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Profile of Neonatal sepsis in a tertiary care hospital: A Descriptive study

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A B S T R A C T

Improvement in Neonatal perinatal survival is a priority health agenda in India. Over one million newborn infants die every year before completing first four weeks of life in our country. Neonatal sepsis remains a signify morbidity and mortality in newborns especially in developing countries like India. A descriptive study carried out among 50 cases of infants with septicaemia admitted to tertiary care hospital. Both primary and secondary data was collected and analysed to know the clinical profile. The incidence of septicaemia was 14.2% and, males contributed to 62%. PROM>12 hours was the main risk factor along with multiple vaginal examination. The most common clinical features were refusal of feeds, lethargy and tachypnea.

Introduction

Neonatal Sepsis can be defined as any systemic bacterial infection confirmed by a positive blood culture in the first month of life. Neonatal septicemia remains one of the main causes of mortality and morbidity despite the progress in hygiene, introduction of new and potent antimicrobial agents for treatment and advanced measures for diagnosis. Up to 10%, infants have infections in the first month of life, the matter which results in 30 - 50% of total neonatal deaths in developing countries¹.

The incidence of neonatal sepsis according to the data from National Neonatal Perinatal Database (NNPD, 2002 - 03) is 30 per 1000

live births. The database comprising 18 tertiary care neonatal units across India found sepsis to be one of the commonest causes of neonatal mortality contributing to 19% of all neonatal deaths². Early onset (within first week of life) neonatal sepsis is generally acquired from pathogens of maternal genital tract, whereas late onset sepsis (after first week till 28 days of life) has its origin either from the community or from hospital³.

Maternal, infant and environmental factors all contribute in NNS, at a time when bacteria may invade the newborn via a number of routes such as; i. intrauterine

infection which occurs due to apparent or in apparent maternal bacteremia with trans placental transmission to the fetus. *Listeria monocytogenes* septicaemia is an example of such infections⁴. Furthermore a fetus may be infected by organisms from vagina invading the amniotic fluid through the cervix with or without intact membrane⁵. The most common organisms found in the amniotic fluid and vagina are *Escherichia coli*, *Enterococcus faecalis*, *Staphylococcus aureus*, and Group-B-beta haemolytic Streptococcus is also occasionally present in the vaginal flora⁴.

Intra partum infection (Ascending Infection) which are acquired just before or during delivery with vertical transmission of the microorganisms from mother to newborn infant⁶. Postpartum infection (nosocomial infection), since bacteria may be acquired from the delivery room or in the newborn nursery via the main pathways, namely the respiratory and gastrointestinal tracts. After birth, the skin and umbilical cord become an important alternative route for the entrance of bacteria into the systematic circulation. The umbilical stump is a frequent site for cutaneous infection leading to septicemia⁷.

Knowledge of clinical profile of the disease in the local population will help in designing preventives and also proper management of the disease. Present study was undertaken to describe the clinical profile of sepsis patients from a tertiary care center in a tertiary care hospital.

Methodology

A descriptive study was conducted in a tertiary care hospital, VIMS, Bellary, Karnataka among newborns admitted with neonatal sepsis. After obtaining the written informed consent from parents/guardians, history taking and a thorough clinical

examination was done. Relevant investigations were done to find microbiological profile of sepsis. Totally data was collected from 50 cases and the sampling technique adopted was non probability purposive sampling technique. Neonates who had undergone surgery and neonates with meningitis were excluded from the study. Micro ESR, Buffy coat, Blood culture and sensitivity was done in all the cases along with other investigations. Data collected was compiled in Microsoft excel and was analyzed using SPSS 20.

Results:

Early onset septicemia was found among 28% of neonates and late onset was found among 72% of neonates. There is no significant relation between gender and occurrence of sepsis.

It was found that among total neonates, 26% weighed between 1500 -2000 grams, 14% weighed between 2001 – 2499 grams and 60% weighed more than 2500 grams. In our study total number of babies delivered vaginally accounted for 88% of total deliveries.

