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Original Article

Septic Arthritis in a Tertiary Care Hospital

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Abstract

Objectives: To study the epidemiological features of septic arthritis in the adult population and to identify the risk factors for mortality in septic arthritis.

Methods: A five year reterospective study was performed on cases with septic arthritis admitted in our hospital between January 1999 and December 2004. Patients were identified according to ICD codes, 711.00. Data was recorded on a standardized data sheet and analyzed by SPSS 11.5 software.

Results: A total of 116 patients were identified, 69 were male (59.5%) and 47 female (40.55%). Mean age of patients was 49.22 years. The most common presenting clinical features were joint swelling (99.1%) and fever (60.3%), Knee joint was the most common joint involved (65.5%) followed by hip (11.2%). Gram stains of synovial fluid was done in 67.2% of cases out of which 22.4% had positive stains. Staphylococcus aureus was the most common organism isolated from blood as well as synovial fluid (18.8%). Mean haemoglobin was 10.83gm/dl and 57.8% of patients had total leukocyte count less than 11,000/cumm. Platelet count was greater than 150,000/cumm in 90.5% patients. Hypertension, renal failure, chronic liver disease and elevated ESR were identified as some of the potential risk factors for higher mortality in a cohort with septic arthritis.

Conclusion: Septic arthritis is associated with significant morbidity and mortality. These results highlight the importance of obtaining cultures before starting any treatment. (JPMA 56:95;2006).

Introduction

Microorganisms have been implicated as the cause of many Rheumatic diseases. In the last two decades Lyme disease and Human Immunodeficiency Virus (HIV) associated infections have emerged as important examples of infectious agents causing arthritis. However, the most important cause of septic arthritis continues to be acute bacterial arthritis.[1] Septic arthritis is associated with high mortality and morbidity.[2-4] Prompt recognition and early initiation of therapy is essential for satisfactory outcome.[5]

Table 1. Analysis for mortality in patients with septic arthritis.

Factors	Numbers	Mortality n (%)	Odds ratio	95% C.I. for Odds ratio
Gender (Female)	47	9 (19)	2.10	0.72, 6.10
Hypertension	45	10 (22)	3.09	1.04, 9.23*
Diabetes Mellitus	36	6 (17)	1.40	0.47, 4.20
Ischemic Heart Disease	14	4 (24)	2.58	0.71, 9.47
Renal Failure	25	10 (40)	9.44	2.98, 29.87*
Chronic liver disease	16	7 (44)	7.86	2.36, 26.16*
Sepsis	46	9 (20)	2.19	0.75, 6.37
Malignancy	9	2 (22)	1.89	0.36, 10.07
Gram stain positive	26	6 (23)	1.65	0.51, 5.39
Steroid	10	2 (20)	1.64	0.32, 8.54
TLC (> 1100)	46	8 (17)	1.55	0.54, 4.49
Neutrophil (< 70%)	71	14 (20)	4.67	1.01, 21.71*
ESR (>14 mm/hr)	32	11 (34)	8.27	2.59, 26.44*
Platelet (<150,000/cumm^3)	5	3 (60)	10.62	1.62, 69.64*
Anaemia (<10gm/dl)	42	9 (21)	2.61	0.89, 7.63
Knee	76	11 (15)	1.18	0.38, 3.68
Organism				
Staphylococcus	18	2 (11)	0.63	0.13, 3.05
Strep	10	2 (20)	1.40	0.27, 7.37
Enterococcus	3	-	-	-
Others Organism	9	4 (44)	5.53	1.28, 123.77

* p-value <0.05

Most of the published data on septic arthritis is from western countries. It is important to know the prevalent pathogen, clinical presentation and disease outcome in our part of the world where disease parameters may be different due to geographic variations.[6-8] We present the clinical data of 116 patients with septic arthritis, who were admitted in last five years in a tertiary care hospital of Pakistan.

Patients and Methods

One hundred and sixteen patients were identified by International Classification of Diseases (ICD) code 711.0. The patients were admitted at Aga Khan University Hospital between January 1999 and December 2004. Adult patients with clinical diagnosis of septic arthritis based on clinical parameters like swelling, erythema, limitation in movement and physician assessment were included in the analysis. Data was recorded on standardized data sheet and analyzed on SPSS 12.01 software. Separate analysis of patients who died with complications due to septic arthritis was done and risk factors were identified. Chi-square and/or Fisher exact test was used to compare the morality among covariates and Odds ratio, and 95% Confidence Interval (C.I.) was estimated to check the strength of association. We compared our findings with available data in literature from other countries and noted the differences in clinical features and other disease parameters.

