

# Study on Profile of Patients Suffering From Bacterial Meningitis Admitted in a Medical College Hospital.

Rajesh Prasad<sup>1</sup>, Krishna Kumar Mani<sup>2</sup>, Amit Kumar Anand<sup>3</sup>

<sup>1</sup>Tutor, Department of Microbiology, VIMS, Pawapuri, Bihar, India.

<sup>2</sup>Assistant Professor, Department of Microbiology, VIMS, Pawapuri, Bihar, India.

<sup>3</sup>Assistant Professor, Department of Microbiology, VIMS, Pawapuri, Bihar, India.

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## ABSTRACT

**Background:** Bacterial meningitis is important cause of morbidity and mortality. The clinical profile is variable and diagnosis depends on clinical suspicion and laboratory investigations. **Methods:** The present observational study included 42 patients of bacterial meningitis to assess their clinicobacteriological profile. Details of background, clinical features and bacteriological diagnosis were obtained. **Results:** All of them suffered from fever, 73.8% from altered sensorium and 64.3% from inability to take food. *S. Pneumonia* was the most prevalent organism (38.1%) followed by *H. Influenza* (28.6%). Group B *Streptococci* (11.9%), *Neisseria meningitides* (7.1%), *Staphylococcus aureus* (4.8%), *Klebsiella* (4.8%), *E. coli* (2.4%) and *Pseudomonas aeruginosa* (2.4%) were the other organisms seen. **Conclusion:** Knowledge of clinical profile of meningitis is essential for timely diagnosis and treatment.

**Keywords:** Bacterial, Meningitis, Profile.

## INTRODUCTION

Meningitis is one of the major causes of morbidity and mortality as well as disability due to its neurological consequences.<sup>[1]</sup> About one third of meningitis is bacterial in nature. It is associated with very high mortality, ranging from 16 - 32%. It also occurs as outbreaks and involves many cases simultaneously.<sup>[2]</sup>

The causative organisms are different in different age groups. In neonates, streptococci and *E. coli*, in infants, *H. Influenza* and meningococci and in adults, pneumococci, meningococci and staphylococcus are the important causes.<sup>[3]</sup> The clinical features are initially vague and classical signs and symptoms develop gradually. The confirmatory diagnosis depends upon culture of organism from CSF which takes time. Hence, the initial CSF profile provides preliminary indication to bacterial meningitis.<sup>[4]</sup> Studies regarding profile of patients and the responsible organisms have not been done in this area and therefore, this study was conducted.

### Aims & objectives

The present study was conducted to find the

clinicobacteriological profile of patients admitted at a medical college hospital and found to be suffering from bacterial meningitis.

## MATERIALS AND METHODS

The present study was conducted in the department of Microbiology at VIMS, Pawapuri. All the patients admitted in the hospital and found to be suffering from bacterial meningitis were included in the present study. Those who have already taken antibiotics or in whom lumbar puncture was contraindicated were excluded. A total of 42 patients were included in the present study.

Detailed history of patients including socio-demographic profile and clinical history as well as findings of clinical examination were recorded for each patient. The CSF samples were collected in the wards in aseptic manner and transported to the department of Microbiology for further examination. CSF examination included looking for gross appearance, total and differential WBC count, levels of glucose & protein and Gram staining & culture of the sample. Three vials of CSF sample were prepared. The first was used for bacteriological examination, second for cytological examination and third for biochemical examination. The CSF sample was centrifuged at 1500 RPM for 15 minutes, the slides were prepared and Gram staining was done. It was examined at 40x magnification for WBC quantification and at 100 x magnification for looking

### Name & Address of Corresponding Author

Dr. Krishna Kumar Mani,  
Assistant Professor,  
Department of Microbiology,  
VIMS, Pawapuri,  
Bihar, India.

for microorganisms. For culture, 0.15 ml of centrifuged CSF specimen was inoculated in sheep blood Agar, chocolate Agar and Mac Conkey agar media. The findings were noted.

All the data was recorded in standardized proforma, entered into Microsoft Excel and analysed using SPSS v 16.0. Informed consent was taken in all the case and the records were kept confidentially.

