Section | Skin & VD

Original | Article

A Prospective Study on Bacteriological Profile of Skin and Soft Tissue Infections with it`s Antimicrobial Sensitivity Pattern in a Tertiary Care Hospital

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ABSTRACT

Background: SSTIs are the most common cause of morbidity in community and hospital.1 the most common examples of SSTIs are cellulitis, abscesses, impetigo, folliculitis, furuncle, carbuncle, necrotizing fasciitis , diabetic foot infections and surgical site infections .

Methods: In this study we were included 207 cases of skin & soft tissue infection. Among all 134 cases have positive bacterial growth which we were considered. This study conducted in Department of skin with collaboration of Department of Microbiology.

Results: We seen 47.1% growth of Staphylococcus aureus followed by Enterococcus spp. While in gram negative bacteria we seen 24.6% growth of Klebseilla followed by Pseudomonas aeruginosa & Escherichia coli.

Conclusions: Local antibiotic policy can be adopted which will prevent resistance among organisms and help in early recovery from infection.
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Keywords: Antimicrobial susceptibility test, Organisms, skin and soft tissue infection

INTRODUCTION

It is well known that skin and soft tissue infections (SSTIs) are a common type of infection. It may contribute to longer hospital stays, increase the cost of medical care. It also plays an important role in development of antimicrobial resistance. SSTIs are the most common cause of morbidity in community and hospital.1 the most common examples of SSTIs are cellulitis, abscesses, impetigo, folliculitis, furuncle, carbuncle, necrotizing fasciitis, diabetic foot infections and surgical site infections. Some infections can be treated by oral antibiotics. Complicated SSTI may require hospitalization, intravenous antibiotic and or surgery. An SSTI is categorized as complicated if the infection has spread to the deeper soft tissue, if surgical intervention is necessary or if the patient has comorbid conditions hindering treatment response.[1,2] SSTIs may be caused by many pathogens. Staphylococcus aureus is salvaged from maximum number of SSTIs. Other organisms recovered are Pseudomonas aeruginosa, Escherichia coli, Enterococcus, Klebsiella and Enterobacter species.[2,3-6] It is crucial to monitor the changing trends in bacterial infection and their antimicrobial susceptibility pattern to provide adequate antimicrobial therapy for controlling infection, preventing morbidity and improve the quality of life.

Though, the most common organism causing wound infections was Staphylococcus aureus followed by other Gram-negative bacilli,[7] but in India Gram negative bacilli was predominantly isolated compared to Gram-positive pathogens.[8,9] These infections are difficult to treat due to increasing antibiotic resistance.[8] The arbitrary use of

antibiotics has also lead to the increase in multidrug resistant organisms (MDRO).[9] Now a days, infections are the leading cause of morbidity in patients of surgery, trauma etc.[10] For proper management of the patients, it is important to know the pathogens causing the infections and its antibiotic susceptibility.[11]

Previous studies provided very limited data on soft tissue infection, mortality rate and antibiotic susceptibility of Gram negative bacilli in our hospital settings. Therefore, the present study was undertaken to determine the aerobic bacteriological profile from various type of wound infections and the susceptibility pattern of the isolates.

METHODS

Study population:- In this study we were included 207 cases of skin & soft tissue infection. Among all 134 cases have positive bacterial growth which we were considered.

Study area:-This study conducted in Department of skin with collaboration of Department of Microbiology.

Study duration:- The duration of this study was over a period of one year.

Data collection:- First samples were inoculated on to Blood agar and MacConkey agar . Then samples were subjected to gram stain of direct smear to examine for the presence of pus cells and any bacteria. Culture plates were incubated at 37degree Celsius for 24hrs to 48hrs in aerobic condition. If there was no growth it was considered sterile. After incubation ,identification of bacterium from positive cultures was done with a standard microbiological technique which includes motility testing by hanging drop preparation ,gram staining and biochemical reactions such as catalase, coagulase, indole, methylred, Voges-Proskauer, citrate, urease, Phenyl pyruvic acid test and oxidase test(6).Further biochemical tests done were carbohydrate fermentation test using Lactose, sucrose, mannitol & Maltose, Triple sugar Iron test, Nitrate reduction test, Arginine dihydrolase production, lysine and ornithine decarboxylase test, Hugh and leifson test. The antimicrobial susceptibility testing was done by Kirby Bauer Disk Diffusion method and interpreted as per Clinical Laboratory Standard Institution (CLSI) guidelines

Data analysis:-Data were analysed by using Microsoft excel.

