

**Research Article**

**A cross sectional study on cases of septic arthritis presenting  
at Mayo Hospital Lahore**

**Abu Bakar Sadique, Muhammad Ali Saeed Bhatti  
and Raheel Ahmed Khan**

<sup>1</sup>House Officer, Mayo Hospital, Lahore.

<sup>2</sup>House Officer, Services Institute of Medical Sciences, Lahore

<sup>3</sup>House Officer, Services Hospital Lahore

[Received: 11/12/2018; Accepted: 20/12/2018; Published: 21/12/2018]

**ABSTRACT**

**Objective:** To assess the frequency of septic arthritis in cases presenting at Mayo Hospital Lahore

**Material and methods:** This cross sectional was conducted at Department of Medicine, Mayo Hospital Lahore from November 2017 to May 2018 over the period of six months. Frequency of septic arthritis, causative organism and their susceptibility to antibiotics was assessed.

**Results:** Mean age of the patients was  $45.03 \pm 12.9$  years. Septic arthritis was found in 37% patients. Total 38 (52.1%) patients were male and 35 (47.9%) patients were female. Knee joint was involved in 65 (89%) cases, hip was involved in 8 (11%) cases and elbow was not in any case. *S. aureus* was involved in 72.6% patients and ceftriaxone was found susceptible in 79.5% cases.

**Conclusion:** Septic arthritis was more common in male as compare to female patients and it can be occurred in any age group. Knee is the most common joint involved in septic arthritis. *S. aureus* was the most common organism isolated and the most susceptible drug was ceftriaxone.

**Key words:** Synovial fluid, Arthritis, Biopsy, Rheumatoid arthritis

**INTRODUCTION**

The presentation of a patient with one or more hot swollen joints is a common medical emergency. Such symptoms have a broad differential diagnosis, and, although not the most typical, the most serious cause is septic arthritis. This disease has substantial morbidity and mortality.<sup>1</sup> Septic arthritis has an annual incidence of 10 per 100,000 individuals in the United States and is more common among those with rheumatoid arthritis or

a prosthetic joint, with up to 70 cases per 100,000.<sup>2</sup> Patients with human immunodeficiency virus (HIV) are also at increased risk for nongonococcal septic arthritis.<sup>2</sup> Septic arthritis most commonly affects the knee, which accounts for approximately 50% of cases. In decreasing order of frequency, septic arthritis also affects the shoulder, hip and elbow, although virtually any articular surface can become infected.<sup>3</sup> Most cases

result from hematogenous spread, since bacterial organisms can easily enter the synovial fluid because synovial tissue lacks a basement membrane.<sup>4</sup> Prompt diagnosis to facilitate appropriate antibiotic management of septic arthritis is essential, since cartilage can be destroyed within days, and in-hospital mortality of treated infections can be as high as 15%.<sup>2</sup> Permanent disability and increased mortality are associated with delayed presentations and diagnosis. Prior research suggests that using history, physical examination and synovial tests, clinicians are able to deduce the etiology of acute nontraumatic monoarticular arthritis within 3 days in most cases. Since emergency physicians often lack the luxury of 3-day admissions for most monoarticular arthritis patients, identification of key diagnostic findings to accurately differentiate septic from nonseptic arthritis within minutes to hours is essential.<sup>2,5</sup>

When conceptualized quantitatively, clinical decision-making is a continuum of disease probabilities from 0% to 100%.<sup>6</sup> Health care providers continually revise disease probabilities throughout the clinical encounter based on multiple factors, including elements of the current and past medical examination, imaging and laboratory studies, and therapeutic responses.<sup>7</sup> In 1980, Drs. Pauker and Kassirer described one theoretical model to compute test and treatment thresholds. Basically, the Pauker-Kassirer algebraic equation provides estimates whereby patients can be divided into three groups: 1) disease probability below the test threshold with further diagnostic testing likely to be more harmful than helpful; 2) disease probability intermediate between the test and treatment thresholds for the diagnosis in question so further testing would be beneficial; 3) disease probability exceeds the treatment threshold with further confirmatory testing a risk to harm patients, either via therapeutic delay or via unintended consequences of diagnostic test related adverse events.<sup>8,9</sup>

Septic arthritis is not an uncommon infection in our population, it may be helpful in generating regional data about pathogens, their susceptibility to the antibiotics providing guidelines so as to reduce irrational use of antibiotics and development of antibiotic resistance.

