ORIGINAL RESEARCH PAPER

Volume-7 | Issue-12 | December-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

CLINICAL DETECTION OF NEONATAL SEPSIS IN THE COMMUNITY KEY TO REDUCING NEONATAL MORTALITY

Gynaecology

Dr Sanjay Choudhary Senior Specialist,Department of Paediatrics, Baba Saheb Ambedkar Medical College ,Delhi

Dr Neeru Malik* CMO(NFSG), Department of Obstetrics and Gynaecology,Baba Saheb Ambedkar Medical College *Corresponding author

Dr Pawan Verma ex-DNB student, Department of Paediatrics Baba Saheb Ambedkar Medical College

Dr Neelu Madan Senior Medical Officer, Obstetrics and Gynaecology,WUS health Centre ,Delhi University

Dr Anupa Singhal Senior Medical officer,Obstetrics and Gynaecology, ,Baba Saheb Ambedkar Medical College

ABSTRACT

Background Neonatal mortality remains high in developing countries and neonatal sepsis is a major contributing cause.This study was undertaken to establish the clinical features commonly associated with outborn neonatal sepsis to enable timely cinical detection and management.

Material and Methods This was an observational cross sectional study conducted on 250 neonates brought to the out born nursery of Dr. Baba Saheb Ambedkar Hospital, with clinical features of sepsis. A detailed history,examination was carried out and treatment details were recorded. Data was analysed using SPSS Statistical Software Version 15.0.

Result In the present study on outborn neonates admitted with sepsis 74.2% had late onset sepsis. The common clinical features associated with definitive neonatal sepsis in this study were fever (82.4%), refusal to suck (82.4%), respiratory distress (76.5%), lethargy (70.6%), vomiting (20.6%), abdominal distension(20.6%),poor cry (17.6%), diarrhoea (17.6%), multiple pustules (8.8%), abnormal movements of hands and feet (8.8%), cold extremities(5.9%) and up rolling of eyes (5.9%)

Conclusion Definitive neonatal sepsis was strongly associated with clinical features of fever, refusal to suck, respiratory distress , lethargy , vomiting abdominal distension,poor cry and diarrhoea. Since timely detection of neonatal sepsis is crucial to reduction of neonatal mortality, clinical detection of cases in the community by peripheral health staff and timely referral and institution of therapy are vital.

KEYWORDS

Neonatal sepsis, Neonatal mortality,Late onset sepsis

INTRODUCTION

India contributes to one-fifth of global live births and more than a quarter of neonatal deaths. Nearly, 0.75 million neonates died in India in 2013, the highest for any country in the world.[1] Neonatal infections, comprising pneumonia, neonatal sepsis and infections of the central nervous system are a leading cause of neonatal sepsis. [2] The burden of neonatal sepsis is huge in the country. Hospital-based studies suggest an incidence of 30 per 1000 live births, whereas community-based studies indicate an incidence of 2.7–17% of all live births.[3] Nearly, one-fifth of neonates with sepsis die in the hospital; the figure rises to up to 50% for those with culture proven sepsis They stay longer in the hospital, consume more resources and are also at a high risk of major neurodevelopmental disabilities at a later age.[4]

Neonatal sepsis or septicaemia is a clinical syndrome characterized by systemic signs of circulatory compromise (e.g., poor peripheral perfusion, pallor, hypotonia, poor responsiveness) caused by invasion of the bloodstream by bacteria in the first month of life. [5]Although, health facility infections are a major problem in low-income countries, but the more pressing issues are the high proportion of home deliveries in unclean environments predisposing to sepsis and ensuring that all neonates have access to effective interventions from health care providers in the first days of life.[6]

Two forms of clinical presentations have been identified. Early onset sepsis, related to perinatal risk factors, usually presents with respiratory distress and pneumonia within 72 hours of birth. Late onset sepsis, related to nosocomial or community acquired infections, usually presents with septicemia,diarrhoea,meningitis and pneumonia after 72 hours of age. Clinical features of sepsis are non- specific in neonates and a high index of suspicion is required for the timely diagnosis of sepsis. Although blood culture is the gold standard for the diagnosis of sepsis, reports are available after 48-72 hours and has a low sensitivity [7]and therefore many studies also include infants with clinical signs of sepsis but a negative blood culture. This condition is normally referred to as clinical, probable or suspected sepsis.

