STUDY TO KNOW PATHOGENS CAUSING NEONATAL SEPTICEMIA AND ITS MICROBIAL SENSITIVITY

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Abstract:
Objective: To know the most common organisms causing neonatal septicemia and its antimicrobial sensitivity in Neonatal Intensive Care Unit of People's Medical College Hospital, Nawabshah.
Study Design: A prospective descriptive study.
Place and Duration: In the Pediatrics Department of People's Medical College Hospital, Nawabshah for one year period from March 2017 to March 2018.
Methodology: Into two groups the patients were divided with septicemia in early and late onset.
Results: 328 infants from 2487 cases with an infection frequency of 13.5% had positive blood cultures. E. coli, coagulase negative staphylococci and Klebsiella are the common bacteria causing septicemia. These isolates are more sensitive to amikacin, meropenem, chloramphenicol, vancomycin, ciprofloxacin and 3rd generation cephalosporin. The greater frequency of isolated pathogens were taken with 52.9% infection rate for early-onset sepsis and for late sepsis 84.5%.
Conclusion: There is no difference in the coagulase negative staphylococcus prevalence (57.3%), Klebsiella spp, E. coli (10.4%) and septicemia (early onset sepsis and end onset). Meropenem was the most effective antibiotic for gram-negative isolates, while against Gram positive isolates vancomycin is very beneficial.
Key Words: *Newborn, Septicemia, late-onset sepsis, antimicrobial activity, early sepsis.*

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INTRODUCTION:

Neonatal septicemia is a clinical syndrome characterized by systemic symptoms and signs in the first month of life. The most common cause of mortality and morbidity worldwide in children is Neonatal sepsis, with 20% of all babies developing sepsis and 30-50% of all neonatal deaths in developing countries. In the newborn, sepsis refers to the generalized bacterial infection recorded with positive blood culture in the first month of life and in Pakistan is the fourth main cause of neonatal death with septicemia. Antibiotic age after 90%. The introduction of antibiotics, however, has fallen by 24-58%. Neonatal septicemia is a life endangering condition and requires treatment and prompt diagnosis in emergency. In developing countries The most common causes of referral to neonatal units is Neonatal sepsis. Approximately 51-89% of all neonatal mortality in the Pakistani population are caused by infections involving 23 to 60% sepsis and pneumonia, depending on infectious causes and all applications to the neonatal unit. The pattern of organisms that cause neonatal sepsis changes with passage of time and probably changes from one region to another due to life style modification. In 1960, Europe and America the most common causes of neonatal sepsis are Gram-negative microorganisms when coagulase negative staphylococci when they passed into group B streptococci in the 1970s. Years, eighty and ninety. In many developing countries, sepsis most commonly caused by gram-negative organisms of early onset neonatal sepsis. The most frequently isolated microorganisms, Enterococcus, Staphylococcus aureus and coagulase-negative staphylococci containing other organisms in hospitalized patients are positive for blood cultures. Today, especially in Asia and other countries, gram-negative organisms and sepsis are reported. Bacteria travels through the bloodstream and the infection can spread to other organs such as the lungs, liver, intestines, joints and kidneys. The problem of resistance to bacterial antibiotics occurred when the first antibiotic was available for clinical use. Over the past two decades, antibiotics have developed numerous drug resistance. The classification of neonatal septicemia is useful because it makes it easy to take into account the common causality principles, treatment and presentation. Two septicemia patterns described in early-onset EOS (EOS) and late-onset EOS (LOS) in the first month of life. The infection occurring within the first 2days of life is usually labeled as early onset infection although it is between 24 hours and 1 week. This category of infection is usually caused by mother or microorganisms derived from prenatal delivery. Generally, early membrane rupture is associated with obstetric complications such as chorioamnionitis, perinatal maternal fever and premature labor. Most affected babies have early or low birth weight, and through the birth canal pathogens are usually transferred.

MATERIALS AND METHODS:

This prospective descriptive study was conducted in the Peadtrics Department of People's Medical College Hospital, Nawabshah for one year period from March 2017 to March 2018. 2487 samples newborn blood samples were collected in the NICU within 28 days and clinical diagnosis of septicemia was made. Each aseptic measure of blood samples was taken in blood culture and susceptibility studies were inoculated into bottles containing Trypticase Soy Broth for aerobic bacteria isolation. At 37 ° C the blood culture are incubated and sub cultured on a solid medium (blood agar and chocolate agar MacConckey) for 24 hours and after 48 hours. The isolates were determined by conventional biochemical methods and Gram staining. Antibiotic susceptibility testing: Pathogens were analyzed and isolated for antibiotic susceptibility testing. The procedure used is mainly the disk diffusion method, which depends on minimum inhibitory concentration and the measurement of inhibition regions are made. Vaccine Muller was implanted in the Hinton medium, calibrated the pathogen at a standard concentration of 0.5 McFarland, and antibiotic discs were placed on the plates surface. The resistant was measured at 37 ° C after incubation for 24 hours. Each newborn included clinical information, newborn name, body weight, acceptance date, pregnancy, type of delivery, gender, age, acceptance clinical diagnosis , hospital stay, pathogens and antibiotic susceptibility.

RESULTS:

Three hundred and twenty-eight newborns were found to be positive with a 13.2% contamination rate in the presence of bacteria in the blood culture. Early and late-onset sepsis, pathogens was 81.2%, respectively, 47.2% (102) and 52.8 (114%) (91) and respectively. All septic patients pathogenic organisms were isolated The total number of isolated pathogenic microorganisms is twenty-one species, these include various types of isolated pathogens and include: (31.4%), Gram negative, (0.3%) Candida spp and (68.3%) Gram positive. Table I.