### OPERATIONAL DEFINITION

**Septic Arthritis:** When WBC count in synovial fluid >50000 cells/mm<sup>3</sup> was labeled as Septic Arthritis.

### MATERIAL AND METHODS

This cross sectional was conducted at Department of Medicine, Mayo Hospital Lahore from November 2017 to May 2018 over the period of six months. Total 73 patients with fever, joint pain and swelling of joint either male or female having age 14-60 years were selected.

Patients with dry taps, patients with an open joint injury, tuberculous infection and infections after elective surgery were excluded.

Study is approved ethically by institutional review board. We were take synovial fluid by taping the joint under ultrasound guidance and sample was send to the laboratory for:

Physical/naked eye examination: color, consistency, hemmorrhagic.

Chemical: protein level, glucose level.

Microbial: RBC, WBC (TLC, DLC), gram staining, ZN staining, culture and sensitivity etc.

Report was identify the etiological agent as well culture and sensitivity for the etiological agent. The identified etiological agent and the drug of choice from culture and sensitivity report was recorded on the pre designed proforma. It was help me to identify the organism and the drug susceptible to it. Demographic data like age, gender and type of joint (knee joint, hip joint) involved was also be entered in predesigned Performa.

All the collected data was entered in SPSS version 20 and analyzed. Mean and SD was calculated for numerical data and frequencies and percentages

were calculated for categorical data. P value  $\leq$  0.05 was considered as significant.

## RESULTS

Mean age of the patients was  $45.03 \pm 12.9$  years. Out of 73 patients septic arthritis was found in 27 (37%) patients. (Fig. 1). Etiological agent (Staphylococcus aureus) found involved in 53 (72.6%) cases. Shown in Fig. 2 and ceftriaxone was found susceptible in 58 (79.5%) cases. Shown in Fig. 3

Out of 73 cases, rheumatoid arthritis was found in 45 (61.6%) cases. Shown in Fig. 4

Stratification for age was done. Two groups were made. First group consisted on patients having age 14-37 years and group consisted on patients having age 38-60 years. In age group 14-37 years there were total 18 (24.66%) patients and septic arthritis was found in 9 (50%) patients. No association was found between age group and septic arthritis. P. value 0.26. (Table No.1)

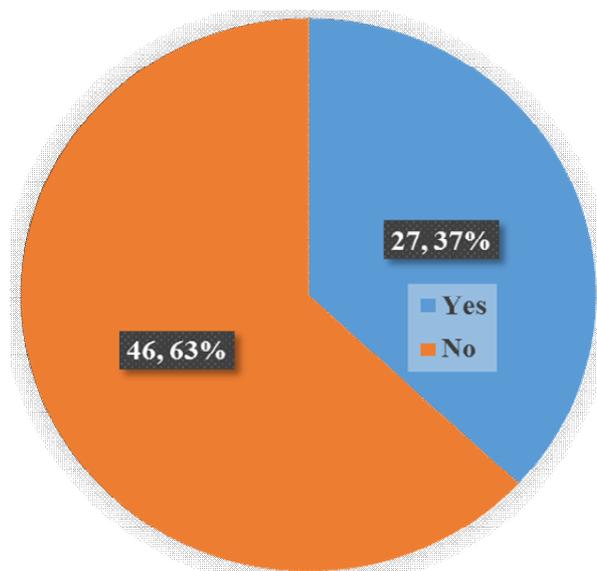
After stratification for gender, out of 38 (52.06%) male patients septic arthritis was found in 13 (34.21%) patients. Out of 35 (47.94%) female

patients, septic arthritis was found only in 14 (40%) patients. No association was found between gender and septic arthritis. P. Value 0.64. (Table No.2).