Timely identification and management of serious neonatal infections can reduce neonatal deaths and further reduction can be achieved in conjunction with additional antenatal and intrapartum care . Hence this study was undertaken to find the clinical features highly associated with neonatal sepsis in babies admitted to the outborn nursery so as to enable an early clinical diagnosis and treatment. Limited data is available on community acquired neonatal sepsis and hence this study exclusively on outborn neonates was a step in that direction.

MATERIAL AND METHODS

This was an observational crossectional study conducted on out born neonates brought to the out born nursery of Dr. Baba Saheb Ambedkar Hospital, with clinical features and risk factors suggestive of sepsis. 250 outborn neonates were enrolled in the present study from January 2012 to December 2014.

Inclusion criteria:

Out born neonates presenting with any two or more of the following signs and symptoms were included into study:

1. Hypothermia(<950C) or fever(>990C)
2. Lethargy, poor cry, refusal to suck
3. Hypoglycaemia (<40mg/dl)/ Hyperglycaemia (>125mg/dl)
4. Poor perfusion, prolonged capillary refill time(>3sec)
5. Hypotonic, absent neonatal reflexes
6. Bradycardia (<100/min)/ tachycardia (>160/min)
7. Respiratory distress, apnoea and gasping respiration
8. Bulging anterior fontanel, vacant stare, high-pitched cry, excess irritability, stupor/coma, seizures, neck retraction
9. Feed intolerance, vomiting, diarrhoea, abdominal distension
10. Bleeding , petichae , purpura
11. Multiple pustules (>10), abscess, sclerema, mottling, umbilical redness and discharge.

Exclusion criteria

1. Neonate with obvious congenital malformation.

2. Neonate born to HIV positive mother.
3. Neonate who have received antibiotics(oral/intravenous).
4. Neonate with history of birth asphyxia/perinatal asphyxia (APGAR score <5 at 1 min).
5. Neonates born with lab confirmed perinatal TORCH infection.

The neonates enrolled into the study were classified into three categories as follows:No sepsis An out born neonate presenting with clinical features and risk factors suggestive of sepsis but Septic screen and blood culture were negative.Probable sepsis An out born neonate presenting with clinical features and risk factors suggestive of sepsis .Septic screen was positive and blood culture was negative.Definitive sepsisAn out born neonate presenting with clinical features and risk factors suggestive of sepsis and both Septic screen and blood culture were positive.

At presentation to the Paediatric Emergency Department, the neonates were assessed and emergency resuscitative measures were given which includes airway management, suctioning of ample secretions, intravenous fluid bolus, oxygen, warmer care as required .Other necessary treatment and stabilisation of vital parameters were executed and appropriate treatment was given as per the NICU management protocol.

Sepsis screen comprised of total leucocyte count,absolute neutrophil count,immature to total neutrophil ratio,micro ESR and C-reactive protein. Presence of two abnormal parameters was considered to be positive screen.[8]

Blood culture using bactec technique was sent in each case. Lumbar puncture was done in each case with late onset sepsis.

The statistical significance of categorical variable between No sepsis, Probable sepsis and definitive sepsis groups was determined by Chi-square or Fischer-Exact test. While the quantitative variables between the groups were analysed by using ANOVA or Krusal-Wallis test. The level of statistical significance was taken as P value < 0.05The data was analysed by using SPSS Statistical Software Version 15.0.

The study was approved by ethical and scientific committees of Dr BSA Medical College and there is no conflict of interest or financial considerations.

OBSERVATION AND RESULTS

In this study conducted from January 2012 onwards, 250 neonates fulfilling the inclusion criteria were enrolled and admitted in NICU of Dr. Baba Saheb Ambedkar Hospital, Delhi.

TABLE I: DISTRIBUTION OF NEONATE WITH EOS AND LOS

ONSET	SEPSIS			TOTAL (N%)
	NO (N%)	PROBABLE (N%)	DEFINITIVE (N%)	
EOS	8 (15.4)	36(27.7)	20(29.4)	64(25.6)
LOS	44(84.6)	94(72.3)	48(70.6)	186(74.4)
TOTAL	54(100)	130(100)	68(100)	250(100)

According to the age of onset of infection, neonates were classified as EOS (≤ 3 days) and LOS (>3 days). There were 64(25.6%) neonates admitted as EOS and 186(74.4%) admitted as LOS.

