

Clinical Spectrum of Early Onset Neonatal Sepsis

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Abstract

Objective: To describe clinical spectrum of early onset neonatal sepsis in our set up.

Materials and Methods: This study was conducted at Neonatology Unit, Department of Pediatric Medicine, Services Hospital, Lahore from 01-07-2007 to 31-12-07.

Subjects and Methods: The data of all the admitted neonates with culture proven early onset neonatal sepsis were analyzed for age, weight, gender, and clinical presentations at the time of admission.

Results: The mean age of neonates at time of presentation was 2.26 ± 1.661 days. Fifty seven percent were boys with male to female ratio 1.32 : 1. The mean weight at time of presentation was 2.9 kilograms, maximum with the standard deviation of 0.319. Refusal to feed was the most common 68%, followed by respiratory distress 47%, and lethargy 41%. Other symptoms included fits 20%, vomiting 18%, irritability 16%, diarrhea 14%, jaundice 8%, bleeding 8% and fever in 7% of patients. Temperature instability (51%) was the most common clinical sign followed by poor sucking 48%, shock 25%, tachycardia 16%, cyanosis 12%, bradycardia 9%, petechiae and purpura

12%, grunting 5%, apnea 5%, and abdominal distension in 2% of patients.

Conclusion: Early onset neonatal sepsis has non specific signs and symptoms so high index of suspicion should be kept in mind while managing a sick neonate so that early and prompt treatment can be instituted.

Introduction

The term sepsis refers to bacteremia and constellation of signs and symptoms caused by microorganisms or their toxic products in blood.¹ Sepsis is termed as neonatal sepsis when it occurs during first 28 days of life. There are two clinical patterns of neonatal sepsis.

Early onset neonatal sepsis occurs from 0 – 7 days usually during first 72 hours.¹ Eighty – five percent of neonates with early onset sepsis present within 24 hours.² Neonatal sepsis after 7 days is classified as late onset sepsis. Neonatal sepsis is an important cause of neonatal morbidity and mortality. The incidence of neonatal sepsis varies from 1 to 4 per 1000 live births in developed countries.¹ In developing countries incidence varies from 10 – 20 / 1000 live births.²

Early onset sepsis is caused by Streptococci, Escherichia coli, Enterococci, Listeria monocytogenes and non-typable Haemophilus influenzae.³

Neonates with bacterial sepsis usually have non-specific symptoms and signs including temperature instability, hypotension, poor perfusion with pallor, tachycardia or bradycardia, apnea, respiratory distress, grunting, cyanosis, irritability, lethargy, seizures, refusal to feed, abdominal distension, petechiae, purpura and bleeding.⁴

Evaluation of neonates with sepsis includes history, clinical examination and lab investigations. The

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investigations include complete blood counts, erythrocyte sedimentation rate, band neutrophil ratio, platelet count and cerebrospinal fluid examination, blood culture, C-reactive protein and urine analysis / culture. Gold standard for diagnosis is isolation of causative organism on blood culture.⁵

Early onset sepsis is a medical emergency and babies present with nonspecific clinical features. Therefore it is of prime importance that high index of suspicion should be kept in mind in babies admitted with nonspecific symptoms and signs. This study will highlight common presentations of early onset neonatal sepsis in our setup and will help in early detection and prompt management of neonates with sepsis.

Materials and Methods

This study was conducted at Neonatology Unit, Services Hospital Lahore. A total of 100 neonates admitted with clinical diagnosis of early onset sepsis proved by blood culture, were evaluated during the study period. Premature and low birth weight neonates were excluded from study. Relevant information including age, gender, weight, mode and place of delivery, presenting complaints and signs suggestive of sepsis were collected. Complete blood counts, band neutrophil ratio, erythrocyte sedimentation rate, chest x-ray, blood culture (both for aerobic and anaerobic agents) and urine culture were done in all patients while cerebrospinal fluid examination and culture was done where indicated. Data were analyzed by using SPSS version 10.