Table-I: Frequency of isolated pathogenic organisms from neonatal septicemia

Organisms	Frequency	%
Coag. Neg. Staph.	188	57.3
E. coli	34	10.4
Klebsiell spp.	26	8.0
Pseudomonas aeruginosa	19	5.8
Streptococcus viridance	11	3.4
S. aureus	9	2.7
Proteus spp.	6.0	1.8
Streptococcus pneumonia	4.0	1.2
Klebsiella pneumonia	4.0	1.2
Serratia spp.	4.0	1.2
Acinetobacter bumannii	4.0	1.2
Candida spp.	1.0	0.3
Others	18	5.5
Total	328	100

Table II shows the Gram-negative pathogens antibiotic susceptibility and its pattern for, with a significant change in the responses of different isolates. The antibiotic was more sensitive to ceftriaxone, amikacin, ciprofloxacin, chloramphenicol, gentamicin, cefuroxime, cefutaxime, ceftazidime, ampicillin, pipracelline and meropenem.

Table-II: Percentage of antibiotic sensitivity patterns against gram negative pathogens

Antibiotics	E. coli (%) No.(34)	Klebsiella spp (%)No. (26)	Pseudomonas aeruginosa (%)No. (19)	Proteus spp (%)No. (6)	Serratia spp (%)No. (4)	Acinetobacter Bumannii (%)No. (4)	Klebseilla pneumonia (%)No. (4)
Meropenem	83	73	59	68	80	71	74
Amikacine	79	71	79	83	28	44	30
Ceftriaxone	74	79	63	83	43	44	45
Chlormphenicol	74	71	47	33	2	59	55
Ciprofloxacine	69	67	73	70	76	58	70
Cefuroxime	74	68	26	67	7	41	21
Gentamycine	74	61	79	83	7	41	55
Ceftazidim	71	55	84	67	45	38	18
Cefataxime	68	71	63	67	28	44	15
Piperacillin	56	58	63	33	0	31	3
Ampicilline	21	26	16	17	1	10	30

Table III shows the pattern for Gram positive and its antibiotic susceptibility which varies significantly in response to different isolates.

Table-III: Percentage of Antibiotic Sensitivity Patterns Against Gram Positive Pathogens

Antibiotics	Coag.Neg. Staph. (%) No. (188)	StaphAureus (%)No. (9) No. (11)	Streptococcus Viridans (%) No. (4)	Streptococcus Pneumoniae(%)
Vancomycin	80	80	79	83
Chlormphenicol	76	78	91	75
Cefuroxime	76	67	73	75
Cefataxime	66	44	91	75
Ceftriaxone	66	56	82	50
Amikacine	78	89	27	50
Gentamycine	65	78	36	25
Penicilline	47	67	82	100
Ampicilline	34	44	82	75
Ceftazidim	47	22	82	75

Following antibiotic Chloramphenicol, vancomycin, Cefotaxime, cefuroxime, amikacin, ceftriaxone, penicillin, ceftazidime and gentamicin was the most sensitive.

DISCUSSION:

In our hospital, doctors offer one or two instances instead of the three that make it difficult to interpret blood cultures. The importance of coagulase-negative staphylococci in bacteremia production remains controversial. In the 1970s, coagulase-negative staphylococci were considered primarily contaminants; As the skin normal flora. Since then, various studies have reported a higher incidence of coagulase-negative staphylococcal infections. In our study, neonatal units containing 61%, Gram positive, 38%, gram negative bacilli and 0,3% fungus were reported in developing countries. In this study, gram positive organisms from neonatal septicemic cases were isolated from 68.3% isolates. In this group, coagulase-negative staphylococci and S. aureus were the first and second most common etiologic agents in the United States leading to nosocomial infections in the bloodstream. In another study, S. aureus and E. coli were the most frequently isolated infections of blood circulation, while Enterococci, Klebsiella spp. Enterobacter spp. Pseudomonas aeruginosa, streptococcal pneumonia and hemolytic streptococci were found in 10 of the 10 most reported species in the USA. U. And Canada. As in Canada. The main pathogens causing sepsis were not antimicrobial resistance, ampicillin-resistant S. aureus and coagulase-negative. In 18% of Streptococcus infected patients ampicillin resistance was noted and for Streptococcus aureus pneumonia 25% of cases have resistance. For Gram positive organisms Vancomycin was the most effective. Coagulase, S. aureus, 80%, Streptococcus virulence, 79% and 83% negative

isolates showed that Streptococcus pneumonea was susceptible. The most effective drug for gram-negative bacteria was ceftriaxone, amikacin, ciprofloxacin and chloramphenicol followed by meropenem. For most organisms, penicillin and aminoglycosides were effective. We continue to use these agents in the first empirical treatment of septicemic newborns in our hospitals. WHO also recommended the ampicillin or penicillin use plus aminoglycosides for infants younger than two months.

CONCLUSION:

This study reveals the difference between two septicemias in hospitals (early and late-onset sepsis) with Klebsiella spp (57.3%), E. coli (10.04%), and negative staphylococcal prevalence 57.3%, (8.0%) and others (24.3%). For gram negative isolates meropenem was the most effective treatment, while vancomycin was the most effective against gram positive isolates.

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