

## Bacteriological Study of Cerebrospinal Fluid In Pyogenic Meningitis in Children of Chotanagpur Region of Jharkhand, India

Dr Partha Kumar Chaudhuri<sup>1</sup>, Dr Sunanda Jha<sup>2</sup>, Dr Anil Kumar Chaudhary<sup>3,1,2</sup> Assistant Professor,<sup>3</sup> Professor Department of Pediatrics and Neonatology, Rajendra Institute of Medical Sciences, Ranchi, Jharkhand, India

---

### Abstract

**Background:** Pyogenic meningitis is one of the most serious infections in children. An early diagnosis along with its cause may help in reducing mortality and morbidity.

**Objective:** To find out the organisms responsible for causing acute pyogenic meningitis in Chotanagpur region of Jharkhand, India.

**Methodology:** Cases with clinical signs and symptom of pyogenic meningitis, confirmed with bacteriological (smear and culture), cytological and biochemical examination of C.S.F (all together) were selected in the study.

**Results:** *E. coli* was isolated in 4 cases, *Klebsiella* in 2 cases in neonatal age group (<1 month)). Thus *E. coli* is the commonest organism isolated in the neonatal age group (44.4%). Above 1 month of age, *H. influenzae* type b and *Streptococcus pneumoniae* was isolated in 12 cases each. Thus these two organisms are the most common pathogen isolated in infant and children above 1 month of age (both 38.7%).

**Conclusion:** Thus our study highlights that etiology of bacterial meningitis is unique to the age of the infants especially neonate and is different in developing versus developed countries. *H. influenzae* type b, Pneumococcal conjugate vaccine and meningococcal vaccine have significantly reduced bacterial meningitis in developed countries in children over 4 weeks of age. Adoption of country wide vaccination against all 3 agents though expensive is the best option. This study will also help in deciding about the suitable antibiotic in empirical treatment of meningitis in Chotanagpur region of India.

**Keywords:** Bacteriological, Cerebrospinal fluid, Children, Pyogenic Meningitis

---

### I. Introduction

Pyogenic meningitis is one of the most serious infections in children. The infection is associated with high risk of mortality and chronic morbidity. An early diagnosis along with its cause may help in reducing mortality and morbidity.

The present work intends to discover the organism responsible for acute meningitis in children of Chotanagpur region. Present work will establish the possibility of particular organism in patient having certain feature, so that line of treatment can be followed depending upon the probability of the organism in Chotanagpur region, when bacteriological analysis of cerebrospinal fluid (C.S.F) is not possible.

### II. AIMS

To find out the organisms responsible for causing acute pyogenic meningitis in Chotanagpur region of Jharkhand, India.

### III. Material And Method

This study was done in Rajendra Institute of Medical Sciences (RIMS), Ranchi during the period from Jun 2014 to May 2015 in the age group 0-16 years. Forty cases with clinical signs and symptom of pyogenic meningitis, confirmed with bacteriological (smear and culture), cytological and biochemical examination of C.S.F (all together) were selected in the study.

### IV. Result And Analysis

Table 1 shows that most of the cases were in infant age group (42.5%) followed by 1-3 year (35%) and then above 3 year (22.5 %). Majority of children were male (60%). Table 2 shows the organism isolated in different age group. *E. coli* was isolated in 4 cases, *Klebsiella* in 2 cases in neonatal age group (<1 month)).

**Table 1:** Shows the age incidence in pyogenic meningitis.

AGE GROUP	NO OF CASES	%
0-1 year	17	month (n =9)
		1-12month (n =8)
1-3 year	14	35
>3 year	9	22.5

**Table 2:** Shows the pathogen isolated in pyogenic meningitis.

AGE GROUP	ORGANISM ISOLATED	NO	
0-1 year	month (n =9)	E.coli	4
		Klebsiella	2
		Pseudomonas	1
		Staphylococcal epidermidis	1
	1-12 month (n =8)	Citrobacter	1
		H.influenzae type b	5
1-3 year (n =14)	Streptococcus pneumoniae	2	
	Klebsiella	1	
	H.influenzae	7	
>3 year (n = 9)	Streptococcus pneumoniae	5	
	Neisseria meningitides	2	
	Streptococci	1	
	Salmonella	1	

## V. Discussion

Bacterial meningitis is more frequent in childhood (especially neonatal age) than in later years. Out of 17 cases in infant age (0-1 yr) group 9 occurred in neonatal period. Our study showed that E. coli and klebsiella is the most common organism isolated in neonatal period. The microbiological profile of neonatal meningitis is poorly studied from India. There are more studies in neonatal sepsis and it is reasonable to extrapolate the result to meningitis. Gram negative organisms like E.coli & Klebsiella are the most common organism in many centers in early onset sepsis (EOS) <sup>1</sup>. Group B Streptococcus which is the commonest cause in developed countries is hardly ever encountered in Indian studies but they may be underestimated <sup>2</sup>. Klebsiella, Staphylococcal (epidermidis & aureus), Pseudomonas, Serratia, Citrobacter, Enterococci, Enterobacter are commonly encountered in many centers in LOS <sup>1</sup>.

In Indian studies there is high negative culture rate probably because of widespread antibiotic use before the C.S.F has been examined. The present study only included those cases where pathogen was isolated in the C.S.F. In children older than 4 weeks, Streptococcus pneumoniae (38.7%), H.influenzae type b (38.7%), Neisseria meningitides (12.9%) are the most common etiological agents in our study similar to finding of other<sup>3</sup>. H.influenzae type b, once the most common pathogen, essentially has disappeared in developed countries where the conjugate vaccine is routinely used. The initial impression that H.influenzae type b is not common organism in India has been disproved in several recent studies <sup>4</sup>. In study conducted in south India two major pathogen were H.influenzae type b (17%), Streptococcus pneumoniae (12%) <sup>5</sup>.

## VI. Conclusion

Thus our study highlights that etiology of bacterial meningitis is unique to the age of the infants especially neonate and is different in developing versus developed countries. H.influenzae type b, Pneumococcal conjugate vaccine and meningococcal vaccine have significantly reduced bacterial meningitis in developed countries in children over 4 weeks of age. Adoption of country wide vaccination against all 3 agents though expensive is the best option. This study will also help in deciding about the suitable antibiotic in empirical treatment of meningitis in Chotanagpur region. Recently Government of India has introduced pentavalent vaccine containing H.influenzae type b conjugate vaccine in this region. Further study will be required in future to see the effect of this vaccination programs in this region.

### References

- [1]. National Neonatal Perinatal Database: Report 2002-2003 ICMR, New Delhi Publication 2005, 45-47.
- [2]. Shet A, Ferrieri P. Neonatal and maternal group B streptococcal infection: a comprehensive review. *Indian J Med Res* 2004; 120:141-150.
- [3]. Allan R, Tunkel, Barry J, Hartman et al. Practice guidelines for the management of bacterial meningitis. *Clin Infect Dis* 2004; 39:1276-1284.
- [4]. Sahai S, Mahadevan S, Srinivasan S, Kanugo R. Childhood bacterial meningitis in Pondicherry, South India. *Indian J Pediatr* 2001; 68:839-41.
- [5]. Are Haemophilous influenzae infections a significant problem in India? A prospective study and review. *Invasive Bacterial Infection Surveillance (IBIS) Group of the International Clinical Epidemiology Network .Clin Infect Dis* 2002; 34:949-57.