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Cerebrospinal Fluid Findings in Septicaemic Newborns

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Abstract: ***Background:*** Meningitis is a serious problem in newborn infants and causes frequent neurological sequel in servicing patient. About 20%-30% of neonatal septicaemia whether early or late, is complicated by bacterial meningitis. ***Methods:*** This is a prospective study conducted from September 2006 to February 2007 among septicaemic babies in Sir Salimullah Medical College and Mitford Hospital. This study was conducted to see the cerebrospinal fluid findings in 51 septicemic newborns. Purposive sampling method was used for collecting the sample. ***Results:*** The age of the respondents ranged from 10 days to 28 days. Most of the respondents were of age group 10-20 years. The mean age of the respondents was 15.43 days and weight was 2.78 kg with a standard deviation (±) 0.56 kg. Among the respondents 55% were male and 45% were female. Maternal fever had a great role in developing neonatal septicaemia. Among 51 septicemic babies 76.5% had only septicemia (39 patients) and 23.5% (12 patients) had septicemia with meningitis. Out of 12 meningitic babies 33.3% were preterm and 58.3% were term and 8.3% were post term. Regarding place of delivery 8 (66.7%) were born at home. Anterior fontanel was full in 12.8% of meningitic babies. 79.5% of septicaemic and 83.3% of meningitic babies had lethargy (p value -0.637), the P value for fever was 0.58 and abdominal distention was 0.522, these differences were not statistically significant. Septicaemic newborns had higher levels (48.2821±64.6952) of C reactive protein. Mean CSF protein was 315.04 mg/dl with a standard deviation 87.87 in case of meningitic babies and 53.66±18.72 in case of septicaemic babies. Out of 51 patients total 05 patients were culture positive. 03cases were blood culture positive (02 cases E. Coli &01 salmonella sup.), 01 case was CSF culture positive (Streptococcus viridians) and 01 case was umbilical swab culture positive (Klebsella). In case of meningitis mortality rate (16.7%) was higher than septicemia (12.8%). ***Conclusion:*** Reviewing the overall findings there was no significant difference between signs and symptoms but mortality rate was higher in case of meningitis.

Keywords: Septicaemia, Meningitis, CSF Culture, C-Reactive Protein, Mortality Rate, Blood Culture.

Original Researcher Article

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Article at a glance:

Study Purpose: *To investigate CSF findings in septicemic newborns and identify markers for distinguishing septicemia from meningitis.*

Key findings: *23.5% of septicemic babies had meningitis. CSF protein levels were higher in meningitic babies, and the mortality rate was greater in meningitis cases.*

Newer findings: *CSF protein levels can aid in diagnosing meningitis in septicemic newborns, with meningitis associated with higher mortality compared to septicemia.*

Abbreviations: *CSF - Cerebrospinal Fluid, CRP - C-Reactive Protein, E. coli - Escherichia coli.*

INTRODUCTION

Neonatal septicemia is a severe systemic infection in newborns, characterized by metabolic and hemodynamic disturbances resulting from infectious agents. It remains a leading cause of neonatal morbidity and mortality worldwide. The

immature immune system of neonates makes them highly susceptible to infections, particularly preterm infants who have impaired host defense mechanisms, such as deficient phagocytic activity, reduced complement system function, and lower levels of maternally acquired immunoglobulins[1,2]. Additionally, the absence of highly specific and sensitive diagnostic tests for early detection of septicemia further complicates management[3]. Neonatal septicemia is broadly classified into early-onset and late-onset sepsis. Early-onset septicemia occurs within the first 72 hours of life, primarily due to vertical transmission of pathogens from the mother during delivery. The most common causative organisms in early-onset sepsis include Group B Streptococcus, Escherichia coli, and Listeria monocytogenes[1,4]. Late-onset septicemia, occurring after 72 hours, is often linked to nosocomial infections, prolonged hospitalization, mechanical ventilation, central venous catheterization, and other invasive procedures[4]. The bloodstream is the primary site of invasion in neonatal septicemia, with potential systemic spread affecting various organs, including the meninges. Approximately 25% of neonates with septicemia develop bacterial meningitis, a serious complication that can lead to long-term neurological sequelae such as developmental delays, hearing impairment, and seizures[4]. The global incidence of neonatal septicemia is estimated to be 2.7 per 1,000 live births, with a case fatality rate ranging from 20% to 70%[5]. Among surviving neonates, a significant proportion experience long-term neurological handicaps, including cognitive impairments and motor dysfunctions[5]. The World Health Organization (WHO) estimates that approximately 4 million neonatal deaths occur globally each year, with neonatal infections contributing significantly to this burden[6]. Neonatal mortality accounts for nearly two-thirds of all infant deaths worldwide, with the highest risk occurring within the first week of life[7]. The early postnatal period is particularly critical, as approximately two-thirds of neonatal deaths occur during the first seven days[7]. Despite advances in neonatal care, the timely diagnosis and effective management of neonatal septicemia remain challenging. The clinical presentation of neonatal sepsis is often nonspecific, overlapping with other neonatal conditions, making early recognition difficult. Delayed diagnosis and inappropriate treatment can lead to poor outcomes, including multi-organ failure and death. Therefore, further research and improvements in early diagnostic markers, antimicrobial therapy, and supportive care are crucial to reducing neonatal morbidity and mortality associated with septicemia.

