EARLY NEONATAL SEPSIS: AN ETIOLOGICAL STUDY

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SUMMARY

Early neonatal sepsis is an important cause of morbidity and mortality among the newborn babies in Pakistan. This is a prospective study of 46 culture positive newborn babies presented with early neonatal sepsis. It was conducted in the Special Care Baby Unit (SCBU) of Khyber Teaching Hospital Peshawar from December 2000 to June 2001. E.coli (25/46), Group B beta-hemolytic streptococcus (6/46), Staphylococcus aureus (05/46) and Enterococci (05/46) were the most common organisms involved in early neonatal sepsis. These organisms were highly resistant to commonly used antibiotics (ampicillin, gentamycin, cefotaxime and tobramycin). Data from surveillance of early onset neonatal sepsis suggests a different microbial spectrum with predominance of gram-negative organisms, many of which are multi-drugs resistant.

INTRODUCTION

During the last two decades, dramatic improvement in survival of newborns, especially the extremely premature group, resulted from major advances such as antenatal steroids and surfactant, as well as from many other less dramatic improvements in care. As fewer babies died of respiratory failure and smaller babies survive, infection has become an increasingly important cause of mortality and morbidity.

Neonatal sepsis is a clinical syndrome characterized by systemic signs of infection accompanied by bacteraemia in the first month of life. Infection falls into two main categories: Early onset (generally acquired from the mother) and Late onset (generally acquired from nursery environment). The line between early and late is usually taken as seven days. Nosocomial infection occurs 72 hours after hospitalization or 8-28 days.

The sepsis rate for babies less than 30 days of age ranges from 1 to 8 per 1000 livebirths. About 22 to 66% of all admissions to the neonatal unit in Pakistan are due to infection and about 50-88% of all neonatal deaths are somehow attributed to infection.
Signs and symptoms of sepsis are highly variable and studies have attempted to find “classic signs” but have been inconclusive. Neonatal sepsis may start with minimal or non-specific symptoms and approximately one-third of cases are associated with concurrent meningitis, which is clinically indistinguishable from sepsis.

This study was an effort to see the etiologic agents in early neonatal sepsis in our setup.

**Material and Methods**

A prospective study was conducted in the Special Care Baby Unit (SCBU) of Khyber Teaching Hospital Peshawar from December 2000 to June 2001. The babies suspected to have or develop early neonatal sepsis any time during hospitalization were evaluated for clinical signs and symptoms and were investigated to establish the diagnosis and isolate the causative organism. Blood culture was taken at the time of admission or when sepsis was suspected.

Following were the inclusive criteria:

a. Clinical signs and symptoms or clinical suspicion of sepsis.

b. Age less than seven days.

Following babies were excluded from the studies:

a. Age more than seven days.

b. No growth on blood culture.

c. Babies having explanation other than sepsis for their illness.

Detailed history was taken and physical examination was conducted. Signs and symptoms were evaluated and recorded on a pre-formed proforma. Risk factors for early neonatal sepsis were also recorded. Each baby was subjected to blood, urine and, in relevant cases, cerebrospinal fluid and swabs from any local focus of infection were taken, using aseptic techniques.

**Results**

Seventy-nine blood cultures were done during study period, of which forty-six were positive. Thirty-one were male and nineteen were females. Twenty-eight had birth weight less than 2500 gram while eighteen had birth weight more than 2500 gram. Mean age of presentation was 38.3 hours of age. Thirty-one were delivered at home while seventeen were either delivered at a hospital or at a maternity clinic. Poor feeding, temperature instability, yellow discoloration and “not looking well” were the most common presentation. Hypotonia, lethargy, depressed reflexes, jaundice, abdominal distension and hepatosplenomegaly were the most common signs.

Prolong rupture of membrane (>18 hours) were noted in thirteen cases while nine had intrapartum maternal fever. Chorioamnionitis was found in only two. Twenty-one cases were premature (<37 weeks of gestation) while six were twin pregnancies. Low APGAR score was noted in seven babies.

E.coli was found to be the most common etiological agent in early neonatal sepsis. It was involved in 25 (25/46) cases while Group B beta-hemolytic streptococcus was responsible for only six (6/46) cases. Other organisms involved in early neonatal sepsis were Staphylococcus aureus (05/46), Enterococci (05/46), Klebsiella (03/46) and Pseudomonas (02/46).

E.coli was least sensitive to ampicillin (8%), gentamycin (20%), cefotaxime (4%) and ceftazidime (4%) and highly sensitive to imipenem (88%) and quinolones (68-84%). Group B beta-hemolytic streptococcus was found to be highly sensitive to
ampicillin (83%), imipenem (83%) and vancomycin (83%). Enterococci had a sensitivity of 80% to amikacin and imipenem and highly resistant to third generation cephalosporins (0-40%). Staphylococcus aureus had a high sensitivity to amikacin (80%), imipenem (80%) and third generation cephalosporins (60-80%). Klebsiella and Pseudomonas were highly sensitive to amikacin, imipenem and quinolones.

**Discussion**

This study reveals that E.coli was the most common etiologic agent in our setup, followed by Group B beta-hemolytic streptococcus. Similar results were obtained by Khan I and Akram DS in their study in 1987 and mentioned by Khattak AA and Uzair M in their publication. Group B beta-hemolytic streptococcus is the most frequently incriminated organism causing neonatal sepsis in Western Literature but was not seen in this study. This may be due to the differences in the environmental and social conditions of the two cultures. E.coli was the most commonly involved organism in neonatal sepsis during 1958-1965 at Yale New Haven Hospital (YEHH). However, Klebsiella and E.coli were the two most common organisms causing early neonatal sepsis during 1986.
to 1989 at Agha Khan University Hospital Karachi.

E. coli was highly sensitive to cefotaxime, tobramycin and gentamycin in 1984-1985 but now most of the organisms were found to be resistant to commonly used antibiotics e.g., ampicillin, cefotaxime and tobramycin. This is due to indiscriminate use of antibiotics in nurseries. This, particularly, occurs with cephalosporin antibiotics as shown in this study. Imipenem is a new antibiotic and the organisms commonly involved in early neonatal sepsis are highly sensitive to this antibiotic. Therefore, cephalosporin antibiotics and imipenem should be reserved for cases of severe infections where evidence suggests their use is warranted.

Because of high mortality, prevention becomes the most important aspect of neonatal sepsis. Proper antenatal care, maternal immunization, good hygienic conditions, spacing between pregnancies, training of lady health workers and dais to conduct aseptic deliveries, promotion of breast feeding plays an important role in its prevention.

**CONCLUSION**

Gram-negative organisms were mainly responsible for early neonatal sepsis in our setup and majority of them were highly resistant to commonly used antibiotics. Therefore, data must be periodically reviewed and antibiotic policy must be revised accordingly.

**REFERENCES**


