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Research Article

APPRAISAL OF SIGNS AND SYMPTOMS, CLINICAL OUTCOMES IN NEONATAL SEPSIS-A PROSPECTIVE OBSERVATIONAL STUDY

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A B S T R A C T

Background- Sepsis remains a major cause of morbidity and mortality among neonates. Early-onset sepsis is associated with acquisition of microorganisms from the mother. Transplacental infection or an ascending infection from the cervix may be caused by organisms that colonize the mother's genitourinary (GU) tract. It occurs at 0-3 days of life.. Late onset sepsis is related to hospital acquired infections. The purpose of this study was to assess clinical outcomes and signs and symptoms of neonatal sepsis.
Results- Based on our study it is found that in signs and symptoms the Fever which is clinically significant and remaining signs and symptoms are clinically non significant. Out of 26 culture positive cases Discharge cases were 15(58%), Left Against Medical Advice cases were 4(15%) and Death were 7(27%). Out of clinical sepsis cases, Discharge cases were 70(58%), Left Against Medical Advice cases were 13(11%) and Death were 37(31%).
Conclusion- Most commonly seen symptoms are lethargy, poor cry, activity, respiratory distress, poor rooting and icterus. In spite of presence number of patients who were cured and get discharged, there is a considerable amount of deaths.

INTRODUCTION

Neonatal sepsis is a clinical syndrome of bacteremia characterized by systemic signs and symptoms of infection in the first month of life. Neonatal sepsis encompasses systemic infections of the newborn including septicemia, meningitis, pneumonia, arthritis, osteomyelitis and urinary tract infection of the newborn. Neonatal sepsis is a major cause of morbidity worldwide and one of the three primary causes of 2.7 million deaths every year. Over 600,000 of these deaths are attributed to infections alone (United nations) and 99% of these deaths take place in developing country settings[1].

Classification

Neonatal sepsis is of two types:

Early onset Sepsis (EOS: Early onset sepsis presents within first 72 hours of life. In severe cases the neonate may be symptomatic in utero (fetal tachycardia, poor beat to beat variability).

Clinically, the neonate usually presents as respiratory distress and pneumonia. Presence of the following risk factors has been associated with an increased risk of EOS:

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- Low birth weight (<2500gms) or preterm baby
- Febrile illness in the mother with in 2 weeks prior to delivery.
- Foul smelling and/or meconium stained liquor.
- Prolonged rupture of membrane (>24 hours).
- More than 3 vaginal examinations during labor.
- Prolonged and difficult delivery with instrumentation.
- Perinatal asphyxia (Apgar score <4 at 1 minute of age) or difficult resuscitation.

Neonates with presence of foul smelling liquor or three of above mentioned risk factors should be considered to have EOS & treated with antibiotics. Presence of ≥2 risk factors should be investigated with sepsis screen and treated accordingly.

Late onset Sepsis (LOS): Late onset sepsis usually presents after 72 hours of age. The source of infection is either nosocomial or community acquired and neonates usually present with septicemia, pneumonia or meningitis. Risk factors for development of LOS include:

- NICU admission
- Poor hygiene
- Low birth weight (LBW)
- Poor cord care
- Prematurity

- Bottle feeding
- Invasive procedure
- Superficial infection (pyoderma, umbilical sepsis)
- Ventilation
- Aspiration of feeds

Manifestations of neonatal sepsis are vague and ill-defined. Alteration in established feeding behavior is common and early, but is a nonspecific symptom. Other features are hypothermia or fever (former is more common in LBW babies), lethargy, poor cry, poor perfusion i.e. prolonged capillary refill time (>2 seconds), hypotonic or absent neonatal reflexes, bradycardia or tachycardia, respiratory distress i.e. apnea or gasping respiration, hypoglycemia or hyperglycemia and metabolic acidosis[2]**.**There cannot be a single recommendation for the antibiotic regimen of neonatal sepsis for all settings. The choice of antibiotics depends on the prevailing flora in the given unit and their antimicrobial sensitivity[1].

Aim: To study the signs and symptoms, Clinical outcomes of treatment for Neonatal Sepsis in a Tertiary Care Teaching Hospital.

Objectives

- To assess the signs and symptoms for neonatal sepsis
- To assess the clinical outcomes of treatment for Neonatal Sepsis.