METHODS AND MATERIALS

Study Design

This prospective observational study was conducted at the neonatal care unit of Sir Salimullah Medical College and Mitford Hospital, Dhaka, over a six-month period from September 2006 to February 2007. The study aimed to evaluate cerebrospinal fluid (CSF) findings in septicemic neonates and determine the prevalence of meningitis in this population. A total of 51 neonates diagnosed with septicemia were included in the study.

Study Population

Septicemic neonates admitted to the neonatal care unit were assessed based on clinical signs and laboratory findings.

Inclusion Criteria

Neonates, both term and preterm, were included in the study if they exhibited at least two clinical signs indicative of septicemia. These signs included reluctance to feed, abdominal distension, poor reflexes, vomiting, bulging anterior fontanelle, convulsions, lethargy or reduced activity, and temperature instability such as fever or hypothermia. The presence of these symptoms suggested a high likelihood of infection, warranting further evaluation and management.

Exclusion Criteria

Neonates with major congenital anomalies, diagnosed bleeding disorders, or those in critical condition who were unable to tolerate lumbar puncture due to hemodynamic instability were excluded from the study. These exclusions were necessary to ensure the safety of the participants and the reliability of the findings, as such conditions could confound the assessment of neonatal septicemia and its outcomes.

Study Procedure

All neonates admitted to the neonatal care unit with clinical suspicion of septicemia were

evaluated for inclusion in the study. After obtaining informed consent from the parents or guardians, a detailed history was recorded, including perinatal factors, maternal health, and clinical presentation. A thorough physical examination was conducted to assess vital signs, neurological status, and systemic involvement. For each neonate meeting the inclusion criteria, blood samples were collected for a complete blood count (CBC), C-reactive protein (CRP), and blood culture. A lumbar puncture was performed under strict aseptic conditions to obtain cerebrospinal fluid (CSF) for analysis. The CSF was examined for cell count, protein, and glucose levels, and microbiological cultures were performed to identify bacterial pathogens. Additional investigations, such as chest X-rays and urine cultures, were conducted as needed to identify potential sources of infection. All neonates diagnosed with septicemia were managed according to standard hospital protocols, including empirical antibiotic therapy based on culture sensitivity patterns. Supportive care, such as intravenous fluids, respiratory support, and monitoring of vital parameters, was provided as required. The clinical course of each neonate was closely monitored, and outcomes were documented, including recovery, complications, or mortality.

Data Collection and Laboratory Investigations

A detailed history was obtained from the caregivers after obtaining informed consent. Clinical examinations were performed to assess vital parameters, neurological status, and systemic involvement. Lumbar puncture was performed under strict aseptic conditions using a disposable needle in all suspected cases of septicemia. CSF samples were analyzed for cell count, protein, and glucose levels. Microbiological cultures of CSF, blood, and umbilical swabs were performed to identify bacterial pathogens. Additionally, C-reactive protein (CRP) levels were measured, with levels exceeding 6 mg/dL considered indicative of septicemia.

Statistical Analysis

Data were systematically recorded and analyzed using SPSS version 10. Descriptive statistics, including mean, standard deviation, and percentages, were used to summarize the findings. Inferential statistics were applied to determine the significance of differences between groups, with a p-value of <0.05 considered statistically significant. This study aimed to contribute valuable insights into the cerebrospinal fluid findings of septicemic neonates, aiding in the early identification and management of neonatal meningitis.

