

Trends of microbiological profile in Septic arthritis cases admitted at a tertiary care hospital

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Abstract

Introduction: Infective arthritis of joints is an Orthopaedic emergency. Early diagnosis and appropriate management of it is of paramount importance. Delay in the diagnosis and treatment of Septic arthritis can lead to disastrous complications like destruction of articular cartilage, physal damage and dislocation of joints.

Material and Methods: Appropriate samples from 57 patients with a diagnosis of septic arthritis were included in study for a duration of one year, from October-2019 and October-2021.

Depending on the location, different specimens was collected, using standard operating proto col. These were subjected to Gram stain, routine Culture and Anti-microbial Susceptibility testing. Culture pro cessing was done by an automated method like vitek-2 compact system.

Results: In a sample size of 57 patients, 43 were males and 14 were females. Knee joint was the most common involved in most of the cases diagnosed with septic arthritis. Culture positivity rate was 37%, with Staphylococcus aureus being the most common pathogen with a high percentage of MRSA (31%), among which three (23%) isolates were Inducible Clindamycin resistant. MDR Klebsiella pneumoniae (9.5%) and MDR Pseudomonas aeruginosa (9.5%) were found in our study.

Conclusion: Changing susceptibility patterns of microbes in septic arthritis point to a need for reconsidering empiric al anti biotic therapy, especially in elderly. Joint damage following infection can lead to significant disability and hence needs to be treated aggressively.

Keywords: Septic arthritis, Microbial agents, Anti biogram

Introduction

Infective arthritis of joints is an Orthopaedic emergency. Early diagnosis and appropriate management of it is of paramount importance. Delay in the diagnosis and treatment of Septic arthritis can lead to disastrous complications like destruction of articular cartilage, physal damage and dislocation of joints [1-3]. Clinicians often start empirical antibiotic therapy for symptomatic relief while awaiting a definitive culture report [4]. The present study aims to evaluate the causative organisms of septic arthritis in all age groups and their susceptibility pattern.

Material and Methods

A total of 57 patients' samples, received to department of microbiology Kamineni academy of medical sciences and research Centre, between October-2019 and October-2021, with a diagnosis of septic arthritis, were included in the study.

Depending on the location of joint, different types of specimens had been collected, using standard techniques such as Synovial fluid obtained by aspiration, Synovial tissue obtained by biopsy, which were carried to laboratory in sterile saline and Pus swab obtained intra-operatively. [5]

These were subjected to Direct Gram staining, Culture using standard media like Blood agar, Chocolate agar and MacConkey agar and if growth was seen in any of the media, the colonies were subjected to identification and anti-microbial susceptibility testing using Vitek-2 Compact system.[5] Their identification was done using IDGP and IDGN cards and susceptibility pattern was obtained using AST P628 for Gram-positive bacteria and AST N405 for Gram-negative fermenters and AST N406 cards for Gram-Negative non-fermenters using the Vitek-2 compact system.

Results

A total of 57 patient's samples received to microbiology department with suspicion septic arthritis. Out of which, 43 (75%) samples were from males and 14 (25%) from females.

The number of male patients outnumbered the female patients with the ratio of 2.5:1. The mean age at which the patients were clinically presented with septic arthritis was 37 years. Out of total cases, lower extremities were involved in 95.21% cases. (19.04% hip, 71.41% knee, 4.76% ankle joint). In the upper extremities, the shoulder joint was affected in 4.76% of cases. The samples obtained to laboratory were 57, out of which total culture positivity rate in our study was 37% (21), among the total positive cultures Staphylococcus aureus was the most common pathogen in septic arthritis, with a high percentage of MRSA (31%).

Also, among these four (31%) MRSA, three (23%) isolates were Inducible Clindamycin resistant, making the Erythromycin as well as Clindamycin not usable for treatment. Streptococcus pyogenes was seen in 14% of positive samples and surprisingly we also isolated Gram Negative Bacteria like Klebsiella pneumoniae (9.5%) and Pseudomonas aeruginosa (9.5%) which were all Multi-Drug Resistant with susceptibility only to Imipenem, Meropenem and Colistin.

There was one isolate of penicillin sensitive Enterococcus faecalis.