TABLE II: RELATIONSHIP BETWEEN VARIOUS SIGNS AND SYMPTOMS AND SEPSIS

Symptoms	Sepsis				p-value
	None (N=52)	Probable (N=130)	Definitive (N=68)	Total (N=250)	
Refusal to suck	38(73.1%)	100(70.9%)	56(82.4%)	194(77.6%)	0.682
Poor cry	0 (0%)	28(21.5%)	12 (17.6%)	40(16.1%)	0.043
Lethargy	32(61.5%)	82(63.1%)	48(70.6%)	162(64.8%)	0.703
Respiratory distress	14(26.9%)	56(43.1%)	52(76.5%)	122(48.8%)	<0.001
Fever	48(92.3%)	106(81.5%)	56(82.4%)	210(84%)	0.428
Abnormal movement Of hands and feet	0 (0%)	4(3.1%)	6(8.8%)	10(4%)	0.193
Up rolling of eyes	2 (3.8%)	6 (4.6%)	4(5.9%)	12(4.8%)	0.931
Diarrhoea	10(19.2%)	18 (13.8%)	12(17.6%)	40(16%)	0.781
Vomiting	8 (15.4%)	24(18.5%)	14(20.6%)	46(18.4%)	0.875
Abdominal distension	6 (11.5%)	10(7.7%)	14(20.6%)	30(12%)	0.172
Cold extremities	0 (0%)	26(20%)	4(5.9%)	30(12%)	0.013
Multiple pustules	10 (19.2%)	16(12.3%)	6(8.8%)	32(12.8%)	0.482
Yellowish discolouration of Skin	8 (15.4%)	10(7.7%)	0(0%)	18(7.2%)	0.072

The common clinical features associated with definitive neonatal sepsis in this study were fever (82.4%), refusal to suck (82.4%), respiratory distress (76.5%), lethargy (70.6%), vomiting (20.6%), abdominal distension(20.6%),poor cry (17.6%), diarrhoea (17.6%), multiple pustules (8.8%), abnormal movements of hands and feet (8.8%), cold extremities(5.9%) and up rolling of eyes (5.9%)

DISCUSSION

Neonatal sepsis is a the leading cause of neonatal morbidity and mortality in our country. In the present study carried out in department of paediatrics Dr. Baba Saheb Ambedkar Hospital, Delhi 250 out born neonates with clinical features and risk factors suggestive of sepsis were studied.

In our study, 64(25.6%) neonates had early onset sepsis and 186(74.4%) had late onset sepsisThe data from NNPD 2002-2003 showed that majority of NNS were EOS (56.1%) and LOS being (45.3%). [3] Upadhyay et al, [9] in which EOS was 41.8% of all NNS while rest of 58.2% was LOS. Our study included outborn neonates brought to medical attention from the community after a gap of 2-3 days. Among 64(25.6%) neonates of EOS 20(31.2%) had culture proven definitive sepsis, 36(56.2%) had probable sepsis and 8(12.6%) had no sepsis. Among 186(74.4%) neonates of LOS 48(25.8%) had culture proven definitive sepsis and 94(50.5%) had probable sepsis and 44(23.7%) had no sepsis.

The common clinical features associated with definitive neonatal sepsis in this study were fever (82.4%), refusal to suck (82.4%), respiratory distress (76.5%), lethargy (70.6%), vomiting (20.6%), abdominal distension(20.6%),poor cry (17.6%), diarrhoea (17.6%), multiple pustules (8.8%), abnormal movements of hands and feet (8.8%), cold extremities(5.9%) and up rolling of eyes (5.9%)

Bhakoo et al[10]studied clinical profile of 100 septic neonates and gave a correlation of clinical signs with prognosis (expired, recovered) as follows: refusal to feed (36%,31%), lethargy (66%,42%), diarrhoea (31%,22%), temperature change (19%,39%), abdominal distension (39%,19%), jaundice (33%,44%) and vomiting (38%,25%), Respiratory distress (31%,19%), apnoeic spells(17%,6%), sclerema (23%,6%), irritability (11%,14%) and others (25%,28%).