Ethical Considerations

The study was conducted following ethical guidelines, and informed consent was obtained from the parents or guardians of all participating neonates. The study protocol was approved by the institutional ethical review board.

RESULT

Mean age 15.43 days with standard deviation (±) 5.65 days. Weight at present 2.78 kg with standard deviation (±) 0.59 kg.

Table 1: Distribution of the respondents by age groups

Age	Frequency	Percentage
< 10 days	11	21.6
11-20 days	26	50.9
>20 days	14	27.5

This table shows that 11 babies (21.6%) were less than 10 days old. Majority of the newborns were between 11 -20 days (50.9%).

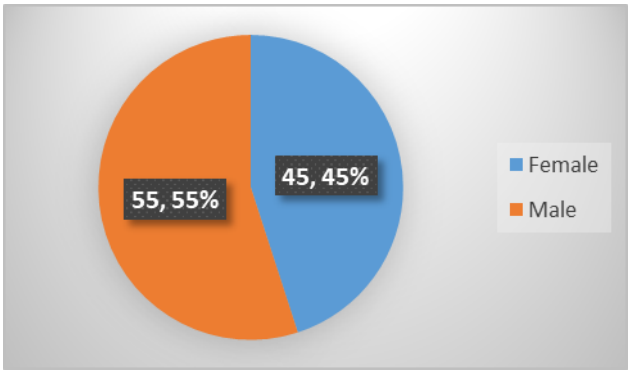

Figure 1: Distribution of the respondents by sex

Figure 1 figure shows that 55% male and 45% female.

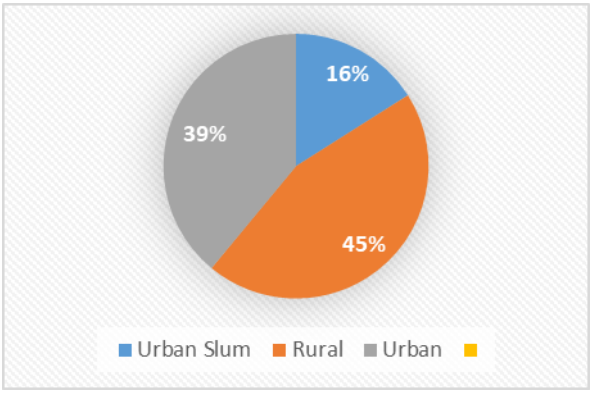

Figure 2: Distribution of the respondents by residing place

Figure 2 shows that Rural 45%, Urban 39% and Urban Slum 16%.

Table 2: Distribution of the respondents by Monthly income

Characteristics	Frequency	Percent (%)
< Tk.5000	17	33.3
Tk. 5001-10000	26	51
> Tk.10000	8	15.7
Total	51	100

This table shows that 51.0% of the respondents earn tk. 5000-10000 monthly, 33.3% earn less than tk. 5000 and 15.7% earn more than tk.10000

Table 3: Distribution of the respondents by septicaemia and Meningitis

Characteristics	Frequency	Percent (%)
Septicemia	39	76.5
Septicaemia with Meningitis	12	23.5
Total	51	100

This table shows that out of 51 suspected septicaemic babies 39 (76.5%) were septicaemic only and 12 (23:5%) babies had meningitis in addition.

Table4: Distribution of the respondents by gestational history

Characteristics	Septicemia	Septicaemia With Meningitis	Total
Gestational History			
Term	28(71.8%)	7(58.3%)	35(68.6%)
Pre- Term	8(20.5%)	4(33.3%)	12(23.5%)
Post- Term	3(7.7%)	1(8.3%)	4(7.8%)
Total	12(100%)	51(100%)	39(100%)

This table shows that 33.3% of preterm newborn had meningitis with septicaemia and 71.8% of term newborn had septicaemia.

