International Journal of Medical Research Professionals

Original Article

A Prospective Study on Septicaemia Patients Attending Emergency Medicine Department of a Tertiary Care Teaching Hospital

Kiranpal Singh Sirohi

Associate Professor, Department of Medicine,
Teerthanker Mahaveer Medical College and Research Centre, Moradabad, Uttar Pradesh, INDIA.

Article History
Received: 10 May 2015
Revised: 22 May 2015
Accepted: 28 May 2015

***Correspondence to:**
Dr. Kiranpal S Sirohi,
Associate Professor,
Department of Medicine,
TMMC & RC,
Moradabad.
sirohi101@gmail.com

ABSTRACT

Background: Bloodstream infections are important causes of mortality and morbidity. Rapid empiric antibiotic therapy is often needed. Knowledge of epidemiological data of common pathogens and their antibiotic sensitivity pattern is needed for rapid therapy. **Methods:** This study was done to analyze the common causes of septicaemia and their antibiotic sensitivity pattern from the Teerthanker Mahaveer Medical College and Research Centre, Moradabad during February 2014 to July 2014. Isolates were identified using bacteriological and biochemical methods and antibiotic sensitivity was done using the Kirby-Bauer disc diffusion method. **Results:** This study showed that of the 198 patients examined 58 (29.2%) had septicaemia. Children below the age of 15 years constituted the greatest percentage of infected subjects (63.4%) followed by patients aged between 16-30 years (10.7%) ($P < 0.05$). The highest incidence of septicaemia were from medicine (8.95‰), followed by paediatrics (7.04‰), surgery (6.46 ‰), out-patients (5.79‰), neonatology (5.12‰), obstetrics and gynaecology (5.05‰) and emergency (2.05‰) wards. The overall incidence of septicaemia was 5.79 per 1000 admissions. Gram-positive bacteria were encountered more often than gram negative bacteria (56.2% versus 43.8%, $P<0.05$). Among the gram-positive bacteria, 26 (82.5%) were *Staphylococci*; 3 (9.5%) were *Streptococcus species*; while 2 (7.9%) were unidentified grampositive bacteria. Among gram-negative bacteria, *Enterobacteriacea* 19 (79.6%) and non-fermenting bacteria 5 (20.1 %) were more frequent. **Conclusion:** Staphylococci were generally sensitive to Minocyclin and Rifampin (90%) while *Enterobacteriaceae* were most sensitive to Cefoxitin (71%) and Aztreonam (74%).

KEYWORDS: Septicaemia, Antibiotic sensitivity.

INTRODUCTION

Septicaemias are important causes of mortality and morbidity and are among the most common healthcare associated infections.[1] Illnesses associated with bloodstream infections range from self-limiting infections to life threatening sepsis that require rapid and aggressive antimicrobial treatment.[2] A wide spectrum of organisms has been described and this spectrum is subject to geographical alteration. Patients who are granulocytopenic or inappropriately treated may have a mortality rate that approaches 100%.[1]

Moreover, fatalities among patients infected with Gram-negative bacilli are higher than those among patients who have Gram-positive cocci as causative agents of their bacteraemia.[3] Worldwide; emergence of antibiotic resistance in all kinds of pathogenic bacteria is a serious public health issue. It is associated with greater hospital mortality and longer duration of hospital stay, thereby increasing health care costs.[4] Also, colonization and infection with antibiotic-resistant bacteria has made the therapeutic options for infection treatment extremely difficult or virtually impossible in some instances.[5] There are many reasons for this alarming phenomenon, including increasing antibiotic use and misuse in humans, animals and agriculture, clustering and overcrowding and poor infection control.[6]

Due to the high mortality and mobility associated with septicaemia, antimicrobial therapy in most cases is initiated empirically before the results of blood culture and antimicrobial susceptibility pattern of the isolates are available.[1]