Results

The mean age of neonates at time of presentation was 2.26 ± 1.661 days. The majority of cases (67%) presented within 48 hours of birth, while 33 (33%) presented from 48 hours to 7 days (table 1). Fifty seven percent were boys with male to female ratio 1.32:1. The mean weight at time of presentation was 2.9 kilograms, maximum with the standard deviation of 0.319 (Table 1). Fifty – six percent babies were delivered at home while 23% were delivered at public hospitals and 21% in private hospitals (Figure 1). Seventy – four percent babies were delivered by spontaneous vaginal delivery (SVD) and 26% babies were delivered by caesarean section (Figure 2).

Refusal to feed (68%) was the most common pre-

Table 1: Weight of neonates with early onset sepsis

Weight	Weight (Wt.) in Kg
Maximum	3.9
Minimum	2.5
Mean	2.9
Standard deviation	0.319

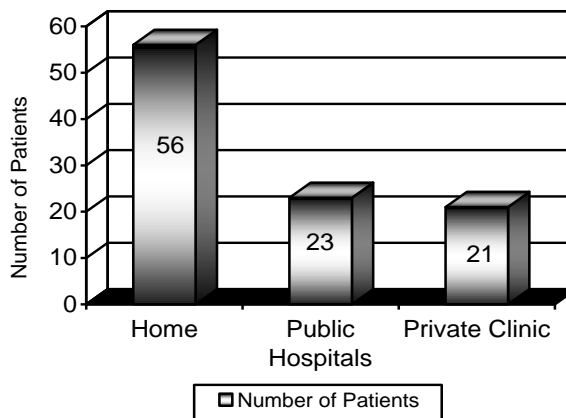


Figure 1: Distribution of neonates with early onset sepsis according to place of birth.

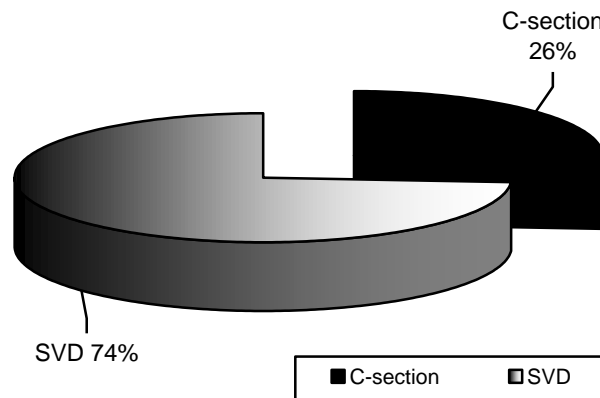


Figure 2: Distribution of neonates with early onset sepsis based on Mode of delivery.

Key:
 SVD: Spontaneous vaginal delivery
 C-section: Caesarean section

senting complaint. Other complaints were respiratory distress present in 47%, lethargy in 41%, fits in 20%, vomiting in 18%, irritability in 16%, diarrhea in 14%,

jaundice in 8%, bleeding in 8% and fever in 7% patients (Table 2). Temperature instability (51%) was the most common sign followed by poor sucking (48%), Shock (25%) tachycardia (16%), cyanosis (12%), bradycardia (9%), petechiae and purpura (12%), grunting (5%), apnea (5%), and abdominal distension (2%) (Table 3).

Table 2: Common clinical presentations (Symptoms) in neonates with early onset sepsis.

Clinical Presentation	Number of Patients	Percentage
Refusal to feed	68	68
Respiratory distress	47	47
Lethargy	41	41
Seizures	20	20
Vomiting	18	18
Irritability	14	14
Jaundice	8	8
Bleeding	8	8
Fever	7	7

Table 3: Common clinical presentations (Signs) in neonates with early onset sepsis.