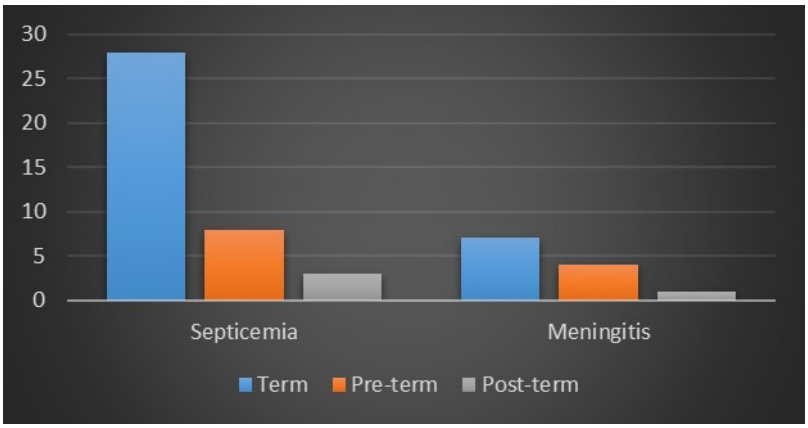

Figure 3: Distribution of the respondents by gestational history

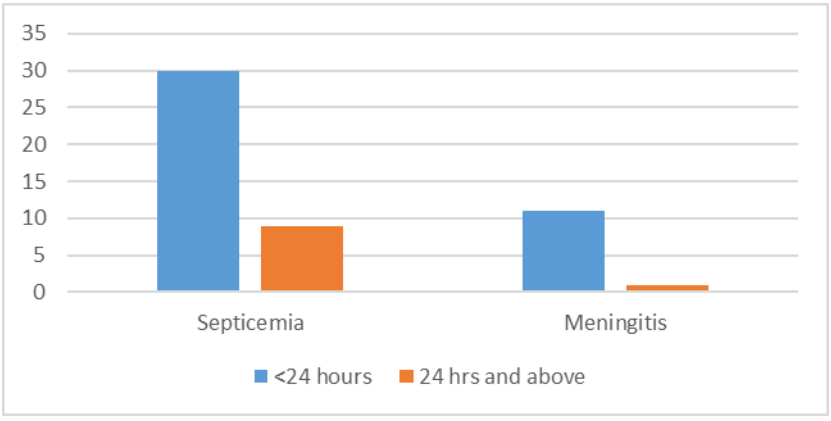

Figure 4: Distribution of the respondents by duration of membrane rupture

This figure shows that the duration of membrane rupture were less than 24 hours in 30 septicaemic babies and nine cases had history of membrane rupture more than 24 hours. Eleven meningitis cases had a history of rupture membrane less than 24 hours out of 12.

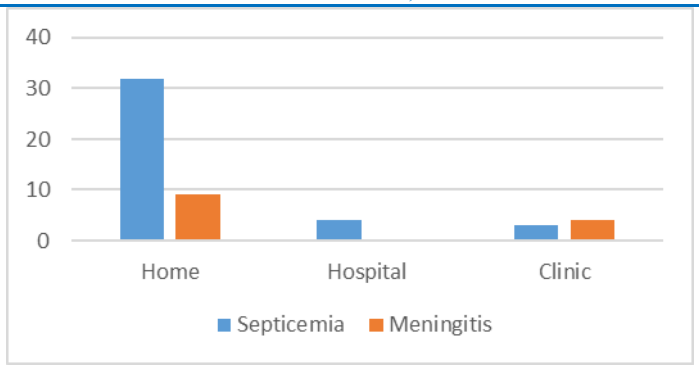

Figure 5: Distribution of the respondents by place of delivery

This figure shows that 32 septicaemic newborn and nine meningitis newborn were born at home.

Table 5: Distribution of the respondents by Birth Weight

Characteristics	Septicemia	Meningitis	Total
Birth Weight			
<1.5 kg	1(2.6%)	1(8.3%)	2(3.9%)
1.5-2.5 kg	18(46.2%)	3(25.0%)	21(41.2%)
>2.5 kg	20(5 1.3%)	8(66.7%)	28(54.9%)
Total	39(100%)	12(100%)	51(100%)

Table 5 presents the distribution of respondents by birth weight and their diagnosis of septicemia or meningitis. The majority of respondents with septicemia (51.3%) and meningitis (66.7%) had a birth weight of >2.5 kg. The 1.5-2.5 kg group accounted for 46.2% of septicemia cases, while only 25.0% of meningitis cases fell into this category. The lowest proportion of cases occurred in the <1.5 kg birth weight category, contributing 3.9% of the total sample.

