

Blood Culture and Sensitivity Pattern in Neonatology Unit of Children Hospital Lahore

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Objectives: To identify spectrum of organisms causing neonatal sepsis and the sensitivity pattern against commonly used antibiotics. **Study design:** Prospective descriptive study. **Material and method:** Blood samples were taken from all neonates with clinical suspicion of sepsis before start of antibiotics and sent for culture by standard method. The data obtained from January 2004 to June 2004 was analyzed and results were tabulated. **Results:** A total of 1900 blood samples were taken. Cultures were positive in 524 samples (27.6%). E Coli was the most common organism found (31.67%) followed by Staph Epidermidis (24.80%), Klebsiella (19.08%) and Pseudomonas (14.69%). Amikacin was the most effective drug followed by Co-Amoxi Clav, Ciprofloxacin, Imipenem and Ceftazidime in that order. Gram positive and gram negative organisms showed a high degree of resistance against Ampicillin and Gentamycin respectively. **Conclusion:** Neonatal sepsis is one of the leading causes of morbidity and mortality. Gram negative organisms are the major cause of neonatal sepsis in NNU of Children Hospital. In this study these organisms showed resistance against commonly used antibiotics (Ampicillin, Gentamycin and Cefotaxime). There is a need to modify already existing protocol in NNU of Children Hospital.

Key words: Neonates, culture, sepsis

Neonatal sepsis is one of the major causes of morbidity and mortality in newborns in both developed and developing countries¹.

Sepsis is still one of the most common reasons for admission to neonatal units in developing countries². Early onset sepsis (EOS) is defined as illness appearing from birth to 72 hours and late onset sepsis (LOS) is defined as illness appearing from 72 hours – 28 days of life^{3,4}. EOS can occur due to ascending infection following rupture of membranes (>18 hours), delivery through infected birth canal, and during active resuscitation. Few infants may develop sepsis even without any identifiable maternal risk factors.

The pattern of organisms differs from place to place and can change in the same place over a period of time. Over all incidence of culture proven sepsis varies between 1-8 cases / 1000 live births and there is equal distribution of EOS & LOS⁵.

In most of developing countries, gram negative organisms remain the major cause of sepsis specially EOS⁶. Higher mortality rate is associated with gram negative sepsis in EOS & LOS^{7,8,9,10}. There is an increasing pattern of emergence of drug resistant pathogens¹¹. Traditionally initial antibiotic coverage has included ampicillin with either gentamicin or a third generation cephalosporin (cefotaxime). Recent reports have suggested that ampicillin has inadequate coverage because of emergence of resistant organisms and increase in gram negative pathogens and third generation cephalosporins are ineffective against Klebsiella & E. Coli¹².

The emergence of multidrug resistant sepsis in developing countries is a new potential threat to the survival of neonates who are often already in a poor condition. Therefore, local surveillance of pathogens and

frequent antibiotic susceptibility pattern is critical to determine appropriate antibiotic therapy.

The present study was carried out to determine causative organisms of neonatal sepsis and drugs susceptibility pattern.

Material and method:

It was a prospective descriptive study carried out in the neonatology unit of Children Hospital & Institute of Child Health over a period of six months.

Neonates with clinical diagnosis of sepsis were admitted in NNU and blood samples were taken prior to use of antibiotics. A total of 3-5 ml of blood was taken aseptically and injected into blood culture bottle containing 25ml broth (brain heart infusion). The blood samples were cultured in the pathology lab of CH by standard method. These samples were incubated at 37 degree centigrade for 24 hours and sub cultured on blood agar and MacConkeys agar and incubated for another 24 hours. Cultures were reported and relative sensitivity put up. Sensitivity plates were incubated for 24 hours and sensitivity pattern of commonly used drugs was checked.

Data was entered in SPSS version 11 and was tabulated. Frequencies were drawn and cross tabulation was done.

Results:

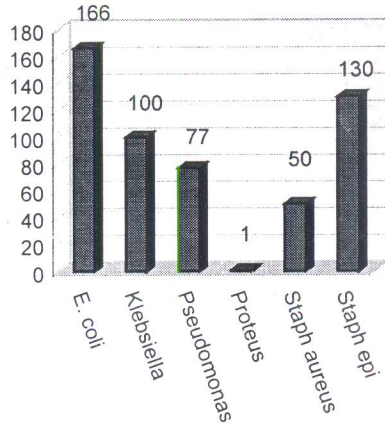
A total of 1900 blood samples were taken over a period of six months. Cultures were positive in 524 samples (27.6%). Among these cultures E coli was the most common organism found i.e. 166/524 (31.67%).