Khatua et al [11] studied 92 cases of neonatal sepsis.58 They found that refusal to feed (92.3%), lethargy (74%), diarrhoea (74%), temperature change (71.6%), abdominal distension (60.1%), jaundice (38%) and vomiting (30.4%) were the most common presenting features. Respiratory distress (24%), apnoeic spells (13%), sclerema (17.4%) and convulsions (10.8%) were associated with poor prognosis.

Waliullah MS et al[12], in their study found that most common clinical presentation of neonatal sepsis was reluctant to feed (96.7%) followed by lethargy (73.4%), abdominal distension (70%), jaundice (50%) , hypothermia (40%).60 Jain NK et al13,in their study on 167 neonates to analyse the clinical profile for septicaemia found that Common clinical manifestation were refusal to feeds (61%), respiratory distress (53%), lethargy(40%), convulsions(29%), abdominal distension(23%), hypothermia(20%), jaundice(14%) and hyperthermia(5%). Many patients in the study had more than 2 clinical features at the time of presentation.

CONCLUSION

Neonatal sepsis is one of the leading causes of neonatal morbidity and mortality in India. It requires rapid and accurate diagnosis as well as appropriate treatment for improved outcome.

A strong correlation was found between culture positive definitive neonatal sepsis and clinical features of fever, refusal to suck, respiratory distress , lethargy, vomitting, abdominal distension,poor cry and diarrhoea.

Early clinical detection of neonatal sepsis can even be done in the peripheral centres with limited facilities so as to enable timely referral for treatment.

REFERENCES

1. Liu L, Oza S, Hogan D, Perin J, Rudan I, Lawn JE et al. Global, regional, and national causes of child mortality in 2000–13, with projections to inform post-2015 priorities: an updated systematic analysis. Lancet 2015; 385(9966): 430–440.
2. Bassani DG, Kumar R, Awasthi S, Morris SK, Paul VK, Shet A et al. Causes of neonatal and child mortality in India: a nationally representative mortality survey. Lancet 2010; 376: 1853–1860.
3. National Neonatal Perinatal Database. Report for the year 2002-03. Available at http://www.newbornwhocc.org/pdf/nnpd_report_2002-03.PDF
4. Sankar MJ, Neogi SB, Sharma J, et al. State of newborn health in India. Journal of Perinatology. 2016;36(Suppl 3):S3-S8.
5. Edmond K, Zaidi A. New Approaches to Preventing, Diagnosing, and Treating Neonatal Sepsis. PLoS Medicine. 2010;7(3):e1000213. doi:10.1371/journal.pmed.1000213.
6. Lawn JE, Cousens S, Zupan J. 4 million neonatal deaths: when? Where? Why? Lancet. 2005;365:891–900.
7. Haque KN. Definitions of bloodstream infections in the newborn. Pediatr Crit Care Med. 2005; 6(3 suppl): S45-49.
8. Neonatal sepsis: AIIMS protocols in neonatalogy 2016; Department of paediatrics All india institute of medical sciences.New Delhi :CBS publishers.
9. Upadhya A, Aggarwal R, Kapil A, Singh S et al: Profile of neonatal sepsis in a tertiary care neonatal unit. Indian Journal of Neonatology 2006; 20(1): 50-57.
10. Bhakoo ON, Agarwal KC, Narang A et al. Prognosis and treatment of neonatal septicemia- A clinico-bacteriological study of 100 cases. Indian Pediatr 1974; 11(8):519-528.
11. Khatua SP, Das AK, Chatterji BD et al. Neonatal septicemia. Indian J Pediatr 1986; 53:509-514.
12. Waliullah MS, Islam MN, Siddika M, Hossain MK, Hossain MA. Risk factors,clinical manifestation and bacteriological profile of neonatal sepsis in a tertiary level pediatrichospital. Mymensingh Med J.2009;18(1);S66-72. http://www.ncbi.nlm.nih.gov/pubmed/19377435
13. Jain NK, Seth D, Mangal V. A clinicomicrobial association in neonatal septicemia. Pediatric Oncall. [serial online] 2010 [cited 2010 October 1];7. Art # 58. Available http://www.pediatriconcall.com/fordoctor/Medical_original_articles/sepsis.asp