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Infection and Tropical Disease

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Profiles and antibiogram of blood microbial isolates in neonatal ward Soetomo Hospital

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Abstract

Background In developing countries, bacterial sepsis is among the leading factors for neonatal morbidity and mortality. Results of bacterial isolation from blood specimens underline the importance of antibiotic resistance surveillance as well as periodic studies of the microbial spectrum and its resistance pattern in order to design a specific empirical antibiotic regimen at the neonatal ward. Objective To determine profile and antibiogram of blood microbial isolates in the neonatal ward Dr. Soetomo Hospital during 2012 Methods Data were collected from all patients in the neonatal ward from January until December 2012.

Results There were 329 blood culture results in the neonatal ward, among which 63 (19.1%) were gram positive bacteria, 254 (77.2%) gram negative, and 12 (3%) fungi. The most frequently identified species were Burkholderia cepacea 77 (23.4%), Pseudomonas Spp 47 (14.3%), Serratia marsescens 39 (1.9%), Staphylococcus coagulase negative 30 (9.1%), and Klebsiella pneumonia ESBL + 26 (7.9%). Based on sensitivity test result most of the gram positive bacteria were resistant to clindamycin 41 (65.1%), trimetroprim-sulfametoxazole 33 (52.4%), ampicillin 32 (50.8%), ampicillin-sulbactam 9 (14.3%) and azithromycin 9 (14.3%). Resistance to ampicillin-sulbactam 224 (88.2%), ampicillin 178 (70.1%), gentamycin 154 (60.6%), amikacin 134 (52.8%), trimetroprim-sulfametoxazole 52 (20.5%), and meropenem 20 (7.9%) were encountered for the gram negative bacteria

Conclusions Burkholderia cepacea is the most frequently identified bacteria in the blood culture. Most of the gram positive bacteria are resistant to clindamycin, trimetroprim-sulfametoxazole, ampicillin, ampicillin-sulbactam, and azithromycin, while gram negative bacteria showed resistance to ampicillin-sulbactam, ampicillin, gentamycin, amikacin, trimetroprim-sulfametoxazole, and meropenem

Keywords: antibiogram, gram negative, neonatal

INF-PP-2-2-062

Profiles and antibiogram pattern of blood microbial isolates in pediatric ward Soetomo Hospital

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Abstract

Background Bacteraemia is the presence of bacteria in the blood. Bacteriologic culture to isolate the offending pathogen and knowledge about sensitivity pattern of the isolates remains the main stay of definitive diagnosis and management of bloodstream infection (BSI). Antimicrobial susceptibility patterns should guide the choice of empiric antimicrobial regimens for patients with bacteremia.

Objective To determine profile and antibiogram pattern of microbial isolates from blood cultures in pediatric ward in Soetomo Hospital during 2012

Methods Data were collected from blood culture results of all patients in pediatric ward since January until December 2012. Results There were 503 blood culture results in the pediatric ward, among which 301 (59.8%) were gram-positive, 189 (37.5%) gramnegative, and 13(2%) fungi. The most frequently identified species were Staphylococcus coagulase negative 123(24.5%), Staphylococcus haemolitycus 47(9.3%), Burcholderia cepacea 40(8%), Staphylococcus saprophyticus 35(7%), and Staphylococcus aureus 30(6%). As far as antimicrobial sensitivity was concerned most of the gram positive bacteria was resistant to ampicillin 191(63.5%). clindamycin 141(46.8%), trimethropim-sulfametoxazole 139(46.2%), azittomycin 52(17.3%) and ampicillin-sulbactam 15(5.0%). The gram negative bacteria were resistant to ampicillin-sulbactam 126(66.7%), ampicillin 120(63.5%), gentamycin 109(57.7%), amikacin 74(39.2%), and trimethropimsulfametoxazole 74(39.2%).