Table 6: Distribution of the respondents by History

Characteristics	Septicemia N (%)	Meningitis N (%)	p value N (%)
Lethargy			
Present	31(79.5)	10(83.3)	0.637
Absent	8(20.5)	2(16.7)	
Fever			
Present	12(30.8)	2(16.7)	0.287
Absent	27(69.2)	10(83.3)	
Poor feeding			
Present	37(94.9)	12(100)	0.581
Absent	2(5.1)	0(0)	
Abdominal distention			
Present	29(74.4)	10(83.3)	0.522
Absent	10(25.6)	2(16.7)	
Vomiting			
Present	19(48.7)	6(50)	0.938
Absent	20(51.3)	6(50)	
Maternal fever			
Present	10(25)	4(33.3)	0.602
Absent	29(74.4)	8(66.7)	
PROM			
Present	3(7.7)	1(8.3)	0.942
Absent	36(92.3)	11(91.7)	

Table 6 present both the septicaemic and meningitis newborn had lethargy and p value is 0.637%; that is, there is no significant variation between two groups regarding lethargy. Regarding presence of poor feeding (p=0.518). Abdominal distention (p = 0.522) and vomiting (p= 0.938) there is no significant variation between two groups.

Table 7: Distribution of the respondents by clinical finding

Characteristics	Septicemia N(%)	Meningitis N(%)	Total N(%)
Appearance			
Ill	12(30.8)	8(66.7)	20(39.2)
Seriously ill	27(69.2)	4(33.3)	31(60.8)
Pallor			
Present	25(64.1)	11(91.7)	36(70.6)
Absent	14(35.9)	1(8.3)	15(29.4)
Anterior fontanel			
Normal	30(76.9)	11(91.3)	41(80.4)
Full	5(12.8)	1(8.3)	6(11.8)
Tense	3(7.7)	0(0)	3(5.8)
Depress	1(2.6)	0(0)	1(2.0)
Length			
<=50cm	15(38.5)	10(83.3)	25(43.0)
>50cm	24(61.5)	2(16.7)	26(51.0)
Head circumference			
<=35cm	32(82.1)	12(100)	44(86.3)
7(17.9)	7(17.9)	0(0)	7(13.7)
Weight			
<=2.5kg	15(38.5)	4(33.5)	19(37.3)
>2.5kg	24(61:5)	8(66.7)	32(62.7)

Table 7 shows that 69.2% of septicaemic newborn and 33.3% of meningitic newborn were seriously ill on admission. Majority (70.6%) of both groups had pallor. p value 0.651. Regarding anterior fontanel 80.4% had normal fontanel and 11.8% had full and 5.8% had tense fontanel. One case of septicaemic newborn had depressed fontanel. Length Mean & SD= 50.24 cm ± 4.97 cm and p value = 0.007. Head circumference mean & SD=33.53 cm ± 1.83 cm. Weight mean & SD= 2.78 kg ± 0.59 kg.

Table 8: Distribution of relationship of the respondents by clinical finding

Characteristics	Septicemia N(%)	Meningitis N(%)	p-value
Appearance			
Ill	12(30.8)	8(66.7)	0.026
Seriously ill	27(69.2)	4(33.3)	
Pallor			
Present	25(64.1)	11(91.7)	0.049
Absent	14(35.9)	1(8.3)	
Anterior fontanel			
Normal	30(76.9)	11(91.3)	0.651
Full	5(12.8)	1(8.3)	
Tense	3(7.7)	0(0)	
Umbilicus			
Healthy	38(97.4)	12(100)	0.575
Unhealthy	1(2.6)	0(0)	

Table 8 shows a significant difference in appearance (p = 0.026) and pallor (p= 0.049) between both the groups.

Table 9: Relationship between types of diagnosis and investigation (blood)

Characteristics	Septicemia And Meningitis	N	Mean	Standard	N
Haemoglobin	Meningitis	12	13.2667	2.1381	0.317
	Septicemia	39	12.3641	2.8465	
Total count	Meningitis	12	8816.6667	1531.3888	
	Septicemia	39	13520.5128	2202.1735	0.000
Platelets	Meningitis	12	3.3333	1.4035	0.311
	Septicemia	39	2.9667	0.9750	
CRP	Meningitis	12	5.6667	5.9135	
	Septicemia	39	48.2821	64.6952	0.028

Table 9 presents Mean Hb% of the total respondents was 12.58 gm/dl ± 2.70gm/dl. Mean Total count of WBC was 12413.72/cmm ± 2874.44/cmm. Mean Platelets count was 3.05 lacs ± 1.09 lacs. Mean CRP was 38.25 ± 59.35.