RESULTS

In this study we were screened 207 cases. Among all cases 134 cases have got positive culture & rest were no growth. In our study we found that 50.7% growth of gram-positive bacteria & 49.3% growth of gram negative. Among gram positive growth we seen 47.1% growth of Staphylococcus aureus followed by Enterococcus spp. While in gram negative bacteria we seen 24.6% growth of *Klebseilla* followed by Pseudomonas aeruginosa & Escherichia coli. Antimicrobial susceptibility pattern we also observed in this study which showed in chart:1,2,3,4.

Table 1: Distribution of cases according to culture growth

Culture growth	No. of cases	Percentage
Negative	73	35.2
Positive	134	64.8
Total	207	100

Table:-2 Distribution of cases according to bacteria

BACTERIA	No. of cases	Percentage
Gram positive	68	50.7
Gram negative	66	49.3
Total	134	100

Table:- 3 Distribution of cases according to isolates

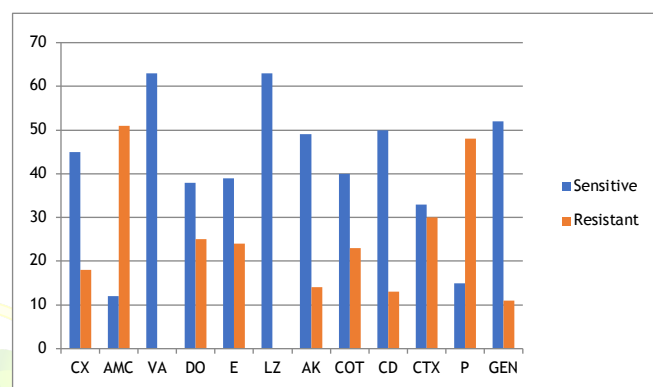| ISOLATES	No. of cases	Percentage
Staphylococcus aureus	63	47.1
Klebsiella spp.	33	24.6
Pseudomonas aeruginosa	18	13.4
Escherichia coli	12	8.9
Enterococcus spp	5	3.7
Proteus spp.	3	2.2

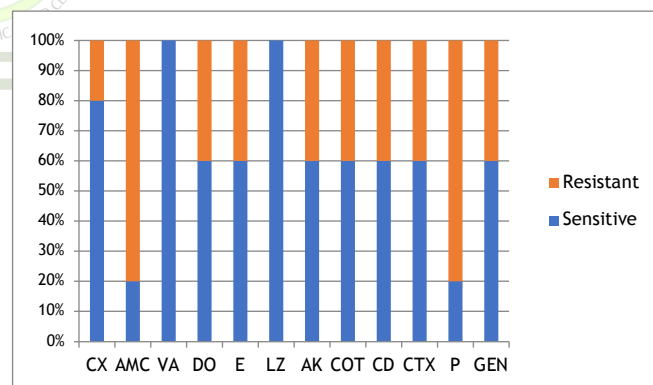**Chart:-1 Sensitivity pattern of Staphylococcus aureus**

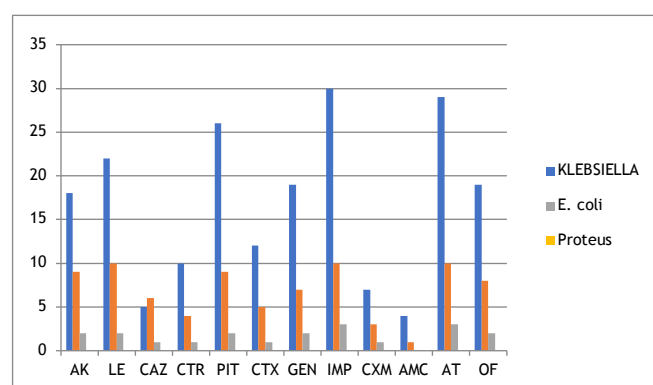**Chart:-2 Sensitivity pattern of Enterococcus spp.**