Results

The mean age of the patients was 49.2±19 years. Sixty nine (59.5%) patients were male and 47 (40.5%) were females. One hundred fifteen (99.9%) patients had single joint involvement; Knee was involved in 77 (66.9%) patients, Hip in 13 (11.3%), wrist in 3 (2.6%), sacroiliac in 4 (3.5%), elbow in 4 (3.5%) and shoulder in 5 (4.3%) patients. The most common clinical presentation was joint swelling which was present in 115 patients. Seventy (60.3%) patients had fever on day of admission. Most of the patients had some co-morbid condition in addition to arthritis. Hypertension was present in 45 (38.8%), diabetes mellitus in 36 (31.0%), ischaemic heart disease in 17 (14.7%), chronic liver disease in 16 (13.8%), renal failure in 25 (21.6%), other infections in 46 (39.7%), malignancy in 9 (7.8%) and rheumatoid arthritis in 11 (9.5%) patients. On laboratory workup, mean haemoglobin was 10.83gm/dl (range 5.0-15.5gm/dl). Total leukocyte count was recorded in 113 patients. Among them, 46 (39.7%) had >11,000/cmm^3, and 67 (57.8%) less than 11,000/cmm^3, Erythrocyte Sedimentation Rate (ESR) was greater than

Table 2. Comparison of the microbiological findings in Pakistan, Lebanon[8], Kuwait[7], France[10], UK[9], Australia[12] and Thailand[13]

Microorganisms	Pakistan n (%)	Lebanon n (%)	Kuwait n (%)	France n (%)	UK n (%)	Australia n (%)	Thailand n (%)
S. Aureus	18(18.8)	16 (72.7)	3 (20)	81 (50)	108 (54)	71 (37)	48 (47.5)
Coagulase negative Staphylococci	10(10.4)			21 (13)			
Streptococcus spp				33 (20.4)	36 (18)	31 (16)	29 (28.7)
(pneumonia, pyogenes, milleri)		1 (4.6)			3 (1.5)		
Enterococci	3(3.1)			1 (0.6)			
Salmonella spp(inclu S typhi)				1 (0.6)			
P. aeruginosa		2 (9.1)		15 (9.3)			19 (18.8)
Gram negative bacilli	1(1.1)	2 (9.1)	2 (13.3)				
(Enterobacter, Citrobacter, Kingella)							
Enterobacter, citrobacter, Kingella)							
Coliform bacilli					15 (7.5)	23 (12)	
N. gonorrhoea							
Neisseria spp (including meningitides)					9 (4.5)		
H. influenza			5 (33.3)		15 (7.5)		
Brucella spp			1 (6.6)				
Mycobacterium spp				6 (3.7)	1 (0.5)		
(including M. Tuberculosis)			4 (26.6)				
Candida spp			1 (6.6)				
Others (fungi, anaerobes mixed infections)	10(10.5)	1 (4.6)		4 (2.5)	12 (6)	66 (35)	5 (4.9)
Total	**42**	**22**	**15**	**162**	**199**	**191**	**101**

40mm/hr in 27 (23.3%) patients, 14-40mm/hr in 5 (4.3 %) and less than 14mm/hr in 84 (72.4%) patients. The platelet count was recorded in 113 patients, and it was in the normal range (150-400,000/cmm3) in 105 (90.5%) cases.

Synovial fluid Gram stain was performed in 78 (67.2%) patients, of which 26 (33.3%) stained positive for specific organisms and 52 (66.7%) were inconclusive. Synovial fluid and blood culture was performed in 96 (82.8%) patients and specific bacteria grew in 42 (43.8%) patients. Specific bacterial growth in cultures were ; Staphylococcus in 18 (18.8%) patients, Streptococci in 10 (10.4%), Enterococci in 3 (3.1%), E-coli in 1 (1.1%) case. Other organisms as anaerobes, mixed infections and gram positive bacilli were detected in 10 (10.5%) patients.