Table 10: CSF cytology of meningitis cases (n- 12)

Number	T.C (Cubic mm)	Polymorph (%)	Lymophocyte (%)
6	100-160	80-90	10-20
3	20000-40000	90-95	5-10
3	40-60	70-80	20-30

Table 10 shows the cerebrospinal fluid (CSF) cytology in 12 meningitis cases. The total cell count (T.C) ranged from 40-60 to 20000-40000 cells per cubic mm. The polymorph percentage varied from 70-90%, while lymphocyte percentages ranged from 5-30%. Higher cell counts corresponded with higher polymorph percentages and lower lymphocyte percentages.

Table 11: Relationship between types of diagnosis and CSF sugar and protein

Characteristics	Septicemia And Meningitis	N	Mean	Standard Deviation	p-value
CSF sugar	Meningitis	12	2.8750	0.6077	0
	Septicemia	39	9.2615	4.5879	
CSF protein	Meningitis	12	315.0417	87.8771	0
	Septicemia	39	53.6667	18.7284	

Table 11 compares CSF sugar and protein levels between meningitis (12 cases) and septicemia (39 cases). The mean CSF sugar in meningitis was 2.88 with a standard deviation of 0.61, significantly lower than septicemia (mean 9.26, SD 4.59), with a p-value of 0. The mean CSF protein in meningitis was 315.04 (SD 87.88), much higher than in septicemia (mean 53.67, SD 18.73), with a p-value of 0, indicating significant differences between the two conditions.

Table 12: Isolation of Organism and Culture Sensitivity

Sample	Organism	Frequency	Sensitivity
Blood culture	E. coli	02	Azithromycine
	Salmonella sup	01	Ciprofloxacine
CSF	Streptococcus Viridians	01	Cefratrixone
Umbilical swab	Klebsella	01	Ceftazidine

Table 12 presents the organisms isolated from various samples and their sensitivity to antibiotics. E. coli was isolated from blood cultures and showed sensitivity to Azithromycin, while Salmonella was sensitive to Ciprofloxacin. Streptococcus viridans from CSF was sensitive to Ceftriaxone, and Klebsiella from an umbilical swab was sensitive to Ceftazidime. A chest X-ray showed lung consolidation in one case.

Table 13: Distribution of the respondents by out come

Outcome	Septicemia N (%)	Meningitis N (%)	Total N (%)
Cured	26(66.7)	6(50)	32(62.7)
Improving	3(7.7)	2(16.7)	5(9.8)
Expired	5(12.8)	2(16.7)	7(13.7)
DORB	5(12.8)	1(8.5)	6(1 1.8)
Transfer to other institute	0(0)	1(8.5)	1(2.0)
Total	39(100)	12(100)	51(100)

Table 13 displays the outcomes of 51 patients, with 39 diagnosed with septicemia and 12 with meningitis. Among septicemia cases, 66.7% were cured, and 12.8% expired. In meningitis cases, 50% were cured, and 16.7% expired. The overall cure rate was 62.7%, with a 13.7% mortality rate and 9.8% showing improvement.

