Int J Pharm Bio Sci 2013 July; 4(3): (B) 1356 - 1361

Research Article Medicinal Microbiology

International Journal of Pharma and Bio Sciences ISSN 0975-6299

BACTERIOLOGICAL PROFILE OF BACTERIAL MENINGITIS AT TERTIARY CARE HOSPITAL IN NORTH KARNATAKA.

DR RAVINDRANATH GANGANE[1] AND DR PRAVEEN KUMAR DODDAMANI*[2].

[1]Prof & HOD Department Of Microbiology,M.R.Medical college,Gulbarga,Karnataka 585105
*[*2] Department of Microbiology, Mediciti Institute of Medical science, Ghanpur village, Medchal Mandal, R.R.District. Andra Pradesh-501401*

ABSTRACT

BACKGROUND: Bacterial meningitis is a serious health problem requiring early diagnosis, effective treatment & prophylaxis. It remains a major cause of high mortality in India and other developing nations. This study was conducted in our institute to know the bacteriological profile of bacterial meningitis and study the antibiotic susceptibility pattern of isolated organisms.
METHODS: 308 CSF samples were collected from clinically diagnosed cases of Bacterial meningitis. CSF was centrifuged, first culture media were inoculated and followed by procedures like direct wet mount, Grams stain, Negative staining, ZN staining. For culture CSF was inoculated on Blood agar, McConkeys Agar, chocolate Agar, BHI broth and sabouraud's dextrose Agar. Identification of bacteria was done by various biochemical tests, enzymatic tests and agglutination test with specific antisera.Identification of fungal cultures done by grams stain, negative staining and lacto-phenol cotton blue mount.Antibiotic sensitivity done by Kirby-bauers disc diffusion test using mueller Hinton agar according to standard guidelines. Detection MRSA was done according to CLSI guidelines.
RESULTS: Out of 308 samples, 82 showed aerobic bacterial growth,10 fungal growth and 11 smears were AFB positive. Most common age group affected was 16 to 60yrs, male were affected more when compared females with male female ratio of 1.75:1 Most common isolate was streptococcus pneumonia 26(31.7%), others were Klebsiella 17(20.7%), E.coli 10(12.1%), Psedumonas aeurginosa 8(9.7%), Staphylococcus aureus 6(07.3%) ,proteus 5(6.09%),H.influenza 3(3.6%),acinetobacter2(2.4%),N.meningitidis,2(2.4%),enterococci fecalis 2 (2.4%) citrobacter frundii 01(3.7%) each.
CONCLUSION: bacterial meningitis is an emergency condition where early diagnosis and aggressive treatment plays vital role in decreasing mortality rate. Most common isolate was streptococcus pneumonia in adults and E.coli in patients less than 1yr.emergence of multidrug resistant organisms in recent times makes the early diagnosis of meningitis important factor to reduce mortality and morbidity associated with it.

KEYWORDS: Bacterial meningitis, streptococcus meningitis, CSF culture,cryptococcal meningitis,N.meningitidis,antibiotic susceptibility.

DR PRAVEEN KUMAR DODDAMANI
Department of Microbiology, Mediciti Institute of Medical science, Ghanpur village, Medchal Mandal, R.R.District. Andra Pradesh-501401

INTRODUCTION

WHO defines Meningitis as inflammation of meninges,the covering of brain and spinal cord. It is most often caused by infection by bacteria,virus or fungus,but can also be caused by chemical irritants ,cancer and other conditions.[1] Bacterial meningitis remains major cause of mortality and long term neurological sequale associated 1,70,000 deaths world wide [1] In spite of availability of potent newer antibiotics, Mortality rate due to bacterial meningitis remains high in India and other developing countries 16-32%[2] Different etiological agents cause bacterial meningitis in different age group. In neonates: group B, E.coli,Listeria monocytogen. In Children and infants: H.influenza,N.meningitidis, Str.pneumoniae. In Adults: str.pneumoniae, N.meningitidis, S.aureus, streptococcus, H.influenza, gram negative bacteria[3,4]. Early diagnosis and treatment is very important as delay in diagnosis and initiation of antibacterial therapy can result in poor outcome of disease[5] As the bacteria causing bacterial meningitis have wide range of organisms so this study was conducted in our institute to know the bacteriological profile of bacterial meningitis and to study the antibiotic susceptibility pattern of isolated organisms.

MATERIALS AND METHODS[6,7,8,9,10]

The study was done over a period of time of 2 year from November 2010 to December 2012 in department of microbiology in Basaveshwar teaching & general Hospital attached to M.R.Medical college, Gulbarga.

Total 308 samples were collected from clinically diagnosed cases of meningitis with signs of meningitis.

Inclusion criteria

1)clinically diagnosed cases of meningitis with signs and symptoms of meningitis. 2)fresh cases were considered for study in all age groups.

Exclusion criteria

1)post-traumatic meningitis,2)post surgical meningitis,3)subarachnoid hemorrhage.

