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DETERMINATION OF THE RISK FACTORS AND CAUSATIVE ORGANISM RESPONSIBLE FOR NEONATAL SEPSIS IN TERTIARY CARE HOSPITAL

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Abstract:

Objective: *To find out the commonest risk factor and causative organism responsible for neonatal sepsis in our set up.*

Material Methods*: This descriptive and cross sectional study was conducted in the pediatric department of LUMHS over a period of 10 months from September 2014 up to June 2015. All the neonates those were clinically diagnosed as neonatal sepsis were selected for the study. Neonates those were already on antibiotic treatment were not selected. Complete neonatal medical history including birth history and clinical examination were done to evaluate the risk factors, and causative organisms were assessed by blood culture investigations. All the data was entered in proforma.*

Results: *Regarding neonatal risk factors, most common cause was preterm birth in 88%, followed by Apgar score at <5 in 70% and low birth weight in 65%. Commonest maternal risk factors for the neonatal sepsis were PROM in75% mothers, followed by LSCS in 70% cases, foul smell liquor found in 60(60%) cases. Most common causative organism was E-coli in 29.0%, following by Klebsella, Staphylococcus auras, Pseudomonas, Enterococci and others with percentage of 14.0%, 05.0%, 10%, 12.0% and 10% respectively, while in the twenty percent cases culture was negative and they were treated on the clinical diagnosis and other investigation.*

Conclusion: *We concluded that preterm deliveries, low birth weight and PROM were the commonest risk factors for neonatal sepsis. E-coli, Klebsella and Pseudomonas were major causative organisms.*

Key Words: *Neonatal sepsis, risk factors, causative organisms*

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INTRODUCTION:

Septicemia is the big cause of mortality and morbidity in neonates. Neonatal sepsis commonest reasons of neonatal admission in the hospitals in developing and countries[1]. It is also a leading cause of neonatal death in developing and developing countries [2]. Reports have showed that Pakistan accounts for 7% of the global neonatal mortality with an estimated 298000 neonatal deaths annually[3]. Worldwide immaturity, asphyxia and infection, are responsible for 87% of neonatal deaths[4]. Bacterial sepsis is thought to be major reason of neonatal mortality and morbidity. Organisms responsible for the neonatal sepsis are different in developed and developing nations and occasionally in same country isolated organisms differ from each other. With the ever altering awareness about bacteriological spectrum, inexpensive and simple interventions are essential requirement of the time of prenatal to postnatal to overcome of that's microbes. These interventions comprises proper immunization, good nutritional status, and good supplementation during pregnancy followed by competent delivery, early mother feeding of the neonates and in case of any morbidity, in time and proper treatment of neonates should be done to prevent neonatal death[5-8]. United Nation's Millennium Development Goal aims to decrease the mortality ratio of under 5 year and since 41% all the neonatal death should be shared to reduce the mortality[9]. To attain this goal we should focused on the risk factors for mortality and the morbidity of neonates. New evidence recommends that basic activities as; uneducated mothers, low socioeconomic status and elevated parity may plays major role in death of neonate[10]. From developed countries majority of studies on mortality and morbidity of neonate are available but the data in the developing countries is very short. Different fetal, maternal and environmental factors are responsible to cause neonatal sepsis. Most important maternal risk factors are maternal pyrexia 2 weeks before delivery, premature rupture of fetal membranes, foul smell liquor, meconium stained liquor and instrumental delivery. Among fetal risk factors responsible for neonatal sepsis is weight of baby at birth, Apgar score and gestation age at delivery. GBS and CONS are the commonest organism responsible for early onset and late onset neonatal sepsis in developed countries, while in the developing countries these organism very rare, with a completely different bacterial spectrum. Commonest etiological agents responsible for neonatal sepsis are GBS and E.coli following the preventive strategies for GBS in developed countries[11] and Klebsiella pneumoniae and Staphylococcus in the India[12]. Nowadays BacT/Alert systems for the detection of microbes are being utilized for cultures of the blood[13]. The biggest challenge for the practicing pediatrician is the upcoming event of neonatal sepsis along with the resistance due to uses of the antibiotics commonly[14,15]. As very few local studies are conducted on this event, therefore this study was designed to find out the commonest risk factor and causative organism responsible for neonatal sepsis in our set up.