Knowledge of local antimicrobial resistance patterns from accurate bacteriological records of blood culture results is needed to provide guidance towards an empirical therapy before sensitivity patterns are available. There is large excess `mortality in Sub-Saharan Africa particularly in children. The mortality rate among five-year-old children is about 25-100 per 1000 compared with 10-30 per 1000 in developed countries.[7] Bacteraemia is usually caused by a wide spectrum of bacteria with varying antimicrobial susceptibility pattern. However, there is a paucity of information about the relative contribution of different bacteria to infections in Sub -Saharan Africa and how this varies across the full range age groups.[7] Bacteraemia often require prompt diagnosis and effective treatment to prevent death and complications from septicaemia. Physical signs and symptoms are usually useful in identifying patients with septicaemia and other non-localized infections but these have limited specificity.[8] Bacteriological culture to isolate the offending pathogen and determine its antimicrobial sensitivity pattern has remained the mainstay of definitive diagnosis of septicaemia.[9] In most cases of suspected septicaemia antimicrobial therapy is always initiated empirically because bacteriological culture results take about a week to be available.

Epidemiological data on common blood stream pathogens and their antimicrobial sensitivity pattern is thus very important to make the right choice of empiric therapy.

MATERIALS AND METHODS

This study was conducted in the Teerthanker Mahaveer Medical College and Research Centre, Moradabad. All the subjects were patients suspected clinically for septicaemia and sent to the bacteriology laboratory for blood culture by physicians. Written informed consent was taken before the study. 5-10 mls of blood was collected from adults and 1-2ml from children and inoculated into the biphasic culture medium. The blood culture bottles were immediately incubated aerobically at 35°c for 24 hrs.

After 24hrs, bottles were checked for positive cultures (growth on the agar slope and/or turbidity in the broth). Negative cultures were reincubated and checked daily for up to three weeks unless growth occurred. Before re-incubation, the slope was re-inoculated by tippling the bottle.

Antibiotic susceptibility testing was done on MH using the Kirby-Bauer disc diffusion technique.[11] Antibiogram for Streptococcus species was done on blood agar.

RESULTS

Of the 198 patients examined for septicaemia, positive culture was found in 58 (29.2%). Age distribution of the patients is shown in Table 1.

Table 1: Age Distribution of Patients with Septicaemia

Age ranges (years)	No clinically examined	No (%) of positive culture
16-30	30	10
31-45	70	21
46-60	58	15
61-75	35	10
>76	5	2
Total	198	58

Table 2: The Type and Distribution of Bacteria Isolates

Bacteria Isolates	Total (%)
S.aureus	11 (20.9)
S. epidermiidis	13 (22.7)
S. sapropihyticus	2 (3.6)
Streptococcus sp.	3 (5.5)
S. typhi	5 (9.1)
Salmonella spcies	4 (6.4)
K. pneumonia	4 (6.4)
E. coli	3 (5.5)
Enterobacter sp.	4 (6.4)
Pseudomonas sp.	2 (2.7)
Acinectobacter sp.	1 (1.8)
Proteus mirabilis	1 (0.9)
Non enterobacteriacaece	2 (2.7)
Gram positive bacilli	2 (4.5)
Klebseilla oxytoca	1 (0.9)
Total	58 (100)

Majority of the infected patients were found in the 31-45 years of age group (n=70) followed by 46-60 age group (n=58) and least in >76 (n=5) age group (63.4%). Maximum no. of positive culture was found in 31-45 age group followed by 46-60 years age group.

The type and pattern of bacteria isolates in the various age groups is shown in Table 2. Gram-positive bacteria were encountered more often than gram negative bacteria (56.2% versus. 43.8%, P<0.05). Among the gram- positive bacteria, Staphylococci constituted 52 (82.5 %), Streptococci species 6 (9.5%) and unidentified gram-positive bacteria 5 (7.9%). Among gram-negative bacteria, enterobacteriacea 39 (79.6 %) and non-fermenting bacteria 10 (20.1 %) were more frequent.

