

Frequency of Meningitis in Neonates Presenting with Sepsis

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ABSTRACT

Objective: To record frequency of meningitis in neonates presenting with sepsis in NICU

Study Design: Descriptive Cross Sectional study

Setting: Department of Pediatrics and Neonatology, University of Lahore Teaching Hospital, Lahore.

Methodology: After taking approval from ethical review committee, Patients in NICU of University of Lahore Teaching Hospital, Lahore. Lumber puncture done and collected 2ml CSF for WBC, Protein and Glucose, CSF culture and also taken 1ml blood sample for plasma glucose. Samples were sent to the hospital laboratory where it was reported by the pathologist. All the information was recorded on proforma by myself.

Results: Out of 80 cases females were 55% and male cases were 45%, mean age was 14.59+5.37 days, mean weight was calculated as 3219.25+171.46 grams, mean gestational age was calculated as 37.93+1.41 weeks. Frequency of meningitis in neonates presenting with sepsis in NICU of University of Lahore Teaching Hospital, Lahore was recorded in 16.25%(n=13) while 83.75%(n=67) were having no meningitis.

Conclusion: Though, the rate of meningitis in neonatal sepsis was not very higher but it still needs to be reduced.

Keywords: Neonates, sepsis, meningitis, frequency

INTRODUCTION

Neonatal sepsis is one of the significant cause of mortality and morbidity in neonates worldwide including developed countries where there are good hygienic conditions advanced neonatal intensive care facilities. Any newborn with neonatal sepsis is at risk of meningitis.¹ Neonatal meningitis is defined as infection of meninges and CNS in the 1st month of life.² The incidence of meningitis in neonatal sepsis vary from 0.3 to 3% in different studies. Most studies of incidence of meningitis in neonatal sepsis was done in developed countries and there is lack of data from developing countries where mortality and morbidity is high.¹ Mortality rate due to neonatal meningitis varies from 10% – 15%.³

The common causative organisms of neonatal bacterial meningitis are group B streptococcus, E.coli and other gram negative micro-organisms. Neurological complications due to neonatal meningitis include seizures, hydrocephalus, arachnoiditis, subdural empyema and encephalopathy.⁴

The investigation for neonatal sepsis include complete blood count, C-reactive protein, Blood Culture, Urine culture, gastric and tracheal aspirate, and most importantly CSF complete examination and culture to detect the neonatal meningitis. The treatment for neonatal sepsis includes broad spectrum antibiotics like ampicillin and aminoglycosides. The antibiotic should be narrowed once the causative organism is identified on culture. Uncomplicated meningitis due to group B streptococcus is treated for 14 days and meningitis due to gram negative organism is treated for 21 days or 14 days after obtaining negative culture.⁵

Most of the neonates with meningitis have negative blood cultures. This discordance between results of blood

and CSF culture emphasize the need for culture of CSF in neonatal sepsis.⁶

In one study conducted on neonate having sepsis 27.4% were diagnosed as a case of meningitis.⁷ In other study the incidence of meningitis was 9%.⁸

The rationale of my study is to timely detect the case of meningitis in patients having neonatal sepsis, so that prompt treatment could be done. This will in turn help in reducing morbidity and mortality burden. There is marked variability in the incidence of meningitis in neonatal sepsis among different studies done previously. This study will help to know the frequency of neonatal meningitis in developing country like Pakistan and also show the importance of doing lumber puncture in every patient admitted with neonatal sepsis.

METHODOLOGY

In this study we included a total of 80 neonates with sepsis of age 1- 28 days of either sex and those with fits with meningomyelocele confirmed on clinical examination, fits due to electrolytes imbalance confirmed by serum electrolytes, fits due to hypoglycemia confirmed by blood glucose level, excluded from the study. Written informed consent was taken from parents/guardians of neonates then I performed lumber puncture and collect 2ml CSF for WBC, Protein and Glucose, CSF culture and collect 1ml blood sample for plasma glucose of babies for evaluation through pathologist.