MATERIAL & METHODS:

This descriptive and cross sectional study was conducted in the pediatric department of LUMHS over a period of 10 months from September 2014 up to June 2015. All the neonates those were clinically diagnosed as neonatal sepsis were selected for the study. Neonates those were already on antibiotic treatment were not selected. Complete medical history was taken from their parents after taking verbal informed consent regarding their gestational age, history of rupture membranes, maternal fever, mode of delivery, birth weight etc, and clinical examination was done to evaluate the risk factors, and causative organisms were assessed by blood culture investigations. For the blood culture sample of the blood was taken and sent to the Hospital laboratory. All the relevant information was recorded on predesigned proforma and results were entered on SPSS 16 version for analysis.

RESULTS:

Total 100 cases were included in the study. Male gender was the most common 60%, and female were 40%. Regarding neonatal risk factors, most common cause was pre term birth in 88%, followed by Apgar score at <5 in 70% cases, low birth weight in 65% cases. **Table 1**

Most common maternal risk factors in our study were as; PROM 75% mothers, followed by LSCS in 70% cases, foul smell liquor was found in 60% cases, maternal pyrexia was in 56% cases, multiple vaginal examinations in 40% cases, chorioamnionitis in 30% cases, meconium stained liquor and SVD in 20% cases and instrumental vaginal deliveries in 10(10%) cases. **Table: 2**

Most common causative organism was E-coli in 29.0% of the cases, following by Klebsella, Staphylococcus auras, Pseudomonas, Enterococci and others with percentage of 14.0%, 05.0%, 10%, 12.0% and 10% respectively, while in the twenty percent cases culture was negative and they were treated on the clinical diagnosis and other investigation. **Table: 3**

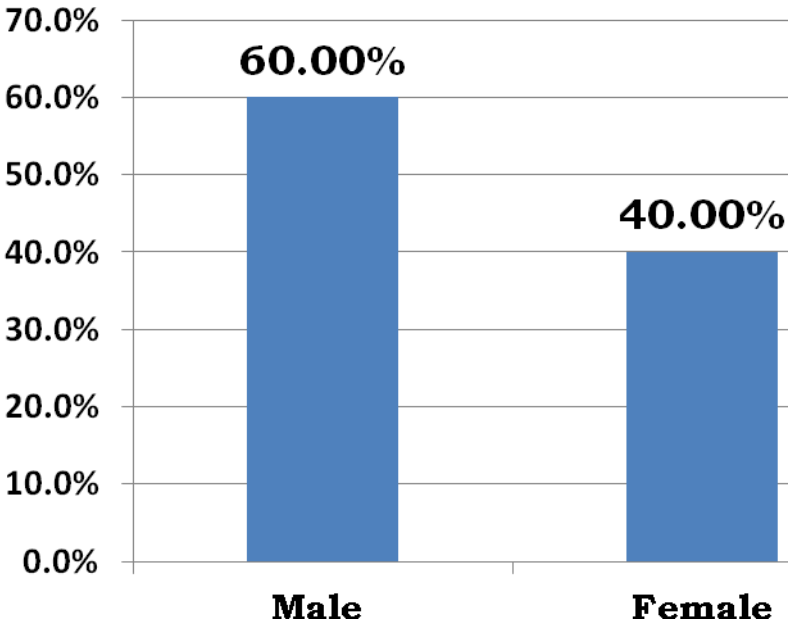

Fig:1. Gender distribution of the neonates n=100

Table:1. NEONATAL RISK FACTORS FOR NEONATAL SEPSIS n=100

Risk factors	Number/ (%)
Use of AMBU bag	25(25%)
Mouth to mouth breathing	10(10%)
Term	12(12%)
Pre term	88(88%)
Low birth weight	65(65%)
Apgar score at <5 at 1 min	70(70%)
Apgar score at <7 at 5 min	30(30%)

TABLE:2. MATERNAL RISK FACTORS FOR NEONATAL SEPSIS n=100

Maternal risk factors	Number (%)
UTI	20(20%)
PROM	75(75%)
Meconium stained liquor	20(20%)
Maternal pyrexia	56(56%)
Multiple vaginal examinations	40(40%)
chorioamnionitis	30(30%)
Spontaneous vaginal delivery	20(20%)
Instrumental delivery	10(10%)
LSCS	70(70%)
Foul smell liquor	60(60%)