Conclusion Staphylococcus coagulase negative was the most frequently encountered bacteria in the blood culture. Most of the gram-positive bacteria was resistant to ampicillin, clindamycin, trimethropim-sulfametoxazole, acitromycin, and ampicillin-sulbactam. The gram negative bacteria were resistant to ampicillin-sulbactam, ampicillin, gentamycin, amikacin, and trimethropim-sulfametoxazole.

Keywords: Antibiogram, pediatries, gram positive

PROFILE AND ANTIBIOGRAM OF BLOOD MICROBIAL ISOLATES IN NEONATAL WARDSOETOMO HOSPITAL

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Abstract

Background:In developing countries, bacterial sepsis is among the leading factors for neonatal morbidity and mortality. Results of bacterial isolation from blood specimens underline the importance of antibiotic resistance surveillance as well as periodic studies of the microbial spectrum and its resistance pattern in order to design a specific empirical antibiotic regimen at the neonatal ward. Objective: To determine profile and antibiogram of blood microbial isolates in the neonatal ward

Dr. Soetomo Hospital during 2012

Methods: Data were collected from all patients in the neonatal ward from January until December 2012.

Results: There were 329 blood culture results in the neonatal ward, among which 63(19.1%) were gram positive bacteria, 254(77.2%) gram negative, and 12(3%) fungi. The most frequently identified species were Burkholderia cepacea 77(23.4%), Pseudomonas Spp 47(14.3%), Serratia marsescens 39(1.9%), Staphylococcus coagulase negative 30(9.1%), and Klebsiella pneumonia ESBL+ 26(7.9%). Based on sensitivity test result most of the gram positive bacteria were resistant to clindamycin 41(65.1%), trimetroprim-sulfametoxazole 33(52.4%), ampicillin 32(50.8%), ampicillin-sulbactam 9(14.3%) and azithromycin 9(14.3%). Resistance to ampicillin-sulbactam 224(88.2%), ampicillin 178(70,1%), gentamycin 154(60.6%), amikacin 134(52.8%), trimetroprim-sulfametoxazole 52(20.5%), and meropenem 20(7.9%) were encountered for the gram negative bacteria

Conclusion:Burkholderia cepacea was the most frequently identified bacteria in the blood culture. Most of the gram positive bacteria were resistant to clindamycin, trimetroprim-sulfametoxazole, ampicillin, ampicillin-sulbactam, and azithromycin, while gram negative bacteria showed resistance to ampicillin-sulbactam, ampicillin, gentamycin, amikacin, trimetroprim-sulfametoxazole, meropenem.

Keywords: antibiogram, gram negative, neonatal

Introduction

Neonatal sepsis is one of the major causes of neonatal morbidity and mortality, particularly in developing countries. It is characterised by bacteraemia and clinical symptoms caused by micro-organisms and their toxic products.1 Bacteraemia, is the presence of bacteria in the blood, an episode of the presence of bacterial colonization of the blood circulation is usually not a lifethreatening condition. This is because several physiological conditions give rise to transient bacteraemia without any obvious clinical sequelae.2,3 Individuals with bacteraemia may develop septicaemia, a life - threatening condition in which multiplying bacteria release toxins into the bloodstream and trigger the release of cytokines, causing fever, chills, malaise and lethargy, with difficulty in breathing especially in children.3,4 This makes septicaemia arising from various causes; a disease of serious clinical importance, and the diagnosis of other non-septicaemic bacterial ailments by recovering such bacteria from blood make blood cultures very useful tools for diagnosing several bacterial infections. Bacteriological culture to isolate the offending pathogen and knowledge about sensitivity pattern of the isolates remains the main stay of definitive diagnosis and management of BSI.3

Bloodstream Infections (BSIs) are a major cause of morbidity and mortality worldwide. Bloodstream infections cause significant morbidity and mortality worldwide and are among the most common healthcare-associated infections. ⁵⁻¹⁰ It is estimated that 2 million patients per year in the United States acquire infections while in hospitals, approximately 350,000 (10–20%) of these infections involve the bloodstream, and 90,000 (4.5%) are fatal. ^{5,9,10}

Early initiation of appropriate antimicrobial treatment is critical in decreasing morbidity and mortality among patients with bloodstream infections. 10,11 The present retrospective analysis was carried out to determine profile and antibiogram of blood microbial isolates in the neonatal ward in Soetomo hospital and to get an updated knowledge about their antibiotic susceptibility pattern. This may help clinicians in selecting the appropriate antibiotics for empirical therapy until the results of culture / sensitivity are known.