## RESULTS

A total of 42 patients suffering from bacterial meningitis were studied. All of them suffered from fever, 73.8% from altered sensorium and 64.3% from inability to take food. 23.8% had neck rigidity while 26.2% had nausea and vomiting.

**Table 1: Clinical features**

Clinical feature*	Frequency (n=42)	%	95% CI
Fever	42	100	
Nausea and vomiting	11	26.2	15.3-41.1
Altered sensorium	31	73.8	58.9-84.7
Neck rigidity	10	23.8	13.5-38.5
Inability to take food	27	64.3	49.2-77
Lethargy	20	47.6	33.4-62.3

\*. multiple response

**Table 2: Result of gram staining.**

Bacteria seen	Frequency (n=42)	%	95% CI
Gram positive	21	50	35.5-64.5
Gram negative	17	40.5	27-55.5
No bacteria seen	4	9.5	3.8-22.1
Total	42	100	-

**Table 3: Organism cultured**

Organism	Frequency (n=42)	%	95% CI
S. pneumoniae	16	38.1	25-53.2
H. influenzae	12	28.6	17.2-43.6
Group B Streptococci	5	11.9	5.2-25
Neisseria meningitides	3	7.1	2.5-19
Staphylococcus aureus	2	4.8	1.3-15.8
Klebsiella	2	4.8	1.3-15.8
E. coli	1	2.4	0.4-12.3
Pseudomonas aeruginosa	1	2.4	0.4-12.3
Total	42	100	-

CSF examination showed that CSF cell count was  $Cu\ mm - 2357.1 \pm 169$  cells per cmm (95% CI- 2304.4 - 2409.7). CSF glucose level was  $32.3 \pm 4.6$  mg% (95% CI- 30.9 - 33.7) and CSF protein level was  $189.2 \pm 11.5$  mg% (95% CI- 185.6 - 192.8). Smear preparation and gram staining of CSF fluid revealed that gram negative bacteria were present in 50% smears, gram negative ones in 40.5% while in 9.5% smears, no bacteria was seen. On culture, it was seen that S. pneumonia was the most prevalent organism (38.1%) followed by H. influenza (28.6%). Group B Streptococci (11.9%), Neisseria

meningitides (7.1%), Staphylococcus aureus (4.8%), Klebsiella (4.8%), E. coli (2.4%) and Pseudomonas aeruginosa (2.4%) were the other organisms seen.

## DISCUSSION

A total of 42 patients suffering from bacterial meningitis were studied. All of them suffered from fever, 73.8% from altered sensorium and 64.3% from inability to take food. 23.8% had neck rigidity while 26.2% had nausea and vomiting. Singh et al found that most common clinical presentation was the fever (96.5%) and vomiting & nausea (42.8%), followed by headache (39.8%), altered consciousness (43.2%), neck stiffness (13.7%), seizures (9.4%), and other neurological sign including Brudzinski's sign, kerning's sign (2.1%).<sup>[5]</sup> On the other hand, fever (98.3%), headache (95.85%), neck stiffness (90.7%), nausea (94.9%) and vomiting (94%) were the common clinical findings in the study done by Madhumita et al.<sup>[6]</sup> Adhikary et al found that the most common presenting feature in both bacterial and aseptic meningitis was fever, followed by altered sensorium. Only 15.7% of cases had neck rigidity.<sup>[7]</sup>

CSF examination showed that CSF cell count was  $Cu\ mm - 2357.1 \pm 169$  cells per cmm (95% CI- 2304.4 - 2409.7). CSF glucose level was  $32.3 \pm 4.6$  mg% (95% CI- 30.9 - 33.7) and CSF protein level was  $89.2 \pm 11.5$  mg% (95% CI- 85.6 - 92.8). Smear preparation and gram staining of CSF fluid revealed that gram negative bacteria were present in 50% smears, gram negative ones in 40.5% while in 9.5% smears, no bacteria was seen. On culture, it was seen that S. pneumonia was the most prevalent organism (38.1%) followed by H. influenza (28.6%). Group B Streptococci (11.9%), Neisseria meningitides (7.1%), Staphylococcus aureus (4.8%), Klebsiella (4.8%), E. coli (2.4%) and Pseudomonas aeruginosa (2.4%) were the other organisms seen.