Collection of sample

CSF was collected under sterile aseptic precautions by trained medical personal either anesthetist or clinician ,the samples were immediately transported to laboratory without any delay.CSF was collected in three tube 1)biochemical analysis for protein,sugar,chloride levels. 2)cytological examination for differential cell count. 3)microbiological examination: macroscopic, direct wet mount, grams stain, Zn staining, Negative staining and culture.

Macroscopic examination

colour,turbidity,cloudiness or purulent,presence of clot or blood,cob web appearance. CSF was first centrifuged at 1500-2000g for 15min at room temperature. Sediment was mixed by forceful aspiration with a sterile pipette so as to dislodge organism that adheres to bottom of tube after centrifugation.

Sediment was subjected to following procedures

Inoculation on to culture plates, direct wet mount, grams staining, negative staining, ZN staining by India ink preparation.

Culture media inoculated were Blood agar, chocolate agar, MacConkeys agar plates ,and BHI broth . All plates were incubated 37^0C ,5-10% co_2 overnight & examine for 3 days.BHI broths was incubated for 7days and examined on daily basis for turbidity before reporting negative. After incubation all plates examined for growth. Identification of organism was done based on colony characteristics, gram staining and standard biochemical test. The antibiotic sensitivity testing of all isolates was performed by modified Kirby Bauer's disc diffusion method on Mueller Hinton agar using antibiotics of Hi media .ESBL & MRSA detection done according to CLSI guidelines. Saubraud's dextrose agar was used for isolation of fungal cultures from CSF after CSF was positive for

fungal element in direct wet mount, grams staining &India ink preparation.

RESULTS

A total of 308 samples collected from clinically diagnosed patients of bacterial meningitis. Out of 308 samples 92 samples were culture positive(30.6%). Out of which 82 were bacterial culture,10 fungal cultures and 11 smears were AFB positive. Most common age group was 16-60yr . Males affected more than female, male female ratio 1.75:1.

Table 1
smear positive versus culture positive

n=308	Smear +	Smear -ve	total
Culture +ve	80	12	92
Culture -ve	10	206	216
	90	218	308

TABLE 2
study of meningitis in various age groups.

AGE GROUP	TOTAL CASES	PERCENTAGE
0-1YRS	79	25.6%
1-5YRS	50	16.23%
6-15YRS	39	12.6%
16-60YRS	129	41.8%
>60YRS	11	3.57%
TOTAL	308	100%

IN OUR STUDY MOST COMMON AGE GROUP WAS 16-30YRS WITH 41.8% FOLLOWED BY 0-1YRS WITH 25.6%

Table 3
distribution of meningitis in male and female.

n=308	Total	Percentage
Male	196	63.3%
Female	112	36.4%

MALE FEMALE RATIO IS 1.75:1
63.3% of cases seen in males,36.4% in females, male female ratio 1.75:1

TABLE 4
PERCENTAGE OF VARIOUS ISOLATES.

	NUMBER OF CASES	%
GRAM POSITIVE COCCI	34	36.9%
GRAM NEGATIVE BACILLI	48	52.17%
FUNGAL GROWTH	10	10.8%
TOTAL	92	

Correlation of isolates with biochemical analysis and cell count of CSF

isolates	Average cell count	Proteins(30-45mg%)	Glucose(40-80mg%)
Bacterial (82)	5000-12000/mm^3	12-500mg%	15mg%
Fungal (10)	50-100/mm^3	50-100mg%	20mg%
AFB +ve (11)	50-250/mm^3	80-100mg%	40mg%

Table 5
Various Organisms isolated from samples

ISOLATES	Total No.	Percentage
Streptococcus pneumoniae	26	31.7%
Klebsiella spp	17	20.7%
E.coli	10	12.1%
P.aureginosa	08	9.7%
S.aureus	06	7.3%
Proteus	05	6.09%
H.influenza	03	3.6%
Acinetobacter	02	2.4%
N.meningitidis	02	2.4%
Enterococci	02	2.4%
Citrobacter frundii	01	1.2%
Total	82	26.62%

TABLE
fungal isolates(n=10) 3.2% of total samples

n=10	Total	Percentage
Cryptococcus spp	07	70%
Candida spp	03	30%

AFB positive Smears = 11

Table 7
Antibiogram of isolates from meningitis.

Antibiotics	Staph aureus	Str.pneumoniae	E.fecalis	Klebsiella pneumoniae	E.coli	Psedumonas	Acinetobacter	Hinfluenza	n.meningitidis	Citrobacter frundii
Ampicillin	66%	50%	100%	0	0	0	0	66%	50%	0
Gentamicin	100%	50%	100%	52%	80%	0	50%	0	50%	100
Cotimoxazole	50%	50%	-	0	0	0	0	66%	-	100
Ceftazidime	-	-	-	47%	-	50%	50%	100%	100%	-
Erythromycin	83%	88%	-	-	-	-	-	-	-	-
Vancomycin	100	100	100	-	-	-	-	-	-	-
Cefoxitin	66%	-	-	-	-	-	-	-	-	-
Amikacin	-	-	-	52%	80%	-	50%	-	50%	-
Cefotaxime	83%	100	-	-	-	-	-	-	-	-
Piercillin-tazobactum	-	-	-	52%	50%	87%	-	-	-	-
Ciproflox/levoflox/lomeflox	50%	61%	50%	52%	-	-	-	-	-	100
Amoxy-clav	66%	61%	50%							
Imipenem-	-	-	-	100	100	100	100	-	-	100
Cephlexin	70%	100	-	-	-	-	-	-	-	