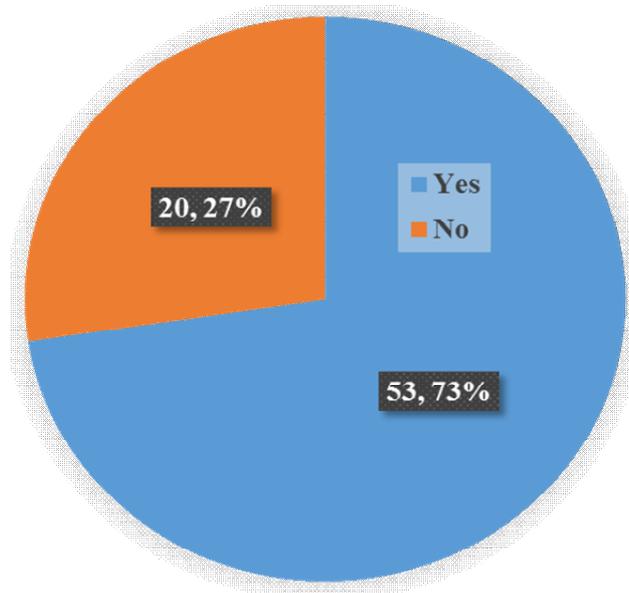
Stratification was done for type of joint involved. Knee joint was found involved in 65 (89.04%) patients and septic arthritis was found in 25 (38.46%) patients. Out of 8 (10.96%) patients with hip joint involved, septic arthritis was found in 2 (25%) patients and elbow joint was not involved in any patient. No association was found between type of joint involved and septic arthritis. (Table No.3) As shown in table No.4, out of 45 (61.64%) patients with rheumatoid arthritis, septic arthritis was found in 14 (31.11%) patients. No association was found between rheumatoid arthritis and septic arthritis.

Stratification for Systemic Lupus Erythematosus (SLE) was done. Out of 3 (4%) patients with SLE septic arthritis was found in 2 (66.67%) patients. Out of 70 (96%) patients without SLE, septic arthritis was seen in 25 (35.7%) patients. No association was found between SLE and septic arthritis. P. value 0.55. See table No.5

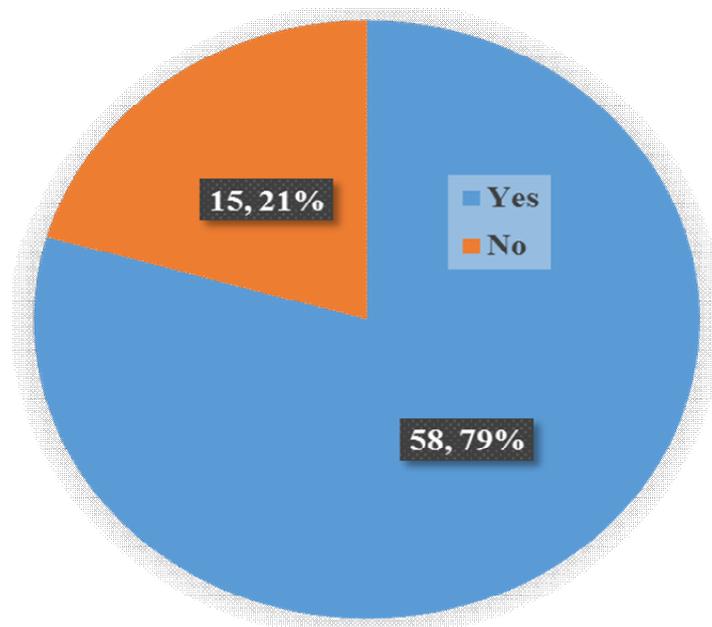
**Fig. 1:** Frequencies for Septic Arthritis



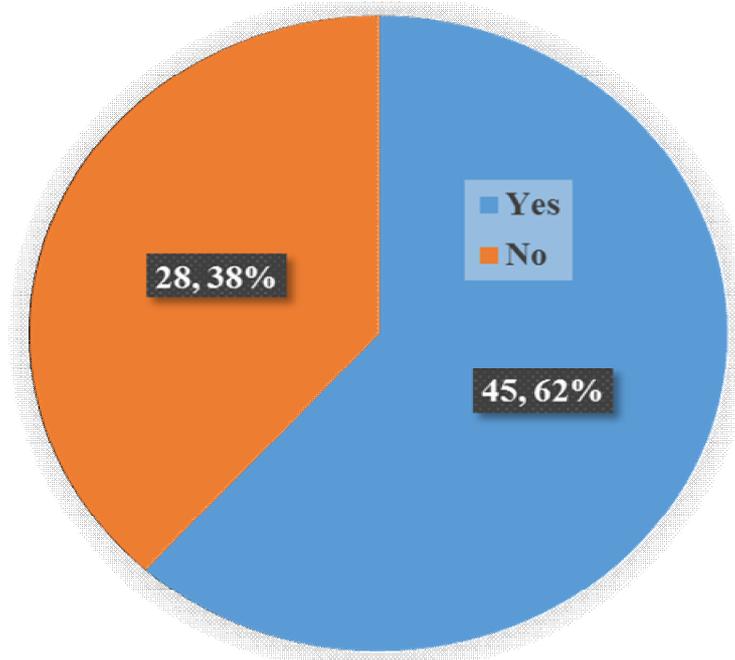
**Fig. 2:** Frequencies for Etiological agent (Staphylococcus aureus)