Shameem et al observed that Streptococcus pneumoniae (44.7%) was the predominant organism identified, followed by H influenzae (25.6%) and Gp. B. Streptococci (9.5%).<sup>[8]</sup> Mani et al found that the bacterial pathogen could be identified by the Gram stain in the CSF samples of 65.7% patients, while 40.8% samples yielded growth on culture. Streptococcus pneumoniae was the predominant pathogen accounting for 61.8% cases. Haemophilus influenzae and Neisseria meningitidis accounted for 1.8% and 1% cases respectively.<sup>[9]</sup>

Singh et al observed that gram positive bacteria (66.18%) were the most common cause of ABM as compared to Gram negative (28.86%) and others (4.96%). The mean sugar levels in the CSF samples were tested with the range of  $32.2 \pm 3.4$  mg/dl, while a high mean level of protein ( $90.2 \pm 11.5$  mg/dl) was detected in clinical samples.<sup>[5]</sup> Madhumita et al commented that Streptococcus pneumoniae remains the major etiological agent of ABM in their study.

Penicillin resistance was detected in 50% of cases among the isolates which came positive by culture. *Neisseria meningitidis* was detected in 24 cases. But since none were cultured, sensitivity patterns could not be correlated. LAT is a convenient and rapid test to support bacterial etiology in ABM.<sup>[6]</sup> Adhikary et al found that the organisms isolated were *Escherichia coli* (25.6%), *Staphylococcus aureus* (15.4%), *Streptococcus pneumonia* (10.2%), *Klebsiella species* (10.2%) and *Pseudomonas aeruginosa* (10.2%).<sup>[7]</sup>

Thus, it is seen that the clinicobacteriological profile of meningitis cases was similar as seen in other studies. The clinical features were vague initially and the CSF examination and culture was helpful in reaching a diagnosis.

## CONCLUSION

It is seen that pneumococci and *H. influenza* are the major causes of bacterial meningitis in this area. The initial clinical signs of meningitis are vague and hence, a laboratory support is essential for an early diagnosis. More studies are needed to assess the trends of bacterial meningitis in this area.

## REFERENCES

1. Mani R, Pradhan S, Nagarathna S, Wasiulla R, Chandramuki A. Bacteriological profile of community acquired acute bacterial meningitis a ten-year retrospective study in a tertiary neurocare centre in south India. *Indian J Med Microbiology*. 2007;25(2):108-14.
2. Kabra SK, Praveen Kumar, Verma IC, Mukherjee D, Chowdhary BH, Sengupta S, et al. Bacterial meningitis in India: An IJP survey. *Indian J Pediatr* 1991;58:505-11.
3. Sonavane A, Baradkar VP, Mathur M. Bacteriological profile of pyogenic meningitis in adults. *Bombay Hosp J* 2008;50:452-5.
4. Devianayagam N, Ashok TP, Nedunchelium K. Bacterial Meningitis. Diagnosis by latex agglutination test and clinical features. *Indian Pediatr* 1993;30:495-500.
5. Singh AK, Kumar A, Gaur V, Jasuja K, Pandey J, Mishra R. Bacteriological profile of acute bacterial meningitis at a tertiary care hospital of North India. *Int J Res Med Sci* 2016;4:4387-93.
6. Madhumita P, Gupta N. Clinical and bacteriological spectrum of community-acquired acute bacterial meningitis in adults at a tertiary care hospital in northern India. *Int J Nutr Pharmacol Neurol Dis* 2011;1:194-200.
7. Adhikary M, Chatterjee RN. Laboratory evaluation of cases of meningitis attending a tertiary care hospital in India: An observational study. *Int J Nutr Pharmacol Neurol Dis* 2013;3:282-8.
8. Shameem S, VinodKumar CS, Neelagund YF. Bacterial Meningitis: Rapid Diagnosis And Microbial Profile : A Multicentered Study. *J. Commun. Dis*. 2008; 40 (2): 111-120.
9. Mani R, Pradhan S, Nagarathna S, Wasiulla R, Chandramuki A. Bacteriological profile of community acquired acute bacterial meningitis: a ten-year retrospective study in a Tertiary Neurocare centre in South India. *Indian Journal of Medical Microbiology*, (2007) 25 (2):108-14.

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