DISCUSSION

Meningitis is most important medical emergency where microbiology laboratory plays a critical role in early identification of causative organism and its antibiotic sensitivity pattern guides the clinicians in proceeding with the treatment. Total 308 clinically diagnosed cases of meningitis were studied during the period of 2yrs,In present study highest incidence of meningitis

was observed in age group of 16-60yrs(41.8%) followed by 0-1yrs(25.6%) which falls in accordance with study conducted by Bahador M et al 2009 showed 31% in 15-60yrs and 21% in 0-1yrs. In our study, Streptococcus pneumonia was most common isolate, similar results were found in study conducted by madhumita et al 2011(34%). Other organisms isolated were klebsiella pneumonia 20.7%, E.coli 12.1%, P.aeruginosa 9.7%, S.aureus 7.3%, proteus spp 6.09%, H.influenza 3.6%, acinetobacter 2.4%, N.meningitidis 2.4%, E.fecalis 2.4%, citrobacter frundii 1.2%. E.coli 6( ) was most common isolate among age group 0-1yrs.similair findings was seen by chang et al 2004 Streptococcus was 100% sensitive to vancomycin and cephalexin; it was also sensitive to ciprofloxacin, ampicillin, chloramphenicol, cotrimoxazole, gentamicin similar to chugh et al 2011 Gram negative bacilli were sensitive to gentamicin, amikacin, cephalosporins. ESBL was not detected in any of the isolated organisms. In our study most of the enterobacteraceae members and pseudomonas were susceptible to amakicin third generation cephalosporins and pipercillin with tazobactem . In case of gram positive bacteria the highly effective antibiotics were erythromycin, vancomycin, amoxy-clav least effective antibiotics were penicillin & cephalexin. Prevalence of pseudomonas 9.7 in our study compared to study conducted

CONCLUSION

Meningitis was seen in all age group; most common age group was 16-60yrs. Streptococcus pneumoniae was most common causative agent of bacterial meningitis followed by other organism klebsiella pneumoniae, E.coli,Proteus,H.influenza,Acentobacter,citroba cter frundii. Study showed variable antibiotic sensitivity for different organisms, but ciprofloxacin, gentamicin,pipercillin and vancomycin were effective against majority of isolates. Hospital should monitor the antibiotic sensitivity pattern as it can provide clue about emerging drug resistant drug resistant & can serve as basis for empirical antibiotic therapy in emergency. Because of high mortality due to meningitis, early detection of meningitis and laboratory confirmation should be employed. Last but not the least rational use of antibiotics or use of narrow spectrum antibiotics is recommended.

REFERENCES

1. WHO website from internet www.who.com
2. R.mani,S.pradhan,S.Nagrathna,R.Wasiulla ,A.Chandramukhi:Bacteriological profile of community acquired bacterial meningitis after 10 yrs retrospective study in tertiary neuro care centre in South India.IJMM 2007;25(2);108-14
3. Chandramukhi A,Neuromicrobiology In:Neuroscience in India.Retrospective and prospective.The neurological society of India society of India.Trivandrum.New Delhi CSIR;1989,p361-95.
4. www.cdc.gov/meningitis/bacterial.html (internet:CDC website).
5. Vande Beek D, deGans J,Tunkel AR,WijdicksEF, Community-aquired bacterial meningitis in adults.N.Eng.J.Med 2006;354:44-53.
6. Colle JG,Miles RS,Watt B, collee Jg,Marmion BP,Fraser Ag,Simmons A, Mackie McCartney practical medical microbiology 14th edn London:Churchill livingstone;2006;131-149
7. Chander J. Textbook of medical mycology 3rd edition New-delhi:Mehta publishers 2009.
8. Starke JR,Mycobacterial infections.In:Kareen roos,Tunkel AR editors,Handbook of Clinical neurology.philadelphia,Elseviers publication 2010:159-177.

9. Gray LD,Fedorko DP,Laboratory diagnosis of bacterial meningitis.Clinical microbiology reviews 1992,5(2):130-145.
10. Clinical laboratory Standards Institute. Performance standards for antimicrobial susceptibility testing:sixteenth informational supplement document M_{100}-S16 Clinical laboratory standard institute,wayne 2007.
11. Cheesbrough monica.District laboratory practice in tropical countries part -2 2nd edition United kingdom:Cambridge university press.2006,chapter 7.13,examination of CSF;116-124.
12. Madhumitha P,Gupta N,Clinical & bacteriological spectrum of community acquired acute bacterial meningitis in adults at tertiary care hospital in northern India.International Journal of nutrition,Pharmacology,Neurological diseases 2011;1(2);194-200.
13. Chugh Y,Kapoor AK,Bhargava A.Antimicrobial sensitivity pattern of gram positive CSF isolates in Children with septic meningitis in atertiary care hospital.Internet journal of medical update 2011 july:6(2):30-39.