Clinical Presentation	Number of Patients	Percentage
Temperature instability	51	51
Poor sucking	48	48
Shock	25	25
Tachycardia	16	16
Pallor	13	13
Cyanosis	12	12
Bradycardia	9	9
Purpura / Purpura	12	12
Grunting	5	5
Apnea	5	5
Abdominal distension	2	2

Discussion

Total of 100 diagnosed cases of early onset neonatal sepsis were included in the study. The diagnosis was based on clinical grounds and proved by blood cultures. There is no consensus about timing of early onset neonatal sepsis. Some authorities have termed early onset neonatal sepsis as infections presenting within 7 days of birth.⁶ However, others have limited this definition to 48 hours.⁷ In this study, we have subdivided early onset neonatal sepsis into 2 parts i.e. birth to 48 hours and 48 hours to 7 days. The mean age at the time of admission was 2.26 days. Majority of neonates (67%) presented within 48 hours of birth. This is comparable with a study done by Linda⁸ which showed that 85% of neonates with early onset neonatal sepsis presented within 24 hours.

Gender distribution revealed male preponderance 57% boys versus 43% girls making male to female ratio 1.32 : 1. It may be explained on the basis of two reasons. First, male sex carries a higher risk for sepsis as compared to females.¹ Second, parents of our country are more concerned about their boys. A study in Lahore³ also showed male predominance where boys were affected more than twice as that of girls while a study⁹ in India showed equal distribution among boys and girls.

Fifty – six percent neonates were delivered at home and 23% at public hospitals and 21% in private hospitals. In developed countries almost all deliveries are conducted in hospitals with aseptic precautions but in developing countries like Pakistan most of deliveries are conducted at home with the help of traditional birth attendant. Home delivery is a risk factor for development of neonatal sepsis because of unskilled staff and unclean environment.¹⁰ These factors are involved in home deliveries as well as deliveries in most of the private clinics. In a study by Maryam³ most of the patients with sepsis were from home or private clinic deliveries.

Regarding mode of delivery, 74% neonates were delivered by SVD and 26% by Caesarean section. Same environmental factors described earlier like unclean environmental and unskilled staff are responsible for sepsis in neonates who were delivered by SVD.

Major clinical presentations studied in neonates with early onset sepsis were refusal to feed (68%), temperature instability (51%) poor sucking (48%), respiratory distress (47%), lethargy (41%), shock (25%) and seizures (20%).

The major common presentations in this study are comparable to those in other studies. Karthikeyan and Premkumar¹¹ described that lethargy with refusal to feed was present in about half of the cases of both early and late onset sepsis. A study³ in Lahore showed that lethargy and poor feeding was the most common presentation and was present in 74.6% neonates. Respiratory distress was present in about half of patients in this study that is comparable to a study in which it was 69%.¹¹ Kadir¹² observed that group B Streptococcus infections most commonly presented with respiratory symptoms within a few hours of birth. Seizures were present in 20% of cases that is about half than that observed in a study by Maryam.³ Only 7% babies with sepsis were febrile. A study by Metzger and Kunit¹³ showed that fever was common in newborns, 1 – 4 days of age and delivered by C-section. Jaundice was present in 7% patients while in another study³ it was more than three times (24.12).

Temperature instability was the most common clinical sign present in 51% of patients. A study by Ng and Chan¹⁴ showed that about 50% of the babies with proven sepsis were febrile, 15% had hypothermia while remaining were normothermic. In this study 25% patients presented with shock which is comparable to another study³ in which 16.70% patients came with this clinical presentation. Apnea was present in only 5% of total patients while in one study³ it was present in 40% of patients. This difference may be due to the fact that in this study low birth weight and premature babies were not included as apnea is not only a feature of sepsis but also associated with prematurity and low birth weight babies. Bleeding was present in 12% of patients that is comparable with a study by Maryam³ in which 18.80% patients were having bleeding. Only 2% patients presented with abdominal distension while in another study³ 11.80% patients were having this presenting complaint.

Conclusion

It is concluded from this study that early onset neonatal sepsis has non-specific signs and symptoms and

index of suspicion should be very high while managing a sick neonate so that an early and prompt treatment can be instituted which will help in reducing morbidity and mortality in early onset neonatal sepsis.

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