RESULTS

Of 80 cases, 48.75%(n=39) had 1-15 days and 51.25%(n=41) had 16-28 days of life, 14.59+5.37 days was the mean age. (Table No. 1)

Patients were distributed according to gender, it shows that 45%(n=36) male and 55%(n=44) females. (Table No. 2)

Mean weight was calculated as 3219.25+171.46 grams. (Table No. 3)

Mean gestational age was calculated as 37.93+1.41 weeks. (Table No. 4)

Meningitis in neonates presenting with sepsis in NICU of University of Lahore Teaching Hospital, Lahore was recorded in 16.25%(n=13) while 83.75%(n=67) were having no meningitis. (Table No. 5)

Table 1: Age of The Patients (n=80)

Age(in days)	No. of cases	%
1-15	39	48.75
16-28	41	51.25
Total	80	100
Mean+SD	14.59+5.37	

Table 2: Gender Distribution (n=80)

Gender	No. of patients	%
Male	36	45
Female	44	55
Total	80	100

Table 3: Mean Birth Weight (n=80)

Birth weight(grams)	Mean	SD
	3219.25	171.46

Table 4: Mean Gestational Age (n=80)

Gestational age (in weeks)	Mean	SD
	37.93	1.41

Table 5: Frequency of Meningitis in Neonates Presenting with Sepsis in NICU of (n=80)

Meningitis	No. of patients	%
Yes	13	16.25
No	67	83.75
Total	80	100

DISCUSSION

This study was planned keeping in view to timely detect the cases of meningitis in patients having neonatal sepsis, so that prompt treatment could be done. This may in turn help in reducing morbidity and mortality burden. There is marked variability in the incidence of meningitis in neonatal sepsis among different studies done previously.

In our study, of 80 cases, 48.75%(n=39) had 1-15 days and 51.25%(n=41) had 16-28 days of life, 14.59+5.37 days was the mean age, 45%(n=36) male and 55%(n=44) females, meningitis in neonates presenting with sepsis in NICU of University of Lahore Hospital was recorded in 16.25%(n=13).

In a study conducted on neonate having sepsis 27.4% were diagnosed as a case of meningitis.⁷ these findings are slightly higher than our study while another study the incidence of meningitis was 9%.⁸ These findings are slightly lower than ours, which shows that it may be different in different populations.

Special characteristics of illness is found in neonatal age. The pattern of clinical symptoms, etiology, and mortality is different as compared to the older children.⁹

The statistics of mortality and survival appears to be different i.e. 17-29% of survival rate and 15-68% complications rate. However, predictive factors include newborn weight, premature delivery, predisposition of microbial germ, bacterial type, duration of sepsis complications and treatment.¹⁰

Even in current era when preventive strategies are advanced, neonatal bacterial meningitis is barely affected for last three decades. This slightly low magnitude may be linked due to a greater number of preterm neonates in addition of time between start of condition and management, the severity of micro organisms, type of bacteria and antibiotic capacity for alleviation of infection site.¹¹

Around 25 percent of meningitis develops in neonates with sepsis, whereas both morbidities may be similar etiology. A Brazilian studies found these factors except for one where 98% of neonates with sepsis showed risk factors for bacterial meningitis.¹²

The infectious agents affect the central nervous system (CNS), usually through haematogenous pathway, and this is the reason why it is associated to newborn sepsis in approximately 75% of the cases. Hence, pathogens causing sepsis are in general the most prevalent and are located in the CNS. Some of these pathogens are Streptococcus group B, Escherichia coli, Listeria monocytogenes, Staphylococcus epidermidis and Staphylococcus aureus. The last 2 agents listed, along with fungus agents, are associated to specific situations such as mechanical ventilation and premature birth with extended hospital care.¹³

This study is helpful to know the frequency of neonatal meningitis in developing country like Pakistan and also show the importance of doing lumbar puncture in every patient admitted with neonatal sepsis.

CONCLUSION

We found a higher rate of meningitis in neonates with sepsis when compared our results with international studies. However, timely management is inevitable to reduce it.

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