TABLE:3. CAUSATIVE ORGANISM RESPONSIBLE FOR NEONATAL SEPSIS n=100

Causative organisms	Number / percentages
E-colie	29(29.0%)
Klebsella	14(14.0%)
Enterococci	05(05.0%)
Staphylococcus auras	10(10%)
Pseudomonas	12(12.0%)
Others	10(10%)
Negative culture	20(20.0%)

DISCUSSION:

This study has been carried out to assess the neonatal and maternal risk factors responsible for neonatal sepsis to reduce the burden of disease and its associated complications. In our study both neonatal and maternal risk factor had a significant effect on the neonatal sepsis. Regarding neonatal risk factors, most common cause was pre term neonate 88%, followed by Apgar score at <5 in 70% cases, low birth weight in 65% cases. In our study males had more neonatal sepsis as compare to females. Our findings are comparable with study of Shaw et al[16]. Similar results are also seen in the study conducted by Bhutta ZA et al from Pakistan[17] and by Daoud AS et al from Dubai [18] and Sanhyi KP et al [19]. Without early diagnosis and management, newborns are likely to develop long-term health complications due to neonatal sepsis; however, which may increase the mortality.

In our study maternal risk factors were found as PROM in 70% mothers, followed by LSCS in 70% cases, foul smell liquor in 60% cases, maternal pyrexia in 56% cases, multiple vaginal examinations in 40% cases , chorioamnionitis in 30(30%) cases, meconium stained liquor and SVD in 20(20%) cases and instrumental vaginal deliveries in 10(10%) cases. In comparison of our study Shah GS et al[20] reported that the factors which carried a significant risk for development of neonatal sepsis were meconium stained liquor, PROM , low birth weight ,low apgar score and prematurity. Comparable results are also seen in the study conducted by Placzek MM et al [21].

The chemical and physical barriers for infection in the human body are also present in the newborn but they are functionally deficient. Also Skin and mucous membranes can easily be broken down in the pre term infant. . Neonates who are seriously ill, preterm , or both are at increased risk due to invasive procedures which break their physical barriers to prevent infection. Due to interdependence of the immune response, these individual lacks of the different components of immune activity in the neonate are responsible for dangerous situation which keeps the newborn at increased risk of infection. In a study it is mentioned that maternal bacteremia is the big source of bacterial transmission to fetus from mother, other risk factors for neonatal infection as; pre-labor rupture membranes of amniotic sac, preterm PROM, and prolonged rupture of membranes[22]. Another study conducted by. Woldu MA et al showed that 82.5% of newborns who were born to mothers having urinary tract infection and developed neonatal sepsis. These finding may support the thought that maternal urinary tract infection is responsible for neonatal sepsis, especially if untreated in the third trimester of pregnancy or labor, and it may be responsible for neonatal sepsis after colonization at the birth canal by the infectious agent[23]. In comparison to our study Boia M et al and others also reported that early rupture membrane and the prolonged labor may transfer microorganisms to amniotic sac and fetal from birth canal and resulting asphyxia may developed which leads to neonatal sepsis[24-26]. Alam MM et al[27]stated that revealed intrapartum pyrexia is the also major risk factor of neonatal sepsis. Intrapartum pyrexia is suggestive of maternal infections which are frequently transmitted to the fetus in utero or during delivery through the birth canal which usually causes early onset sepsis.

In this study most common causative organism was E-coli in 29.0% of the cases, following by Klebsella, Staphylococcus auras, Pseudomonas, Enterococci and others with percentage of 14.0%, 05.0%, 10%, 12.0% and 10% respectively, while in the twenty percent cases culture was negative and they were treated on the clinical diagnosis and other investigation. In the fevour of our study Muhammad Z et a[28] reported that major causative organisms were Staphylococcus aureus and E. coli for the neonatal sepsis as well as 26.9% and 23.1% respectively.. Najeeb S et al[29] found Staphylococcus aureus was commonest bacteria in 26.9% cases including Escherichia coli in 30 (23.1%) cases

CONCLUSION:

We concluded that preterm deliveries, low birth weight and PROM were the commonest risk factors for neonatal sepsis. E-coli, Klebsella and Pseudomonas were the commonest causative organisms, while twenty percent culture was negative; this may due to mostly peoples had visited local clinics and used multiple antibiotics previously. Parents should be counseled after delivery regarding neonatal sepsis and its risks, and also should be advised preterm babies and those on high risk of sepsis should be consult with peadiatricians properly to reduce the neonatal morbidity and mortality.

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