was repeated in 2 (3.39%) cases (Table 4).

Table 4. Evaluation of treatments

Variables	n (%)
Surgical procedure	
Arthrotomy	27 (43.55)
Closed needle aspiration	22 (35.48)
Arthroscopy	13 (20.97)
Number of drainage procedures	
1	57 (96.61)
≥ 2	2 (3.39)

Parenteral empirical antibiotic therapy was initiated urgently in all patients without delay, and culture results were obtained. The mean intravenous and oral sequential treatment durations were 14.12±12.49 (3-62) and 29.77±8.66 (7-41) days, respectively. Considering the associated risk factors such as immunosuppression, trauma, and recent hospitalization and care services, a combination therapy of vancomycin and third-generation cephalosporin (ceftriaxone/ceftazidime) was initiated in 32 patients (54.24%). Vancomycin was initiated in the patients with positive Gram staining and in 27 other patients (45.76%), who underwent intra-articular injection

or had an adjacent cutaneous infection. According to the culture results, the treatment was changed to cefazolin in 15 patients (25.42%), ampicillin-sulbactam in 3 patients (5.08%), and third-generation cephalosporin in 2 patients (3.39%). In one of the 2 patients diagnosed with endocarditis, the causative microorganism was MRSA, and vancomycin was used as an antibiotic therapy, while the other patient was infected with *Enterococcus faecalis*, and his treatment was completed with a combination of ampicillin and gentamicin. Clindamycin and ciprofloxacin were the most frequently used oral treatment options in 47 patients (79.66%) and 33 patients (59.93%), respectively. Loss of function was observed in 20 patients (33.90%), and death was observed in 4 patients (6.78%).

Septic arthritis cases with or without positive culture results for microorganisms were compared. There was no statistically significant difference between the groups in terms of their age distribution (p=0.242), sexes (p=0.943), involved joint areas (p=0.503), numbers of leukocytes in the synovial fluid (p=0.133), presence of leukocytes in the blood (p=0.985), CRP values (p=0.187), ESR values (p=0.240), fever status (p=0.325), or outcomes (p=0.416).

Table 5. Evaluation of septic arthritis cases according to culture results

Variables	Culture Positive SA (Newman A+B), n (%)	Culture Negative SA (Newman A+B), n (%)	p
Age			
<50	12 (38.71)	7 (25.00)	^a 0.242
50-69	11 (35.48)	8 (28.57)	
≥70	8 (25.81)	13 (46.43)	
Sex			
Female	13 (41.94)	12 (42.86)	^a 0.943
Male	18 (58.06)	16 (57.14)	
Join Involvement			
Knee joint	22 (70.97)	22 (78.57)	^a 0.503
Other than knee joint	9 (29.03)	6 (21.43)	
Length of stay			
Median (Min-Max)	15 (3-54)	9.5 (3-20)	^b 0.001**
Synovial Fluid Leukocyte count			
0-25.000	4 (12.90)	1 (3.57)	^c 0.133
25-50.000	9 (29.03)	3 (10.71)	
50-100.000	12 (38.71)	18 (64.29)	
≥100.000	6 (19.36)	6 (21.43)	
Blood Leukocyte			
<10,000	11 (35.48)	10 (35.71)	^a 0.985
≥10,000	20 (64.52)	18 (64.29)	
CRP			
Median (Min-Max)	14.70 (1.32-35)	11.33 (0.10-30.58)	^b 0.187
ESR			
<30	2 (6.45)	5 (17.86)	^d 0.240
≥30	29 (93.55)	23 (82.14)	
Has Fever			
Yes	15 (48.39)	10 (35.71)	^a 0.325
No	16 (51.61)	18 (64.29)	
Outcome			
Loss of function	12 (38.71)	8 (28.57)	^c 0.416
Death	3 (9.78)	1 (3.57)	
Recovery	16 (51.61)	19 (67.86)	

^aPearson's Chi-Squared Test ^bMann-Whitney U Test ^cFisher Freeman Halton Test ^dFisher's Exact test
CRP; C-reactive protein, ESR: Erythrocyte sedimentation rate

A statistically significant difference was found between the hospitalization periods of the patients based on their culture results, where the patients with positive culture results had longer hospital stay durations (median, min-max: 15, 3-54) than those with negative culture results (median, min-max: 9.5, 3-20) ($p=0.001$) (Table 5).