DISCUSSION

This study is a record of septicaemia in patients attending the Medicine department of Teerthanker Mahaveer Medical College and Research Centre, Moradabad. Results showed that septicaemia was present in 29.2% of patients examined. Gram positive

bacteria were encountered more than gram-negative bacteria, and the most frequent invasive bacteria were Staphylococcus epiderimidis, S. aureus, Salmonella typhi and Klebseilla species.[6]

These results are similar to those obtained in some previous studies[9]: Bacteremia was identified in 552 (45.9%) of 1201 children in Nigeria; 53.4% of the infections were due to gram positive bacteria and 46.6% due to gram negative bacteria. The most frequent isolate was S. aureus (47.7%) followed by coliforms (23.4%), unidentified gram negative rods (8.0%), Pseudomonas aerugenosa (5.8%), Streptococcal species (4.7%) and Chromobacteria species (4.5%). Hill et al.[7] also reported an incidence of 34% (297) out of 871patients studied. The isolates were dominated by gram-positive bacteria.

Results have also shown a very high incidence of septicaemia among 31-45 age group. It is also in accordance with results from Laos in which 69.2% of Staphylococci were form majority bulk.[12] The rate of isolation also reduced with increasing age as seen in this study.

However, while this study represents real life clinical practice in the hospital in which it was conducted, our approach had some limitations.

The primary reason for requesting the blood culture from patients is still not clear.

CONCLUSION

This study shows that Staphylococcus epidermidis, S. aureus and Salmonella typhi are the living cause of bacteraemia among patients in the locality.

REFERENCES

1. Atul G., Anupuba S., Taya G., Goyal R.K. and Sen M.R. (2007). Bacteriological Profile and Antimicrobial Resistance of Blood Culture Isolate from a University Hospital .J, Indian Acad of Clin Med; 8(2)139-43.

2. Young L.S.(1995) in Mandell G. L Benett J.E Dolin R. Principle and Practice of Infectious diseases. Churchill Livingstone.46:690-705.

3. Fuselier P.A., Garcia L. S. and Procop. G.W (2002). Bloodstream infections. In Betty A.F., Daniel F.S., Alice S.W. eds. Baily and Scott's Diagnostic microbiology. Mosby 865-83.

4. Gangoue P.J., Sinata K.S., Ngassam P., Adiago D., and Ndumbe P. (2006). Antimicrobial Activity Against Gram-Negative Bacilli from Yaounde Central Hospital, Cameroon. Afr Health Sci 6(4) 232-235.

5. Collignon P.J.(2002). Antibiotic Resistance. Med J Aust 177(6):325-9.

6. Kholy A., Baseem H., Hall G.S.., Procop G.W. and Longworth D.L.(2003). Antimicrobial Resistance in Cairo, Egypt 1999-2000: a survey of five hospitals. J Antimicrob Chemother 51(3):625-30.

7. Hill P.C., Onyeama C.O., Ousman S., Amegau S., Naomi S. and Dokor S. (2007). Bacteraemia in Patients Admitted to an Urban Hospital in West Africa. BMC Infect Dis 7:1471-2334.

8. Adejuyigbe E.A., Adeodu O.O, Ako N.K., Taiwo O and Owa J.A (2001). Septicaemia in High Risk Neonates at a Teaching Hospital in Ile Ife. East. Afr Med J. 789:590-3.

9. Meremikwu M. M., Nwachukwu C.E., Asuquo A.E., Okebe J.U. and Utsalo S.J.(2005). Bacterial isolates from blood cultures of children with suspected septicaemia in Calabar, Nigeria (2005) BMC Infect Dis. 5: 110.

10. Konemann, W.E., Allen, S. D., Dowell, V. R., Janda, W. M.,Sommers, H. M. Winn, Jr.W. C. (1988). Color Atlas and Textbook of Diagnostic Microbiology (3rd edn) J.P. Lippincott Co. Philadelphia. Pp 89-156

11. Tenover, F.C. Implementation of NCCLS Antimicrobial Susceptibility Testing Standard. http://wwwn.cdc.gov/cliac/pdf/Addenda/cliac0904/Addendum_W.pdf Accessed on the 15-09-2010

12. Rattanaphone P., Simaly P D., Soukaloun B.R and Vimone S.(2006). Causes of Community-Acquired Bacteraemia and Patternns of Antimicrobial Resistance in Vienttiane, Laos. J Trop Med 234:789-92.

How to cite the article: Kiranpal Singh Sirohi. A Prospective Study on Septicaemia Patients Attending Emergency Medicine Department of a Tertiary Care Teaching Hospital. Int J Med Res Prof. 2015, 1(2); 52-54.