MATERIALS AND METHODS

Study Design: Prospective Observational Study

Study Period: The study was conducted in the 6 months period i.e., from 1st September 2018 to February 2019.

Study Site: NICU and SNCU, Department of pediatrics, Government General Hospital, Guntur.

Sample Size: 146 neonates were included in our study based on inclusion and exclusion criteria

Materials Used

- Patient Assent form.
- Patient data collection form

Inclusion Criteria

- Neonates with 0-28 days of age and of either gender.
- All neonates with clinical sepsis and proven positive blood cultures.
- Neonates with sepsis and its complications.
- Guardians with language compatibility.
- Both early onset and late onset (>72 hours) of sepsis are included.

Exclusion Criteria

- Neonates without guardians.
- Patients who are not willing to give Assent.
- Neonates with suspected sepsis are excluded.
- Neonates whose case records contain inadequate information.

METHODOLOGY

The study was conducted after obtaining approval from Institutional Ethics Committee and patient assent. The patients were screened based on inclusion and exclusion criteria. Patients who satisfy the inclusion criteria were included in the study. Data was collected from patient case records. The obtained results were tabulated and arranged on Microsoft excel. Data was analyzed using SPSS17.00 software.

RESULTS

Age group (in days) Vs No.of patients

Results showed that patients within 1-7 days age group were 110 (75%) ; within that 89 (74%) were with clinical sepsis and 21 (81%) were with culture sepsis. Among 8-14 days age group, there were 13 (9%); in that 10 (8%) were with clinical sepsis and 3 (11%) were with culture sepsis. Among 15-21 days age group, there were 13 (9%); in that 11 (10%) were with clinical sepsis and 2 (8%) were with culture sepsis. Among 22-28 days age group there were 10 (8%); in that 10 (8%) were with clinical sepsis and 0 (0%) were with culture sepsis.

Table 1 Age Group (in days) Vs No of Patients

Age (Days)	No. of patients (N=146)		Total (N=146)
	Clinicalsepsis (n)(%)	Culturepositive Sepsis (n)(%)	(n)(%)
1 to 7	89 (74%)	21 (81%)	110 (74%)
8 to 14	10 (8%)	3 (11%)	13 (9%)
15 to 21	11 (10%)	2 (8%)	13 (9%)
22 to 28	10 (8%)	0 (0%)	10 (7%)
Total(146)	120	26	146

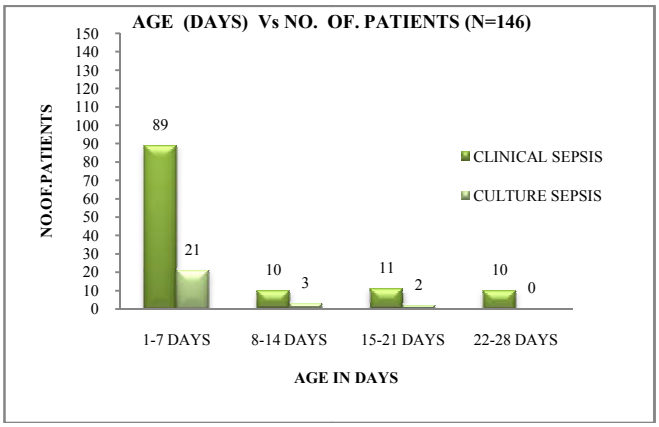

Figure 1 Age Group (In Days) Vs no of Patients

Gender Vs No. of Patients

Results showed that male patients were 71 (49%); in that 59 (49%) were with clinical sepsis and 12 (46%) were with culture sepsis. The female patients were 75 (51%); in that 61 (51%) were with clinical sepsis and 14 (54%) were with culture sepsis.