Table 1: Distribution of various bacterial isolates

Bacterial isolates	Number of isolates	Percentage
Staphylococcus aureus	13	62%
Streptococcus pyogenes	3	14%
Klebsiella pneumoniae	2	9.5%

Pseudomonas aeruginosa	2	9.5%
Enterococcus faecalis	1	4.7%
Total	21	100%

Table 2: Bacterial isolates from different joint spaces

Sample collection Site	Staphylococcus aureus	Streptococcus pyogenes	Klebsiella pneumoniae	Pseudomonas aeruginosa	Enterococcus faecalis
Hip	3 (14%)	1 (4.7%)	-	-	-
Knee	8 (38%)	2 (9.5%)	2 (9.5%)	2 (9.5%)	1 (4.7%)
Ankle	1 (4.7%)	-	-	-	-
Shoulder	1 (4.7%)	-	-	-	-

Figure 1:

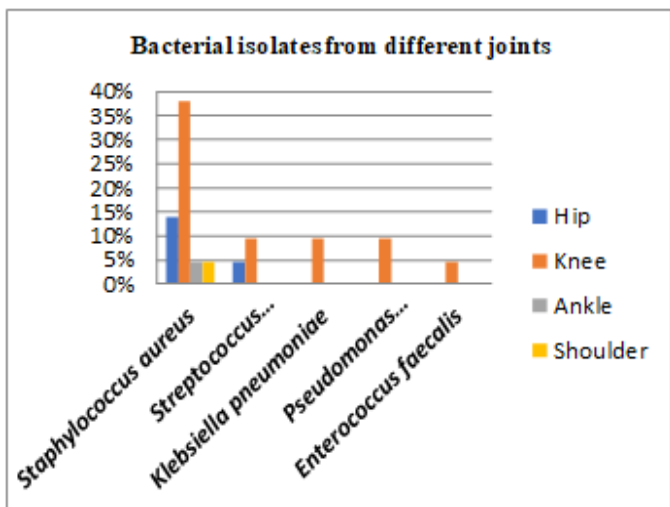
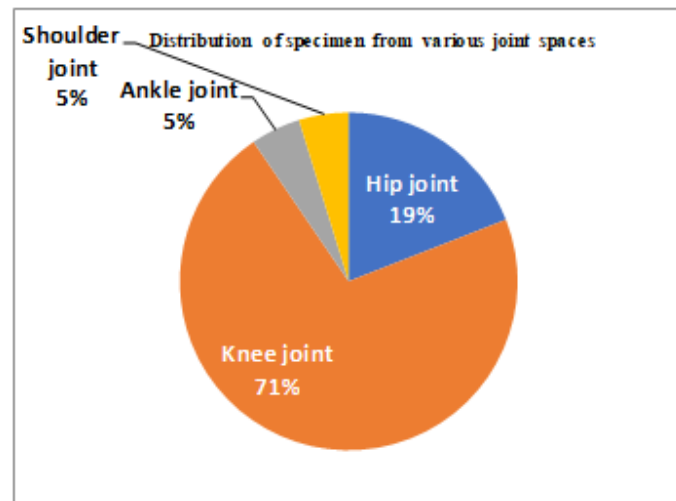


Figure 2:



Discussion

The identification of causative organism and knowledge of its susceptibility to various antimicrobials plays a crucial role in the treatment of Septic arthritis. Delay in the treatment can lead to irreversible joint damage while blindly giving empirical therapy may cause patients to undergo unnecessary medical and surgical treatments; therefore, identification and susceptibility of causative organism is crucial [6]. The gold standard diagnostic test remains to be positive culture from the affected joint [8]. In our study of 57 sample size, 43 (75%) of samples were collected from males and 14 (25%) from females. The mean age of presentation to the hospital was 37 years. The data is similar to the study by Luke Rasmussen et al.[8] where 40 males (61.5%) and 25 females (38.5%) were found to be suspected of septic arthritis but the mean age was 66 years (19-96 years). In our study, knee joint was observed to be the most common joint affected followed by hip. This shows concordance to Luke Rasmussen et al. [8] study where Knees were the most affected joints followed by hips, shoulders, ankles, elbows, and wrists. 37% of our samples were culture positive. Similar studies show higher culture positivity rates like M N Gupta et al. [7]

(57%) and Luke Rasmussen et al. [8] (61.5%). Of the positive culture growth, *Staphylococcus aureus* was found to be the commonest organism isolated (62%). Of which, 31% were Methicillin-Resistant *Staphylococcus aureus* (MRSA). This is similar to various western and Asian studies which showed 36% [9] and 42% [10] respectively. This is in Di concordant to the study by Jerry George et al. [11], where MRSA were prevalent in only 11% of isolates. We also saw increased number of cases with other gram-positive cocci like *Streptococcus pyogenes* and *Enterococcus faecalis*, together accounting for 19% of total isolates. This is higher than the available data which varies from 1-16% [4, 7]. Among the culture positives (37%), 19% of the isolates were Gram negative bacteria (*Klebsiella pneumoniae* and *Pseudomonas aeruginosa*). This was matching with other studies like Girish Motwani et al. study [4] (13%), Narang et al. study and Jerry George et al. study (7%). [11]

Conclusion

Changing susceptibility patterns of microbes in septic arthritis points to a need for reconsidering empirical antibiotic therapy, especially in elderly. Joint damage following infection can lead to significant disability and hence needs to be treated aggressively. Therefore, for proper selection of antimicrobials as a part of empirical therapy, we need to have a data of most common organism getting isolated in present days and its susceptibility pattern.

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