DISCUSSION

This is a prospective study done on 51 suspected septicaemic newborn to sec the cerebrospinal fluid findings. was carried from September 2006 to February 2007. In this study[11]. cases (21.6%) was less than 10 days old and 26 cases comprising 51% within 10-20 days and 14% cases more than 21 days. Different studies have shown preponderance of early onset sepsis over late onset[14]. In this study 54.9% were male and 45.1% were female This result was consistent with other studies which shown that male infants were more likely to develop scpticaemia[15]. One study showed that male infants were two to six times more likely to develop septicaemia[2]. The reason for these findings had not been evaluated. One possibility may be in our country was that parents were more concern about their male child and seek more medical attention for them. In this study 34 patients had septicaemia and 12 had meningitis the ratio is 3:3: 1 this is consistent with other study which showed that about 20 - 30 % of septicaemic newborn had meningitis[16]. G-1 Haque MM Shown 13.33 percent of blood culture positive septicaemic newborn had meningitis[7]. A large number (61 %) of the study populations in this study came from rural and urban slum area. This was due to lack of ante-natal facilities and lack of knowledge. Regarding presenting complaints lethargy present in 79.5% cases whereas 83.3% in meningitis. Fever present in only 30.8% cases and 69.2% had no fever in case of septicaemia. Poor feeding was the main presenting complaints and comprises more than 90% in case of septicaemia and more than 95% in cases of meningitis. This was consistent with other study which showed poor feeding was the main presenting complaint that exceed more than 57 percent[17]. Abdominal distention was one of the presenting complaints which comprise more than 80 percent in both the group. Hypothermia was also a presenting complaint which comprises 5.1 percent which was not consistent with other studies which showed hypothermia rather than hyperthermia was the predominate feature. This may be due to small sample size.[1,7] Regarding gestational age term (71.8% vs. 58.3%) pre-terrn (20.5% vs. 33.3%) In this study term babies had more incidences which as not consistent with other studies which showed pre term had more incidence, and this may also due to small sample size[1,7]. This study showed preterm neonate were more susceptible to develop meningitis which was consistent with other studies[11,16]. Several studies report that prematurity. low birth weight, prolong rupture of membrane and maternal infection were most common perinatal factors associated with septicemia and meningitis[2,7,11]. Regarding presenting features lethargy (p = 0.637), fever (p = 0.287), poor feeding (P =0.581), abdominal distension (p = 0.522) and vomiting (p = 0.930) all the value arc above 0.05 and was not statistically significant i.e. presenting complaints between

septicaemic.1and meningitic newborn were same. Regarding clinical findings appearance (p = 0.026) and pallor (0.04) had significant difference in the diagnosis of septiocaemic and meningitis newborn. Diagnosis of meningitis is difficult based on clinical features. So lumber puncture is often missed. Neonatal meningitis has high mortality and a later long-term neurological complication. Neonatal meningitis without septicaemia. is rare and bacteriological meningitis is a common problem associated with septicaemia. Early recognition or meningitis is or prime concern in neonate because neonate has a limited response to any stressful condition[18]. Infant less than 72 hours meningitis is rare and Oluade conclude that they reserved LPs during first 72 hours of life[19]. Septicaemia was diagnosed by clinical features and investigations. Those babies had CRP positive and leukocytosis were diagnosed as septicaemic cases, but blood culture was not always positive. CRP had a significant relationship in diagnosis of septicaemia rand meningitis (P= 0.028) in this study. This study was consistent with other studies which showed that more than 70 percent of suspected septicaemic newborn had high C reactive protein values[12,13]. Regarding haernoglobulin percentage emening1t1c newborn had a mean level 13•26- gm/dl and septicaemic newborn had a mean haemoglobulin 12.26grn/dl.Total count of WBC was 12413.72=28.44/cmm which correlates with other studies which showed leococytosis.1 In this study CSF sugar was very low around 2.8 + 0.6 mmol in meningitis cases and CSF protein was very high 315.04 (P = 0.000) in meningitis cases indicating meningitis which correlate with other studies which also showed abnormal biochemistry[1,5,7]. Regarding Isolation of Organism E. coli found in 2 cases, salmonella species in one case in blood and in CSF one of case found streptococcus viridians and in umbilical swabs Klebsiella one case this result was consistent with several studies which showed gram negative E.coli was principle cause of septicemia[7,10]. Streptococcas viridens was found in CSF only in one case and that was not found in blood. This patient died before getting culture report. Organism was sensitive to 3rd generation cephalosporin (ceftrizone). Comparison of clinical signs failed to draw any line to distinguish between septicaemia and meningitis. In contrast to infant and older children - neonate lack budging fontanelle and neck rigidity. Babies with meningitis had a high mortality rate than that of septicacmia (l67% vs 12.8%) But this diflerence was not statistically significant bocausc of sall sample siac. Despite considerable advances in antimicrobial therapy bacterial meningitis continues to be a major cause of paediatric morbidity and mortality. So to minimize the long term sequel of meningitis institution of antibiotics in meningitic doses and durations is needed that could be changed after getting the reports.