Chart:-3 Sensitivity pattern of E. *coli, Klebsiella, Proteus*

DISCUSSION

In the present study, the prevalence of culture positive samples is 64.73%. Similar results were found by Hanumanthappa P et al[12] and Sah P et al.[13] This study observed the domination of Gram-positive organisms which comprises 50.75%. These findings were supported by Sah P et al.[13] Though studies done by Afroz Z et al,[14] Najotra K et al,[15] Madhavi S et al[16] showed domination of Gram-negative isolate. The most common organism isolated in our study is Staphylococcus aureus. Similar findings were found by Najotra K et al,[15] Hanumanthappa P et al[12], Sah P et al[13] and Madhavi S et al.[16] Results also showed that among the Gram-negative organisms, the most common isolate is Klebsiella species. Hanumanthappa P et al[12] also reported the similar findings. However, in Afroz Z et al[14], Najotra K et al.[15]
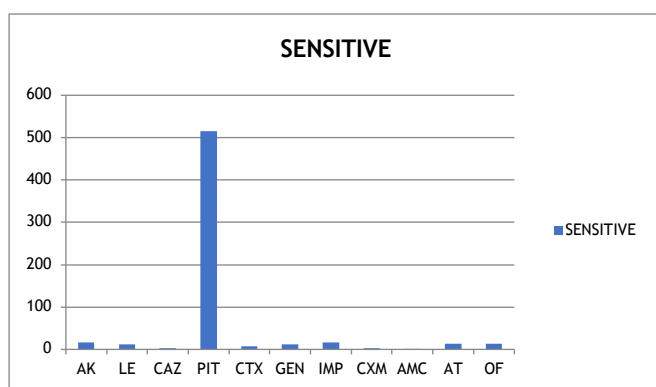
SENSITIVE

Chart:-4 Sensitivity pattern of Pseudomonas aeruginosa

Mishra D et al[17] studies, the most common isolate is Pseudomonas and in Sah P et al the most common isolate is Escherichia coli.

Staphylococcus aureus is 100% sensitive to Vancomycin and Linezolid in this study. Similar finding was found in Mishra D et al, Najotra K et al. While Sah P et al found only 5.56% Vancomycin resistance in their study. Staphylococcus aureus is least sensitive to Amoxycillin/ Clavulanic acid in our study. In contrary, a study conducted by Madhavi S et al[16] Staphylococcus aureus showed maximum resistance towards Ampicillin. The prevalence of MRSA is 28.57% in this study. Similar finding was found by Mishra D et al. However, Rani S et al,[18] Shetty J et al[19] showed low prevalence of MRSA in their study.

In the present study, the most common organism among Gram negative isolates is Klebsiella species. Klebsiella showed highest susceptibility towards Imipenem and maximum resistance towards Amoxyclav. Mohanty S et al[20] found Klebsiella has the maximum sensitivity towards Piperacillin/ Tazobactum and maximum resistance towards Piperacillin. While Sah P et al observed Klebsiella has maximum susceptibility towards Ciprofloxacin and maximum resistance towards Cefepime and Amoxycillin. Therefore, the antibiotic susceptibility pattern of Klebsiella changed in different studies.

It can be concluded that the most common organism causing skin and soft tissue infections is Staphylococcus aureus followed by Klebsiella.

The study also observes a rise in prevalence of MRSA. Though, a changing pattern were observed among the organisms isolated as well as their antibiotic sensitivity pattern in several studies from different geographical locations.

CONCLUSION

This study concludes that it is important to conduct repeated monitoring of antibiotic susceptibility pattern to reduce the increasing trend of antimicrobial resistance. Additionally, a local antibiotic policy can be adopted which will prevent resistance among organisms and help in early recovery from infection. The study stresses on appropriate and judicious use of antibiotics.