Table 2 Gender Vs no .of patients

Gender	No. of patients (N=146)		Total (N =146)	P Value
	Clinical Sepsis (n) %	Culture Positive Sepsis (n) %		
Male	59 (49%)	12 (46%)	71 (49%)	
Female	61 (51%)	14 (54%)	75 (51%)	0.7805
Total(146)	120	26	146	

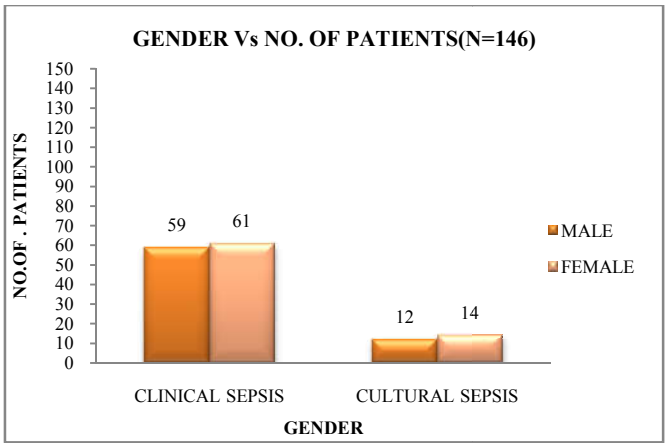

Figure 2 Gender Vs no .of Patients

Signs and symptoms Vs No.of Patients

Based on the results obtained in our study patients showing signs Fever/hypothermia were 46 (32%); in that 32 (27%) were with clinical sepsis and 14 (54%) were with culture positive sepsis. Lethargic patients were 58 (40%); in that 49 (41%) were with clinical sepsis and 9 (35%) were with culture positive sepsis. Patients with poor cry were 109 (75%); in that with 92 (77%) were with clinical sepsis and 17 (65%) were with culture positive sepsis. Patients with poor sucking or rooting were 67 (46%); in that 54 45%) were with clinical sepsis and 13 (50%) were with culture positive sepsis. Patients with brady/tachycardia 30 (21%); in that 22 (18%) were with clinical sepsis and 8 (31%) were with culture positive sepsis. Patients with poor perfusion/prolonged capillary perfusion were 30 (21%); in that 26 (22%) were with clinical sepsis and 4 (15%) with culture positive sepsis. Patients with hypotonia /abnormal neonatal refluxes were 29 (20%); in that 24 (20%) were with clinical sepsis and 5 (19%) were with culture positive sepsis. Patients with respiratory distress were (67%); in that 81 (68%) were with clinical sepsis and 17 (65%) were with culture positive sepsis. Patients with apnea and gasping were 56 (38%); in that 46 (38%) were with clinical sepsis and 10 (38%) were with culture positive sepsis. Patients with cyanosis were 44 (30%); in that 38 (32%) were with clinical sepsis and 6 (23%) were with culture positive sepsis. Patients with Hypoglycemia were 26 (18%); in that 22 (18%) were with clinical sepsis and 4 (15%) were with culture positive sepsis. Patients with icterus were 67 (46%); in that 52 (43%) were with clinical sepsis and 15 (58%) were with culture positive sepsis. Patients with hypotension/shock were 13 (9%); in that 13 (11%) were with clinical sepsis and 0 (0%) were with culture positive sepsis. Patients with multiple pustules were 3 (2%); in that 3 (3%) were with clinical sepsis and 0 (0%) were with culture positive sepsis. Patients with umbilical redness and discharge were 7 (5%); in that 5 (4%) were with clinical sepsis and 2 (8%) were with culture positive sepsis. Patients with seizures 30 (21%); in that 28 (23%) were with clinical sepsis and 2 (8%) were with culture positive sepsis. Patients with Diarrhea were 3 (2%); in that 3 (3%) were with clinical sepsis and 0 (0%) were with culture positive sepsis. Patients with sclerema were 14 (10%); in that 12 (10%) were with clinical sepsis and 2 (8%) with culture positive sepsis; Abdominal distension 30 (21%) in that 28 (22%) with clinical sepsis and 4 (15%) were with culture positive sepsis. Patients who refused feeds were 45 (31%); were in that 37 (31%) with clinical sepsis and 8 (31%) were with culture positive sepsis. Patients with hyperglycemia were 19 (13%); in that 14 (12%) were with clinical sepsis and 5 (19%) were with culture positive sepsis. Patients with other symptoms like vomitings, eye discharge, bleeding were 44 (30%); in that 38 (32%) were with clinical sepsis and 6 (23%) were with culture positive sepsis.