**Fig. 3:** Frequencies for susceptibility to ceftriaxone according to culture and sensitivity



**Fig. 4:** Frequencies for Rheumatoid Arthritis



**Table No.1:** Stratification for age

Age	Septic Arthritis		Total	P. value
	Yes (%)	No (%)		
14-37 Years	9 (50)	9 (50)	18 (24.66)	0.26
38-60 Years	18 (32.73)	37 (67.27)	55 (75.34)	
<b>Total</b>	<b>27 (37)</b>	<b>46 (63)</b>	<b>73</b>	

**Table No.2:** Stratification for gender

Gender	Septic Arthritis		Total	P. value
	Yes	No		
Male	13 (34.21)	25 (65.79)	38 (52.06)	0.64
Female	14 (40)	21 (60)	35 (47.94)	
<b>Total</b>	<b>27 (37)</b>	<b>46 (63)</b>	<b>73</b>	

**Table No.3:** Stratification for type of joint

Type of joint	Septic Arthritis		Total	P. value
	Yes	No		
Knee	25 (38.46)	40 (61.54)	65 (89.04%)	0.46
Hip	2 (25)	6 (75)	8 (10.96%)	
Elbow	0	0	0	
<b>Total</b>	<b>27 (37)</b>	<b>46 (63)</b>	<b>73</b>	

**Table No.4:** Stratification for rheumatoid arthritis

Rheumatoid Arthritis	Septic Arthritis		Total	P. value
	Yes	No		
Yes	14 (31.11)	31 (68.89)	45 (61.64)	0.22
No	13 (46.43)	15 (53.57)	28 (38.36)	
<b>Total</b>	<b>27</b> <b>(37)</b>	<b>46</b> <b>(63)</b>	<b>73</b>	

**Table No.5:** Stratification for *Systemic Lupus Erythematosus (SLE)*

Systemic Lupus Erythematosus (SLE)	Septic Arthritis		Total	P. value
	Yes	No		
Yes	2 (66.67)	1 (33.33)	3 (4)	0.55
No	25 (35.7)	45 (64.3)	70 (96)	
<b>Total</b>	<b>27</b> <b>(37)</b>	<b>46</b> <b>(63)</b>	<b>73</b>	

## DISCUSSION

In this study mean age of the patients was 45.03 years which is contrast with the study of Li SF<sup>10</sup> et al who reported mean age of the patients of septic arthritis as 53 years. But the study by Weston et al<sup>11</sup> is in agreement with my study.

Out of 73 patients, septic arthritis was found in 37% patients. These findings are not in agreement with the study of Li SF et al.<sup>10</sup> In one study by Nutt et al<sup>12</sup> septic arthritis was found in 29% patients. These findings are in agreement with my findings.

In this study male are more sufferer than female patients. These findings are in agreement with the study by Kaushik et al<sup>13</sup> conducted in Kuwait. Another study by Fahmi et al<sup>14</sup> also documented that mare are more sufferer of septic arthritis as compare to female. His findings were also in agreement with my study.

In my study knee was the most common (89%) affected joint. In a study by Abid et al<sup>15</sup> knee was the most common joint affected with septic arthritis. A study by Kaushik et al<sup>13</sup> was also in agreement with my study. Uthman et al<sup>16</sup> also found the knee as most common joint involved in patients with septic arthritis.

In present study s. aurous was the most common 72.6% etiological agent causing the septic arthritis. Yadav et al<sup>17</sup> also found the S. aurous as most common 62% organism. These findings are in favour of my study.

Studies by Abid et al<sup>15</sup> and Nahman et al<sup>18</sup> were also in agreement with my study. Kalantari et al<sup>19</sup> also found S. aurous as most common pathogen as 60.5% patients which was also in favor in my study. A study by Arnold et al<sup>20</sup> was in contrast with my study who found *H. influenzae* as an

important cause of septic arthritis in third world nations.

Ceftriaxone was susceptible in 79.5% patients in present study which was in agreement with the study of Yadav et al<sup>17</sup> which showed susceptibility of ceftriaxone as 83%. These findings are in favor of my study.

## CONCLUSION

Septic arthritis was more common in male as compare to female patients and it can be occurred in any age group. Knee is the most common joint involved in septic arthritis. *S. aureus* was the most common organism isolated and the most susceptible drug was ceftriaxone.