REFERENCES

1. Mohanty S, Kapil A, Dhawan B, Das BK . Bacterilogical and antimicrobial susceptibility profile of soft tissue infections from northern India .Indian J Med Sci 2004;58:10-15.
2. Weigelt J, Itani K, Stevens D, Lau W, Dryden M, Knirsch C. Linezolid versus vancomycin in treatment of complicated skin and soft tissue infections. Antimicrob Agents Chemother 2005;49:2260- 66.
3. Shenoy MS, Bhatt GK, Kishore A,Hassan MK. Significance of MRSA strains in community associated skin and soft tissue infections.Indian J Med Microbiology 2010;28:152-4.
4. Palit A, Inamdar AC .Current concepts in management of bacterial skin infections in children.Indian J Dermatol Venorol Leprol 2010;76:476-88.
5. Patil R, Baveja S, Nataraj G, Khopkar U .Prevalence of methicillin – resistant Staphylococcus aureus (MRSA) in community aqquired primary pyoderma .Indian J Dermatol Venerol Leprol 2006;72:126- 8.
6. Jyothi P, Metri B C, Peerapur B V. High level resistance to aminoglycosides in urinary isolates of Enterococci. Ann Med Health Sci Res 2014;4:58-9
7. Sultana S, Mawla N, Kawser S, Akhtar N, Ali MK (2015) Current microbial isolates from wound swab and their susceptibility pattern in a private medical college hospital in Dhaka city . Delta Med Col J 3: 25-30.
8. Biradar A, Farooqui F, Prakash R, Khaqri SY, Itagi I (2016) Aerobic bacteriological profile with antibiogram of pus isolates. Indian J Microbiol Res 3: 245-249.
9. Krishnamurthy S, Sajjan AC, Swetha G, Shalini S (2016) Characterization and resistance pattern of bacterial isolates from pus samples in a tertiary care hospital, Karimnagar. Trop J Pathol Microbiol 2: 49-54.
10. Hanumanthappa P, Vishalakshi B and Krishna S (2016) A study on aerobic bacteriological profile and drug sensitivity pattern of pus samples in a tertiary care hospital. Int J Curr Microbiol App Sci 5: 95-102.
11. Kelwin W.S (1999) Anti-microbial therapy for diabetic foot infections. Post Grad Med 106: 22-28.
12. Hanumanthappa, P., Vishalakshi, B., & Krishna, S. A. (2016). Study on aerobic Bacteriological profile and Drug sensitivity pattern of Pus samples in a tertiary care hospital. Int. J. Curr. Microbiol. App. Sci, 5(1), 95-102.
13. Sah, P., Khanal, R., & Upadhaya, S. (2013). Skin and soft tissue infections: bacteriological profile and antibiotic resistance pattern of isolates. J Universal Coll Med Sci, 1(3), 18-21.
14. Afroz, Z., Metri, B. C., & Jyothi, P. (2015). Bacteriological profile and antimicrobial susceptibility pattern of skin and soft tissue infections among gram negative bacilli in a tertiary care hospital of South India. Journal of Pharmaceutical Sciences and Research, 7(7), 397.
15. Kaur Najotra, D., & Kakru, D. K. (2012). Bacteriology and antibiogram of skin and soft tissue infections from a tertiary care hospital. Indian Journal of Medical Specialities, 3(1).
16. Madhavi S, Parveen SS. Bacteriological Profile and Antimicrobial Sensitivity of Wound Infections. Int. J. Curr. Microbiol. App. Sci. 2015;4(12):248-54.
17. Mishra, D., & Palo, S. (2016). Antibiotic resistance pattern of bacterial isolates from skin and soft tissue infections. International Journal of Research in Medical Sciences, 4(5), 1458-1462
18. Rani, S., Jayalekha, B., & Sreekumary, P. K. (2016). Bacteriological profile of pyoderma in a tertiary care centre in Kerala, India. International Journal of Research in Dermatology, 2(1), 1-11.
19. Shetty, J. Skin And Soft Tissue Infections Associated with Methicillin Resistant Staphylococcus Aureus, Esbl, Amp C And Metallo B-Lactamase Producing Bacilli In A Tertiary Care Hospital.
20. Mohanty, S., Kapil, A., Dhawan, B., & Das, B. K. (2004). Bacteriological and antimicrobial susceptibility profile of soft tissue infections from Northern India.