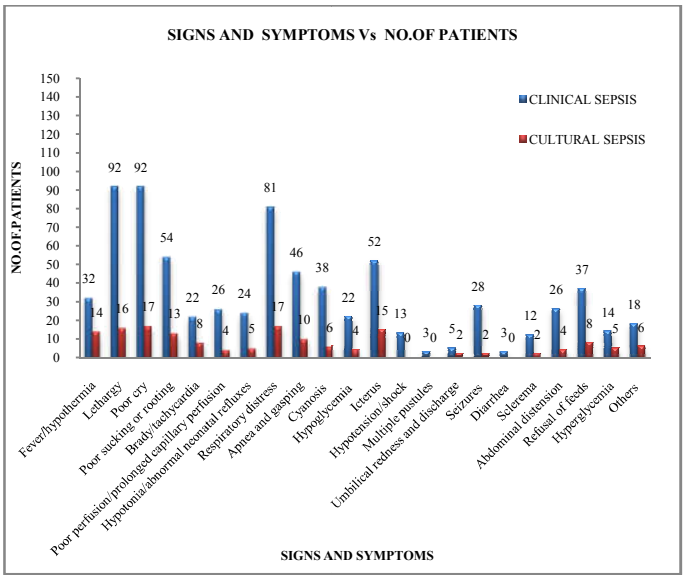

Figure 3 Signs and symptoms Vs No.of Patients

Table 3 Signs and symptoms Vs No.of Patients

Signs And Symptoms	Clinical Sepsis (N) (%)	Culture Positive Sepsis (N) (%)	Total
Fever/hypothermia	32(27%)	14(54%)	46(32%)
Lethargy	92(77%)	16(62%)	108(74%)
Poor cry	92(77%)	17(65%)	109(75%)
Poor sucking or rooting	54(45%)	13(50%)	67(46%)
Brady/tachycardia	22(18%)	8(31%)	30(21%)
Poor perfusion/prolonged capillary perfusion	26(22%)	4(15%)	30(21%)
Hypotonia/abnormal neonatal refluxes	24(20%)	5(19%)	29(20%)
Respiratory distress	81(68%)	17(65%)	98(67%)
Apnea and gasping	46(38%)	10(38%)	56(38%)
Cyanosis	38(32%)	6(23%)	44(30%)
Hypoglycemia	22(18%)	4(15%)	26(18%)
Icterus	52(43%)	15(58	67(46%)
Hypotension/shock	13(11%)	0(0%)	13(9%)
Multiple pustules	3(3%)	0(0%)	3(2%)
Umbilical redness and discharge	5(4%)	2(8%)	7(5%)
Seizures	28(23%)	2(8%)	30(21%)
Diarrhea	3(3%)	0(0%)	3(2%)
Sclerema	12(10%)	2(8%)	14(10%)
Abdominal distension	26(22%)	4(15%)	30(21%)
Refusal of feeds	37(31%)	8(31%)	45(31%)
Hyperglycemia	14(12%)	5(19%)	19(13%)
Others	38(12%)	6(23%)	44(30%)

Sepsis distribution Vs No.of patients

Results showed that patients with clinical sepsis were 120 (82%) and with culture positive sepsis were 26 (18%).

Table 4 Sepsis Distribution Vs no. of Patients

Types of Sepsis	No.of Patients (N=146) n (%)
Clinical sepsis	120 (82%)
Culture positive sepsis	26 (18%)
Total	146 (100%)

