

ORIGINAL ARTICLE

STUDY OF NEONATAL MENINGITIS IN NEONATAL SEPTICEMIA- CAN WE DO BETTER?

Bijal Shah¹, Hiral shah², Deepa Banker³, Anunaya katyar⁴, Chandraprkash Gupta⁵

Authors Affiliation: ¹Associate professor; ²Assistant professor; ³Professor; ⁴Third year resident; ⁵Second year resident, Department of Paediatrics, Smt N.H.L Municipal Medical College

Correspondence: Dr. Anunaya Katyar, Email: anunaya13@gmail.com

ABSTRACT

Introduction: Neonatal meningitis is most of the time remains undetected in all neonatal septicemias as they may not show any signs and symptoms of meningitis. This study was therefore set out to look for the neonatal meningitis in early and late onset neonatal septicemic patients.

Material and Method: This is a cross sectional observational study done in a tertiary care hospital from October 2012 to august 2013 in 155 neonates. Preformed questionnaires were used to note sign of meningitis in babies with early or late onset septicemias. In all groups CSF examination was done to rule out meningitis.

Result: Out of 155, 28(18%) were in grp A (with meningeal signs) and 126(82%) were in Group B (without any signs). It was found that all the patients having meningeal signs were having positive CSF while 58 (48%) newborn were having a positive CSF instead of no meningeal signs (p value significant). Mortality was high 21% in group A and was significantly low 10% in group B due to early diagnosis.

Conclusion: CSF is a septic screen diagnostic test for late onset septicemia and should be done in all high risk early onset septicemias are proven facts still it is not done at many centers.

Key Words: Neonatal, meningitis, septicemia

INTRODUCTION

Neonatal septicemia are responsible for about 30-50% of the total neonatal deaths in developing countries. Bacterial meningitis occurs in as many as 15 percent of neonates with bacteremia. Among infants 5 to 10 percent with early-onset and approximately 25 percent of those with late-onset infections have meningitis ^{1,2}. Risk factors for neonatal sepsis and meningitis include low birth weight (LBW, <2500 g), preterm birth (<37 weeks' gestation) ², premature rupture of membranes (ie, before the onset of labor or regular uterine contractions) ^{2,3}, septic or traumatic delivery ³, fetal hypoxia, maternal peripartum infection ⁴, galactosemia ^{3,4}, and urinary tract abnormalities. The early signs and symptoms of neonatal meningitis are very non-specific and indistinguishable from those of septicemias, birth asphyxia, respiratory distress syndrome and hypoglycaemia. A high index of suspicion is therefore necessary and laboratory support essential to make a diagnosis and offer appropriate treatment. Early intervention can signifi-

cantly reduce mortality and morbidity^{4,5,6}. Although specific data need to document this are lacking. present study is aimed to find incidence of neonatal meningitis in neonatal septicemias with association with specific meningeal signs and see the outcome.

MATERIAL AND METHODS

This is a cross sectional observational study done from October 2012 and August 2013.

Babies were considered septicemic and were included in study if any 2 of these were positive :- CRP >0.6 mg/dl, Total WBC count <5000/mm³ > 10,000/mm³, Absolute Neutrophil Count <2000/mm³ or according to manroes chart for that maturity and age and Platelet count <1lac/mm³ ^{7,8}. Babies with history of birth asphyxia, extreme preterm (<1000gms) and congenital malformation of spinal cord /brain were excluded from the study.

Babies were categorized in group A if any sign of meningitis present which included convulsion, apnea, depressed sensorium, bulging anterior fontelle and excessive irritability while Group B were babies without any meningeal signs. Lumbar puncture was done in both group babies and considered meningitis when any of 2 of following were present ¹⁰:

Cells >10-15/mm³; Protein >120 mg%
 Glucose <40 mg%; Any organism in gram staining

Blood culture and CSF culture were sent and results were analyzed statistically. Patients were managed according to protocols.. Data was analysed using SPSS.

RESULTS

Total 155 babies having septicemias were enrolled. Among which 93 (60%) were males and 63 (40%) were females. 28(18%) babies were in Group A and 126 (82%) babies were in Group B.

Out of total 155 patients 28(18%) had a positive CSF with presence of meningeal signs while those with no meningeal signs 58 (46%) had a positive CSF.