The maternal risk factors such as PROM>12 hours, Meconium liquor and multiple vaginal examinations were significantly associated with EOS.

The most common features were refusal of feeds (70%), lethargy (36%), jaundice (28%) and Tachypnea (32%). Of these clinical features, only Tachypnea was significantly associated with early onset sepsis.

The commonest organisms in case of early onset septicemia were Klebsiella, Ecoli, staphylococcus coagulase positive and streptococcus beta hemolyticus and in case

of late onset septicemia, and staphylococcus coagulase positive, klebsiella, Ecoli, Pseudomonas, and staphylococcus coagulase negative.

The incidence of neonatal septicemia at Vijayanagar Institute of Medical Science was 14.2%. This incidence was higher than that reported by Kurien Anil Kuruvilla⁸ (1998) which was 9.8 per 1000 live births lower from that reported by National Neonatal Perinatal Data base (NNPD) 2000, the incidence of neonatal sepsis was reported to be 38 per 1000 intra mural live births in a tertiary care institutions⁹.

In the present study early onset septicemia was noted in 28% and late onset septicemia

in 72% of cases. The finding reported by Sunaina Rishi Garg in 2004¹⁰ was early onset septicemia was present in 53.2% and late onset septicemia in 46.8% of care. The findings by Nawshaduddin Ahmed from Bangladesh in 2002¹¹ reported early onset sepsis in 53.4% and late onset sepsis in 46.5%. In our study late onset septicemia was more common than early onset septicemia perhaps this discrepancy is due to newborn with birth weight less than 1500 were eliminated from the study and some neonates in catchment area of our hospital, which largely serves a low socio-economic status community, may have died prior to arrival at the hospital.

Table.1 Age sex wise distribution

Age	Males	Females	Total
0 -72 hours	09	05	14 (28%)
4 – 7 days	16	08	24 (48%)
8 – 28 days	06	06	12 (24%)
Total	31	19	50 (100%)

Table.2 Birth weight and septicemia

Birth weight	Early septicemia (EOS)	Late septicemia (LOS)	Total
1500 – 2000 grams	08	05	13 (26%)
2001 – 2499 grams	02	05	07(14%)
>2500 grams	04	26	30 (60%)

Table.2 Comparison of maternal risk factors for early and late onset septicemia

Maternal risk factor	Early septicemia (EOS) (n=14)	Late septicemia (LOS) (n=36)	P value
PROM >12 hours	10 (71.4%)	02 (05.5%)	0.001
Maternal pyrexia	02 (14.2%)	01 (02.7%)	0.12
Chorioamnionitis	01 (07.1%)	02 (05.5%)	0.83
Prolonged and difficult	04 (28.5%)	06 (16.6%)	0.34
Meconium liquor	05 (35.7%)	03 (08.3%)	0.01
Multiple vaginal examination	08 (57.1%)	03 (08.3%)	0.001

Table.3 Common symptoms and signs septicemia

Symptoms	Early septicemia (EOS) (n=14)	Late septicemia (LOS) (n=36)	P value
Refusal of feeds	11	24	0.41
Lethargy	05	13	0.97
Poor cry	03	09	0.79
Diarrhea	01	03	0.89
Vomiting	01	03	0.89
Fever	02	08	0.53
Signs			
Jaundice	04	10	0.95
Tachypnea	10	06	0.002
Pyoderma	01	05	0.51
Umbilical discharge	00	04	-----

Table.4 Organisms isolated from septicemia

Organisms	Early septicemia (EOS) (n=14)	Late septicemia (LOS) (n=36)	Total
Gram positive			
Staph.coagulase +	01	05	06
Staph.coagulase -	00	01	01
Strepto.beta haemolyticus	01	00	01
Strepto.non hemolyticus	00	01	01
Gram negative			
<i>Klebsiella</i>	02	03	05
<i>E.coli</i>	02	02	04
<i>Pseudomonas</i>	00	02	02
<i>Enterobacter</i>	00	01	01
<i>Citrobacter</i>	00	01	01

Sex incidence in the present study showed male predominance. The sex ratio was 31(62%) were males and 19(38%) were females. This findings confirms with Nawshaduddin Ahmed from Bangladesh in 2002¹¹ have reported 2:1 ratio of male to female infants in this study.