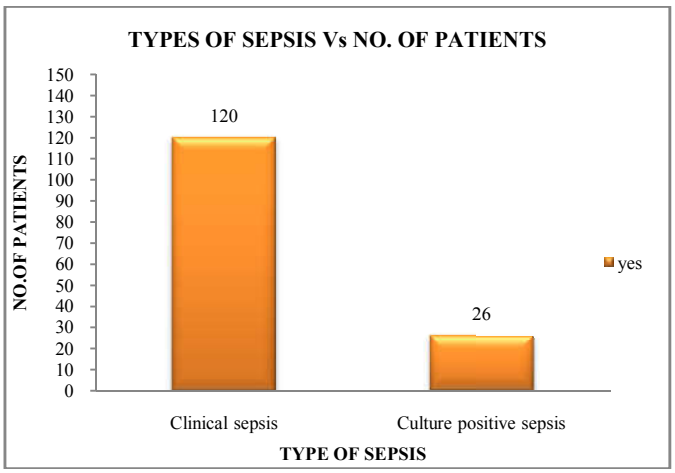

Figure 4 Sepsis Distribution Vs no. of patients

Clinical Outcome Vs No. of patients

Results showed that no of patients with discharge outcome in clinical sepsis were 70 (58%), no of patients with death outcome in clinical sepsis were 37 (31%) and no of patients with LAMA[Left Against Medical Advice] in clinical sepsis were 13 (11). The no of patients with discharge outcome in culture positive sepsis were 15 (58%), no of patients with death outcome in clinical sepsis were 7 (27%) and no of patients with LAMA[Left Against Medical Advice] in clinical sepsis were 4 (15%).

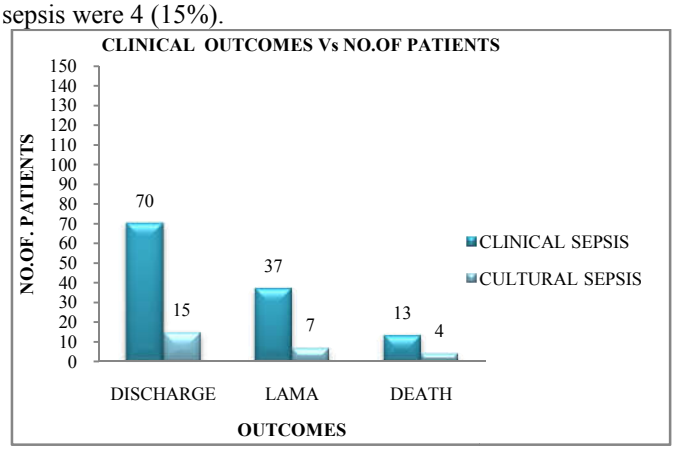

Figure 5 Clinical Outcomes Vs No.of patients

Table 5 Clinical Outcomes Vs No.of patients

Outcome	Clinical Sepsis (n) (%)	Culture Positive Sepsis (n) (%)	Total (N=146) (n) (%)
Discharge	70 (58%)	15 (58%)	85 (58%)
Death	37 (31%)	7 (27%)	44 (30%)
Lama	13 (11%)	4 (15%)	17 (12%)
Total (N=146)	120 (100%)	26 (100%)	100 (100%)

*LAMA- Left Against Medical Advice

DISCUSSION

A Prospective Observational Study was carried out on "Appraisal of Signs And Symptoms, Clinical Outcomes In Neonatal Sepsis-A Prospective Observational Study". 146 patients met the inclusion criteria and were included in the study. The data obtained was tabulated and analyzed. Based on the results obtained, our study revealed that the distribution of clinical sepsis 120 (82%) is more predominant which is dissimilar to the study done by Preeti M. Huggi *et., al* (2012) on " A study of neonatal septicemia in a tertiary care hospital in kalaburagi" which showed that 63(31.5%) were found to be culture positive. In our study, males were 71(49%) and females were 75(51%). The percentage of culture positive cases was higher among females 14(54%) compared to males 12(46%), which is dissimilar to the study done by Preeti M. Huggi *et., al* (2012) on " A study of neonatal septicemia in a tertiary care hospital in kalaburagi" which showed that males were 57.5% compared to females 42.5%. The percentage of culture positive cases was higher among males 53.97% compared to females 46.03%[3].Based on our study it is found that in signs and symptoms the Fever(P value of 0.0068) which is clinically significant and remaining signs and symptoms are clinically non significant. Based on the results obtained, our study found that, out of 26 culture positive cases discharge cases were 15(58%), Left Against Medical Advice[LAMA] cases were 4(15%) and death were 7(27%). Out of clinical sepsis cases, discharge cases were 70(58%), Left Against Medical Advice[LAMA] cases were 13(11%) and death were 37(31%).

CONCLUSION

Neonatal septicemia is one of the leading causes of infant mortality and morbidity. Our study found that sepsis was predominantly found in female patients. Most commonly seen symptoms are lethargy, poor cry, activity, respiratory distress, poor rooting and icterus. In spite of presence number of patients who were cured and get discharged, there is a considerable amount of deaths. Therefore preventive measures are to be taken to prevent the occurrence of sepsis.

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