DISCUSSION

In this study we aimed to evaluate the etiology, risk factors, and treatment options and outcomes of septic arthritis, and we conducted retrospective analyses of 60 native septic arthritis joints in 59 patients. Microorganisms were identified in the synovial fluid or blood culture in 52.54% of our cases. This rate was close to the results of Madruga Dias et al. (12) in which agents were isolated in 41.2% of the cases, while it was lower than those reported in the studies of Helito et al. (13) and Eberst-Ledoux et al. (14), which were 77.1% and 81%, respectively. The low rate of positive cultures could have been caused by the administration of antibiotic therapy to patients before their admission to the hospital. The unnecessary use of antibiotics is an important public health problem, and attempts have been made in recent years to limit the easy access of patients to antibiotics and promote their rational usage (15).

Staphylococcus aureus accounts for more than two-thirds of the organisms identified in septic arthritis, followed by *streptococci* and Gram-negative bacilli. *S. aureus* is the organism most commonly found in patients with septic arthritis, and *Streptococcus* species are the next most common (16). In this study, *S. aureus* was isolated as the causative agent in 22 cases (70.96%), and the rate of MRSA was 31.82%. Only one case of MRSA was community-acquired and did not have any associated risk factors, while the other 6 patients had at least one comorbidity, including diabetes, malignancy, chronic renal failure, recent hospitalization, or patient care service history. A high rate of MRSA could be related to risk factors, and it should be considered in the selection of empirical antibiotics.

Septic arthritis typically presents as a warm, edematous, and tender joint or joint(s) with reduced range of motion (9,17). Fever is not a conclusive determinant in the diagnosis, and the incidence of fever has been reported as 36-75% in various studies (6,18- 20). In this study, a fever of 37.8°C or above was detected in only 42.37% of our patients. Additionally, pain complaints and joint range of motion limitations were detected in 96.61% and 100% of our patients, respectively.

In patients with septic arthritis, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), and white blood cell count (WBC) values are generally elevated. However, the lack of an increment in acute phase reactants does not exclude the diagnosis of acute septic arthritis (3,21). WBC counts were elevated in 64.41% of our cases, while ESR values were elevated in 88.14%, and CRP values were elevated in 96.61%. Gupta et al. (19) detected high CRP levels in 98% of their patients, and Helito et al. (20) found elevated ESR and CRP levels in all their patients. In the study conducted by Li et al. (21), in which 73 adult patients diagnosed with septic arthritis based on positive arthrocentesis or surgical findings were included, the sensitivity values of WBC, ESR, and synovial fluid WBC

(jWBC) were found to be 48%, 96%, and 64%, respectively. They concluded that in more than one-third of their cases, the jWBC count was lower than 50.000 cells/mm³, and septic arthritis in adults could not be ruled out definitively by supplemental blood tests and arthrocentesis (21). Similarly, Carpenter et al. (22) reported that the exception of recent joint surgery or cellulitis overlying a prosthetic joint, history, physical examination, and routine blood tests were insufficient to distinguish acute septic arthritis from other forms of arthritis. In our study, WBC values were over 50.000 cells/mm³ in 71.18% of the septic arthritis cases who were followed up. In a systemic review, Margaretten et al. (8) emphasized the diagnostic importance of arthrocentesis, particularly the WBC value of the synovial fluid and the percentage of polymorphonuclear leukocytes (PMNL) combined, and the sensitivity of Gram staining was identified as 29-50%. The percentage of PMNL was 90% or higher in all of our cases, and bacteria were detected in the Gram staining tests of the synovial fluid in 33.90% of the cases. The analysis of the synovial fluid helps in the diagnosis of septic arthritis, but if septic arthritis is suspected, the initiation of empirical antibiotic therapy is necessary and should not be delayed while waiting for culture results (23).

Consistent with previous studies (3,9,19,24-26), in our study, the infection mostly affected a single large stiff joint, and the knee joint was affected in 74.6% of the cases. Only one patient had polyarticular septic arthritis (1.69%), and this rate was similar to the result of Clerc et al. (25), which was 1.7%, but lower compared to the results of the studies carried out by Gupta et al. (19) and Munoz-Egea et al. (24), which were 15% and 14.6%, respectively.

The risk of developing septic arthritis increases at ages over 60 years, as well as among patients with recent bacteremia, diabetes, cancer, cirrhosis, or kidney disease. Other risk factors include drug, substance, or alcohol abuse, a history of corticosteroid injection, recent trauma or surgical procedure, and a history of rheumatoid arthritis (1). In a prospective study, being aged 80 years and above, diabetes mellitus, rheumatoid arthritis, closed joint surgery, the presence of prosthesis, and skin infection were identified as risk factors for septic arthritis (27). In our study, 35.60% of the cases were aged 70 years or above, and 39% were immunosuppressed. Malignancy, systemic corticosteroid usage, and chronic kidney failure were the most common causes of immunosuppression. Diabetes was present in 30.51% of our patients. In various studies, the rates of associated immunosuppression have been reported as 4.3-34.4%, and diabetes rates have been reported as 19.1-32.9% (12,18,20). High immunosuppression rates may be attributed to our classification as a tertiary hospital for diagnosis and treatment in Turkey, and therefore, having greater numbers of complicated hospitalizations.