## REFERENCES

1. Tercic D, Bozic B. The basis of synovial fluid analysis. *Clin chem lab Med* 2001;39: 1221-6.
2. Eisenberg M, Schumacher H, Davidson P, Kauffmann L. Usefulness of synovial fluid analysis in the evaluation of joint effusions. Use of threshold analysis and likelihood ratios of access a diagnostic test. *Arch Int Med* 1984;144:715-9.
3. Shmerling RH. Synovial fluid analysis. A critical reappraisal. *Rheum Dis North Am* 1994; 20(2): 503-12.
4. Sangeetha B, Vora IM, Abraham S, Srivastava S, Jignesh S, Chaturvedi R. Role of synovial fluid analysis and synovial biopsy in joint diseases. *bj. Org. Journal* 2004.
5. Donge DR, Brouwer R, Smit M, Frankinjer M, Dulhain RJ, Toorenbergen V. Automated counting of white blood cells in synovial fluid. *Rheumatology* 2004; 43: 170-3.
6. Revell PA. The synovial biopsy. In: Antony PP, Sween M, Lowe DG. editors. *Recent Advances in Histopathology-13*. New York : Churchill living stone; 1987. p. 79-83.
7. Mc Carty DJ. Synovial fluid. In: Koopman WJ editor. *A Text book of Rheumatology*. 14<sup>th</sup> ed vol (1). Philadelphia: Lippincott Williams and Wilkins; 2001.p 83-104.
8. Segovia AD. Descriptions of therapeutic arthrocentesis and of synovial fluid. In a Nahuatl text from perhispanic Mexico. *Ann Rheum Dis* 1980; 39:291-3.
9. Amer H, Swan A, Dippe P. The utilization of synovial fluid analysis in the UK. *Rheumatology* 2001;40:1060-3.
10. Li SF, Cassidy C, Chang C, Gharib S, Torres J. Diagnostic utility of laboratory tests in septic arthritis. *Emergency Medicine Journal*. 2007 Feb 1;24(2):75-7.
11. Weston VC, Jones C, Bradbury N, Fawthrop F, Doherty M. Clinical features and outcome of septic arthritis in a single UK Health District 1982-1991. *Ann Rheum Dis* 1999;58:214-9.
12. Nutt L, Orth H, Goodway J, Wasserman E. Superior detection of pathogens in synovial fluid by the Bactec 9240 Peds Plus/F system compared to the conventional agar-based culture method: original research. *Southern African Journal of Epidemiology and Infection*. 2010;25(4):11-4.
13. Kaushik P, Malaviya AN, Rotimi VO. Infective arthritis in adults – experience at a teaching hospital in Kuwait. *Rheumatology International*. 1999 Dec 1;19(1-2):1-5.
14. Khan FY, Abu-Khattab M, Baagar K, Mohamed SF, Elgendy I, Anand D. et al. Characteristics of patients with definite septic arthritis at Hamad General Hospital, Qatar: A hospital based study from 2006 to 2011. *JCR*.2013:1-14.
15. Abid N, Bhatti M, Azharuddin M, Islam M. Septic arthritis in a tertiary care hospital. *JPMA*. 2006;56(3):95.
16. Uthman I, Bizri AR. Clinical features of septic arthritis at a tertiary care hospital in Lebanon. *Clin Rheumatol* 2003;22:359-60.
17. Yadav S, Dhillon MS, Aggrawal S, Tripathy SK. Microorganisms and Their Sensitivity Pattern in Septic Arthritis of North Indian

Children: A Prospective Study from Tertiary Care Level Hospital. *ISRN Orthopedics*. 2013;2013:1–4.

18. Nahman A, Hammoudeh M. Pyogenic Arthritis in Qatar. *Qatar med J*.2003;2:36-9.
19. Kalantari N, Taherikalani M, Parvaneh N, Mamishi S. Etiology and Antimicrobial Susceptibility of Bacterial Septic Arthritis and Osteomyelitis. *Iranian Journal of Public Health*. 2007;36(3):27–32.
20. Arnold SR, Elias D, Buckingham SC, Thomas ED, Novais E, Arkader A, et al. Changing patterns of acute hematogenous osteomyelitis and septic arthritis: emergence of community-associated methicillin-resistant *Staphylococcus aureus*. *J Pediatr Orthop*. 2006 Dec;26(6):703–8.