Group A had 79% discharges and 21% expiry while Group B had 90% discharges and 10% expiry. Mortality was significantly low (only 10%) in the patients due to early diagnosis and intervention. Even morbidity and duration of hospital stay was also reduced due to early ruling out meningitis.

We have seen that out of 155 babies included in the study only 27% had blood culture positive whereas 73% had CSF culture positive. Thus CSF culture can be a better indicator of septicemia also.

DISCUSSION

The neonate is extremely vulnerable to infections in the first 28 days of life. Death and morbidity during this period are very high. Sepsis accounts for 25-40% of all neonatal death, meningitis can occur alone or as a part of sepsis in neonatal period^{1,3,5}. However, data from large studies show a 38% rate of culture-positive meningitis in neonates with negative blood culture results and suspected sepsis. Accordingly, a lumbar puncture should be part of the evaluation of an infant with suspected sepsis Meningitis in newborn has varied clinical presentation and rapid and often fatal course. Hence early diagnosis of meningitis is important to influence the outcome.^{4,5,6}

Table 1: Distribution of Newborn

Parameters	Meningitis(n=86)		No Meningitis (n=69)
	Group A	Group B	
Gender			
Male	14	40	39
Female	14	18	30
Gastation			
Term	18	31	50
Preterm	10	27	19
Birth Wt			
<1500	11	11	10
1500-2500	8	29	30
>2500	9	18	29

Group A= Meningeal signs positive; Group B= Meningeal signs negative

Table 2: Incidence of Meningitis

	CSF Positive	CSF Negative
Group A (N=28)	28(18%)	0
Group B(N=127)	58(46%)	69(54%)

Group A= Meningeal signs positive; Group B= Meningeal signs negative; P value <0.0001

Table 3: Outcome of children

	Expiry	Discharge
Group A (N=28)	6(21%)	22(79%)
Group B(N=127)	13(10%)	113(90%)

Group A= Meningeal signs positive; Group B= Meningeal signs negative; P value <0.0001

Table 4: Culture Studies finding among patients

	Blood culture +ve	CSF culture +ve
Group A (n=28)	11(40%)	17(60%)
Group B (n=127)	30(24%)	50(76%)
Total(n=155)	41(27%)	67(73%)

In our study it was seen that neonatal meningitis commonly affects the male neonates (60%) which is comparable to studies done by De Louvois⁽⁵⁾ and James et al⁽⁶⁾.

Universally preterm are more affected as evidenced by james overall et al⁽⁶⁾ contrasting in our study we saw that term infants were more affected.

It is very easy to diagnose meningitis with signs and symptoms while it was observed in our study that many newborns without any evident signs and symptoms of meningitis but having septicemia were found to be having positive lumbar puncture. As seen the signs of septicemia are often subtle and non specific thus it may become difficult to pick up meningitis without any signs and symptoms and it has been noticed that septicemia ac-

counts for 60% of admissions^(11,12) which also reinforces on how important it is to consider lumbar puncture as a part of septic screen

According to a study done by et-al-heath⁽¹²⁾ it was found that the mortality and morbidity from neonatal bacterial meningitis remains unacceptably high despite advances in antibiotics and intensive care while in our study the mortality was decreased and also the hospital stay was lesser due to earlier detection of meningitis.

Blood cultures were negative in 73% of neonates with meningitis, comparable to the 52% negative blood culture rate by Shattuck and Chonmaitree⁽¹³⁾ and there was no correlation between blood culture positivity and cases of meningitis. The results further re-emphasize the importance of not relying solely on blood cultures nor neglecting to perform lumbar punctures on neonates with suspected sepsis, as babies with meningitis would remain undetected.

Our study had limitations like lesser duration of study period, less reliable blood and CSF culture and due to limitations of resources lesser components taken. Thus a long duration study with larger number of patients is required in our country.

CONCLUSION

Almost all literature suggest that CSF to be considered as a part of septic screen. Our study reinforces the importance of ruling out meningitis in neonatal septicemias for better outcome.

There may be a number of opportunities for improving the outcome and further research is required. The ultimate goal however, is prevention and more work is also required here. Thus to decrease the incidence on meningitis in any newborn infants and to ensure a good outcome of all babies lumbar puncture must be included in septic screening.

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