This is most likely due to attention given to the male babies in general. Though the exact explanation for male preponderance is uncertain, the possible lows of gene for synthesis of immunoglobulin at x-‘charosome probably accounts for

relative resistance of female infants to infection.

In the present study percentage of septicemia in preterm was 24% and term 76%. A study by A.S.M. Nawshaduddin Ahmed et al in 2002¹² 50% of neonatal septicemia were preterm, 47% were term and 3% were post term.

28% babies were delivered in our hospital remaining 72% cases were referred from outside. The relative high percentage in referred babies was due to the fact that

present study was conducted at a referral centre and majority of the babies were from rural background. The majority of the study population was poor and delivered at home, largely in the hands of untrained birth attendants and conducted in poor standards of asepsis¹¹. A study by Sunaina and Rishi Garg in 2004¹⁰ showed 46.8% were home deliveries and 37.6% in outside hospitals and 15.6% were intramural deliveries.

In the present study the total number of low birth weight babies was 20 (40%) and the total number of babies weighing above 2500 grams were 30 (60%). Among the low birth weight babies 13(26%) were between 1500 - 2000g and 7(14%) were between 2001 - 2499 grams. A study by Sunaina & Rishi Garg in 2004 (8) showed 23.4% of babies with birth weight of 1.5 - 2 kg and 20.6% with birth weight of 2 - 2.5kg. In this study 44 cases (88%) delivered vaginally and 6(12%) were delivered by LSCS. A study by Sunaina and Rishi Garg 2004¹⁰ showed similar finding of 85.3% were normal deliveries and 14.7% were LSCS.

Among the various antenatal factors in the mother described to predispose to neonatal sepsis, PROM > 12hrs, meconium stained amniotic fluids and multiple vaginal examination were significantly associated with early onset sepsis. Maternal pyrexia, chorioamnionitis and prolonged and difficult delivery through more common with EOS was not significantly associated with sepsis. A study by Kurien Anil Kuruvilla et al in 1998¹³ showed only meconium stained liquor and multiple vaginal examinations to be significantly associated with EOS.

The most common symptoms by which 35 (70%) of cases presented were refusal of feeds followed by Lethargy (36%), tachypnea (32%) and fever (30%). Study by RS. Jaswal et al in 2003¹⁴ showed similar finding with birth refusal of feeds (66%)

being the most common symptoms followed by lethargy and Jaundice. Another study by Katrthikeyan and Premkumar in 2001¹⁵ showed lethargy with refusal of feeds (28%), fever¹¹ and respiratory distress was the major presenting feature.

The common clinical features in the early onset septicemia were refusal of feeds, tachypnea, lethargy and Jaundice and babies with late onset septicemia common clinical features were refusal of feeds, lethargy fever, Jaundice among them only tachypnea was significantly associated with early onset sepsis a finding similar to that reported by Nawshad et al. in 2002¹¹. A study by Karthikeyan and Premkumar in 2001¹⁵ revealed respiratory distress was significantly more likely to be the presentation of early onset neonatal sepsis where as fever was more likely to be the presenting feature of late onset sepsis. A study by Sunaina and Rishi Garg in 2004¹⁰ showed cyanosis, tachypnea, hypothermia and apnea more common with EOS and poor feeding, lethargy, excessive cry, abdominal symptoms and seizures were more common in LOS.

Conclusion

Incidence of Neonatal septicemia at our institute was 14.2% according to the present study. Septicemia was more common in males than females. Intra partum risk factors for early onset sepsis were PROM > 12 hrs, meconium stained amniotic fluid and multiple vaginal examination.

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