Limitation of the study

The study's limitations include a small sample size of 51 newborns, which may limit the generalizability of the findings. It was a single-center study, conducted at Sir Salimullah Medical College and Mitford Hospital, which may not reflect broader healthcare settings. The use of purposive sampling could introduce selection bias, and the lack of long-term follow-up limits understanding of the enduring effects of neonatal septicaemia and meningitis.

CONCLUSION

This study fails to distinguish clinically between septicaemic babies with that of meningitis. Only CSF study by lumber puncture helps to differentiate between them: Meningitis has a high mortality and morbidity than septicaemic babies. So, prompt and empirical treatment should be of the prime interest then it may be changed after getting all the reports if necessary.The difficulty in diagnosing septicaemia was that there was no single test to diagnosis septicaemia. It was diagnosed by a high degree of clinical suspicion and other laboratory support. But in case of meningitis CSF study in the only tool. So, it is important to do a lumber puncture in suspected cases of neonatal septicaemia. Proper education about the long term sequels of the grave disease should also be a part of treatment so that the caregivers give attention and seek medical advice attention appropriately.

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REFERENCE

1. GotofT SP. Neonatal sepsis and meningitis. In: Behrman RE, Kliegman RM, Arvin AM, editors.

Nelson textbook of pediatrics. 15th ed. WB Saunders Company; 1996. p. 528-37.
2. Namdeo UK, Singh HP, Rajput VJ, et al. Bacteriological profile of neonatal septicemia. Indian Pediatr. 1987;24:53-6.
3. Gerdes JS. Clinico-pathologic approach to the diagnosis of neonatal sepsis. Clin Perinatol. 1991;18:361-90.
4. Mir F, Aman S, Khan SR. Neonatal sepsis: review with a study of 50 cases. J Trop Pediatr. 1987;33:131-5.
5. Haque KH. Infection and immunity in the newborn. In: Campbell AGM, McIntosh N, editors. Forfar and Arneil's textbook of pediatrics. 5th ed. Pearson Professional Limited; 1998. p. 273-89.
6. Saving Newborn Lives. State of the World's Newborns. Save the Children Federation; 2001. p. 1-49.
7. Haque MM, Ahmed AS, Chowdhury MAKA, Darmstadt GL, Saha SK. Septicemic neonates without lumbar puncture: what are we missing? J Trop Pediatr. 2006;52(1):63-5.
8. Yurdakok M. Antibiotic use in neonatal sepsis. International child health, 1998:9(l): 85-96.
9. BingenE. denamur N. Elion J. Genotyping nmay provide rapid identification of E. coli Ki organisnı that cause nconatal meningitis. Clin infect Dis, 1984;22:152-1 56.
10. Korhonem TK. Vircola R, Rounio T. Penitration of fimbriate enteric bacteria through basement nembrane: a hypothesis. FEMS Microbiol Lett. 1992: 100: 307-312.
11. De Louvois J. Harvey D. Antibiotic therapy of the newborn. Clinics in perinatology. 1988: 15: 365-88
12. Yoder MC. Polin RA Immunotherapy of neonatal septicaemia. Paediat Clin North Am. 1986: 33: 481-5
13. Kushner J. Feldmann G. Control of the acute phase response: Demonstration of C. reactive protein synthesis and secretion by hepatocytes during acute inflammation if the rabbit. J Exp Med, 1978; 48: 466-72
14. Glandstone IM, Ehrenkranz RA. Edberg SC, A year review of neonatal sepsis and comparison with the previous fity years experience. Pacdiat infect Dis J, 1990: 9: 819-25.
15. Washbun TC, Medearis DN. Child B. Sex Difference in susceptibility to inlection. Pacdiat, 1965. 35: 57 - 61.
16. De Louvis J, Harvey D. Infection in newborn. John Wileya and sons, London 1990: pp. 107-15.
17. Saving Newborn Lives: State of the World's Newborns. Save the children Federation 2001: |-49.
18. Oluade A. Olugbanga A. Evaluation of neonate with risk for sepsis: Lumber puncture?J paediatr. 1980: 3: 1063 – 1067.
19. Ahmed ASMNU. Chowdhury MA, Haque MM, Darmsladt GL. Clinical and bacteriological profile of neonatal septicaemia in a tertiary level pediatric hospital in Bangladesh. Ind Pediatric 2002; 39: 1034-9.