Out of 116 patients; 16 (13.8%) patients died and remaining 100 (86.2%) showed clinical improvement. Mortality patient data was analyzed separately to identify the risk factors for poor outcome (Table 1). Hypertension, renal failure, chronic liver disease, elevated ESR and low platelet count were found as statistically significant risk factors associated with higher mortality.

The comparison of micro-organisms identified in different series is summarized in Table 2.

Discussion

To our knowledge this is the first study that has compared data on septic arthritis in Pakistan with other countries. As in other regions, males suffer more than females.[7-10] The mean age in our patients was 50 which is similar to data from Kuwait[7] and UK.[9] In contrast, the mean age of patients from Lebanon[8] was lower.

In our series S. aureus was identified as the most common organism and streptococci as second most common pathogen isolated from synovial as well as blood specimens. This is similar to data published from other countries[7-10] except for few recent publications which show changing patterns of organisms.[6,11] In a prospective multicenteric study from Amsterdam Health District, only 55% of non-gonococcal, non-tuberculous cases were due to staphylococci[11], however in the same period a study survey involving English and Welsh laboratories demonstrated decreased prevalence of S. aureus.[6] Gram negative bacilli were not significant in our series, in contrast to series from France[10], UK[9], Australia[12] and Thailand[13] where gram negative rods were frequently encountered. Other organisms such as Neisseria gonorrhoea, brucella, mycobacteria were not commonly isolated from our

patients. Geographic variations have been implicated in the diversity of microorganisms seen in different parts of the world due to predisposed social and cultural background; e.g brucella arthritis in middle east.[7,14] In our patients the overall microbiologic yield from synovial and blood culture specimens is similar to series from Kuwait[7] but much lower compared to western data.[9] This low culture yield in our country is probably due to prior antibiotic use since most of the patients who presented in our hospital had prior history of taking antibiotics as outpatient elsewhere.

In our patient population knee was found to be most common joint involved, which is similar to results published from other countries.[7-9] However none of our cases had prosthetic joint infection, as compared to results from UK[9] and France[11] where presence of prosthesis is one of the important risk factors for development of septic arthritis. The reason for this could be fewer number of procedures performed in our country.

As far as inflammatory markers are concerned, ESR was found to be less useful as predictor of septic arthritis since 72% of patients had normal ESR values. In comparison a series from Kuwait revealed ESR raised in 66.7% of patients.[7] A study from UK[9] showed C-reactive protein (CRP) >100mg/ml in most of the patients while the ESR was only moderately elevated.[9] The measurement of CRP may be a more sensitive indicator of possible septic arthritis than ESR. Sixty percent of our patients presented with fever which is also a common manifestation in western countries.[10] Presentation was mainly monoarticular in our series as compared to UK[9] where 14.8% of patients presented with polyarticular involvement[11] and Kuwait[8] where all of the neisserial infections were polyarticular. These clinical and laboratory features indicate that over reliance on certain features such as white cell count, temperature, and ESR may be misleading and if presentation is with polyarticular involvement; sepsis should be ruled out as a concomitent condition.[7,9] The low culture yield as well as absence of elevated inflammatory markers such as ESR and WBC count might be beacuase of the antibiotic usage prior to hospitalization making most of the study patients as partially treated septic arthritis.

In our patient population the mortality associated with septic arthritis was 14% compared to 11.5% from UK series[9], 5-15% from other series[15,16] and 0% from Kuwait where none of the patients died with complications related to septic arthritis.[7] In our series hypertension, renal insufficiency, Chronic liver disease and thrombocytopenia were identified as potential risk factors for higher mortality. In contrast; UK series revealed confusion at presentation, age >65, multiple joint sepsis and elbow joint involvement as potential risk factors for higher mortality[9]. In an other study, history of rheumatoid arthritis, previous joint trauma, intravenous drug abuse, open surgical drainage and diabetes mellitus were found to be major risk factors for the development of septic arthritis.[17]

In conclusion septic arthritis is associated with significant morbidity and mortality in our country. Patients with cardiovascular disease, renal failure and hepatic disease in association with septic arthritis have a higher risk of poor outcome. This group of patients should be treated aggressively and promptly with appropriate antibiotics. The fact of lower yield of synovial and blood culture for specific organisms raise the importance of obtaining these cultures before the start of antibiotics.

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