To the best of our knowledge, in the literature in English, there are no randomized controlled studies determining the best treatment option for septic arthritis or the optimal duration of antibiotic therapy. If there is clinical suspicion of septic arthritis, empirical antibiotic therapy should be started without delay until culture results are obtained, even if the Gram staining test is negative. In case of strong clinical suspicion, it is recommended to continue the

antimicrobial therapy even if the culture results are negative and even in cases responding to empirical treatment (28). In our study, a combination of surgical drainage and antibiotic therapy was applied to our patients, and parenteral empirical antibiotic therapy was initiated immediately in all patients before the culture results were obtained. The treatments were modified according to the culture results. We believe that the selection of empirical antibiotics according to the risk factors of patients and the local antibiotic resistance rates will play an effective role in the success of treatment management.

The removal of bacteria and inflammatory residues from the joint space is an important component of infection management in septic arthritis (1,3,17,28). Surgical treatment includes decompression, lavage, debridement, and synovectomy. Arthrotomy, arthroscopic debridement, and serial closed needle aspiration are among the invasive treatment options, and the most appropriate surgical method is still controversial (1). In a randomized controlled study comparing arthrotomy and arthroscopy by standardizing the antibiotic treatment, physical therapy, and post-operative evaluation protocols of knee septic arthritis, it was concluded that both techniques showed similar efficacy. However, arthroscopy was preferable over arthrotomy as it posed a smaller threat of reinfection and inflammation (29). Aim et al. (30) emphasized that arthroscopic treatment could be applied to all patients with native joint septic arthritis. Nevertheless, follow up for the need of repeated arthroscopy should be considered in patients with no significant improvements, especially those with positive drainage fluid culture results. In our study, the choice of surgical procedure was considered by the orthopedic specialists according to the patients' status. Arthrotomy drainage was applied in 43.55% of the cases, closed needle aspiration was applied in 35.48%, and arthroscopic drainage was applied in 20.97%. Two immunosuppressed cases required repeated drainage after arthroscopy.

The mortality rate was 6.78% among our patients, and it was found to be lower than the rates in the relevant literature (3,5,6). The rate of function loss was 33.90%, which was consistent with the literature (6). The loss of function was generally in the form of difficulty in walking, using a single crutch, and mild to moderate morbidity in the first 6 months. This condition showed a significant improvement in the follow-ups after 6 months. Trauma created by surgery could also have affected loss of function.

Our patients with and without microorganisms isolated in their culture tests were also compared in the terms of their demographic, clinical, laboratory, and disease characteristics. We did not find any statistically significant difference between the two groups, except for their durations of hospitalization, which were longer in the patients with microorganisms isolated in their culture tests. The isolation of microorganisms in culture confirms the diagnosis, but we believe that the diagnosis of septic arthritis cannot be excluded when both groups have similar characteristics and a pathogen cannot be isolated, and the clinician must carefully evaluate the data.

Our study had certain limitations due to its retrospective nature and relatively small sample size. However, we think that this study is important in terms of contributing to the

literature, since septic arthritis cases are rare and involve only adult patients older than 18 years of age.

CONCLUSION

In conclusion, the mortality rate was found as 6.78% in our cohort study in which we analyzed the epidemiology, diagnosis, treatment, and outcomes of acute native bacterial septic arthritis. *S. aureus* was isolated, and it was the most common causative pathogen. In approximately one-third of the cases, Staphylococci were methicillin-resistant. Therefore, it is necessary to administer empirical antibiotics to also cover MRSA. More than half of our patients had at least one risk factor. In the presence of risk factors in patients presenting with acute single and warm swollen joints, septic arthritis is suspected until proven otherwise to avoid irreversible errors. Prompt diagnosis and initiation of treatment are important to reduce the probability of morbidity and mortality. We did not find any statistically significant difference between our patients with and without microorganisms isolated in their culture results in terms of their demographic, clinical, laboratory, or disease outcomes. This situation increases the importance of clinical awareness in reaching accurate and well-timed diagnosis and treatment. From this starting point, randomized studies with larger sample sizes are needed.

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