Staph.Epidermidis was next 130/524 (24.80%) followed by Klebsiella 100/524 (19.08%), Pseudomonas 77/524 and Staph. Aureus 46/524.

Regarding drug susceptibility pattern, Amikacin was the most effective drug against E coli, Klebsiella and Pseudomonas. (sensitive organisms n=309) Co_Amoxi Clav was the second most effective drug (sensitive organisms n=243) followed by Ciprofloxacin, Imipenem & Vancomycin.

Trimethoprim/Sulphamethoxazole, Ampicillin and Gentamicin were least effective drugs while Cefotaxime and Ceftazidime were in between these 2 groups.

Frequency of organisms (n=524)



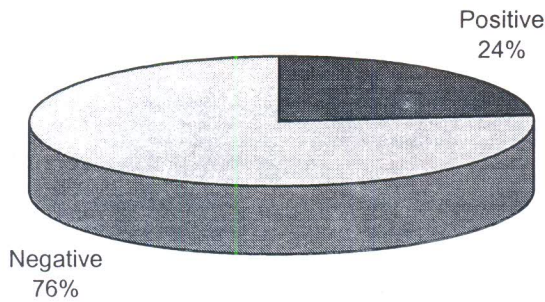
Culture Results

	Frequency	%age
No growth	1376	72.4
Positive growth	524	27.6
Total	1900	100

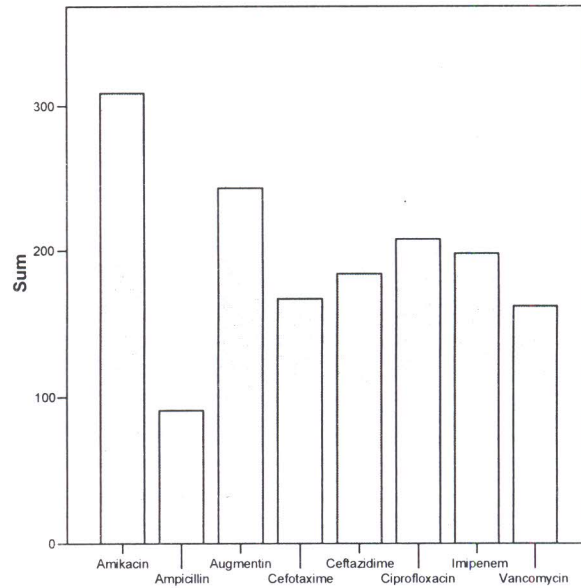
Frequency & Percentage of Organisms

Organism Name	Frequency	Percentage
E-coli	166	31.67
Klebsiella	100	19.09
Pseudomonas	77	14.69
Proteus	1	0.20
Staph. Aureus	50	9.55
Staph. Epi.	130	24.80
Total	524	100.00

Culture data



Effectiveness of antibiotics against organisms



Discussion:

In our study, culture positivity was 27.6% which is lower when compared to other studies as 43% in India¹³, 53% in USA¹⁴ and 62.8% in Pakistan.

Gram negative organisms were the major cause of sepsis. E. Coli was the most common organism isolated followed by Klebsiella.

E.Coli predominance has also been shown by others^{2, 15, 16}. However one study⁵ found Pseudomonas and other studies Klebsiella to be the most common organism for sepsis^{17, 18}. Amikacin was the most effective drug. Others have reported similar results^{10, 13, 19}.

Co_Amoxi Clav was found to be effective against Staph.Epidermidis as well as against E Coli and Klebsiella while others found Amoxil to be effective against E Coli, Klebsiella and Staph. Aureus².

Ciprofloxacin and Imipenem are effective against gram negative organisms. Similar results have been obtained in other studies^{17, 19}.

Ampicillin and Gentamicin were ineffective against Staph. Edermidis and E Coli respectively. Possible reason may be that most neonates referred to our unit have already received several antibiotics before arrival. Similar results were shown by others^{2, 11, 12}.

Conclusion:

- Gram negative organisms are the major cause of neonatal sepsis in neonatal unit of Children Hospital Lahore.
- Amikacin, CoAmoxi Clav, Ciprofloxacin and Imipenem are effective against gram negative organisms.

- Knowledge of likely causative organism and its pattern of sensitivity can aid in instituting prompt and appropriate therapy in order to minimize morbidity and mortality from neonatal sepsis.

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