Materials and methods

Present study was based on retrospective analysis of data about blood culture results, of specimens submitted for culture to Microbiology Laboratory of

Soetomo Hospital, Surabaya. Three hundred twenty nine blood culture bottles containing appropriate amount of blood received from the patients admitted to neonatal ward Soetomo Hospital, Surabaya; during the period January – December 2012.

Results

There were 329 blood culture results in neonatal ward, among which 63(19.1%) were gram-positive bacteria, 254(77.2%) gram-negative, and 12(3%) fungi. The most frequently identified species were Burkholderia cepacea 77(23.4%), Pseudomonas Spp 47(14.3%), Serratia marsescens 39(1.9%), Staphylococcus coagulase negative 30(9.1%), and Klebsiella pneumonia ESBL+ 26(7.9%).(Table 1) Based on sensitivity result most of the gram positive bacteria was resistant to Clindamycin 41(65.1%), Trimetroprim-sulfametoxazole 33(52.4%), Ampicillin 32(50.8%), Ampicillin-sulbactam 9(14.3%) and Azithromycin 9(14.3%). While the gram negative bacteria was resistant to Ampicillin-Sulbactam 224(88.2%), Ampicillin 178(70,1%), Gentamycin 154(60.6%), Amikacin 134(52.8%), Trimetroprim-sulfametoxazole 52(20.5%), and Meropenem 20(7.9%).

Table 1. Five microorganism most frequent in neonatal ward

Microorganism	Number	. %
burkholderia cepacea	77	
pseudomonas spp	47	23.4 14.3
serratia marcencens	39	
staphylococcus coagulase negatif	30	11.9
Klebsiella Pneumonia esbl +	26	9.1
Total		7.9
	219	66.6

Table 2: Levels of resistance of various bacteria to commonly used antibiotics

	Causative bacteria (%)						
antibiotics	burkholderia cepacea	pseudomonas spp	serratia marcencens	staphylococcus coagulase negatif	Pneumonia		
Amikasin	76	39	0	0	esbl+		
Amoxicilin	0	0	0	0	24		
Amoxiclav	75	44	38	0	0		
Ampicilin- Subactam	67	43	39	4	24		
Azitromicin	0	0	8	C			
Astreonam	1	32	4	0	8		
Cefotaxim	0	33	0	0	24		
Ceftazidim	10	2	5	0	24		
Ciprofloxacin	68	0	0	0	23		
Clyndamicin	10	1		3	4		
Gentamicin	74	37	0	22	0		
Cloramphenicol	4	4	1	23	17		
Linezolid	0	0	1	9	8		
Piperacillin-	1		0	1	0		
tazobactam	'	0	0	4	6		
Tobramycin	66	9	1	2	_		
Trimetropim- sulfametoxazole	3	16	1	14	7 17		
Vancomycin	0	0	0	0			
Meropenem	1	3	1		0		
Ampicillin	76		38		3		
	3		30	9	20		

Discussion

Gram negative bacteria was identified in present study as the most common blood culture isolates from hospitalized patients in neonates than gram positive. These results are consistent with previous studies.

1.10,12 But there were different bacteria from some previous studies. In this study the most common organism was Burkholderia cepacea. In previous studies, the predominant pathogen was Escherechia colli in India 13 and also in Pakistan 1, while Klebsiella pneumoniae in Yemen 12. In Indonesia, the previous study also found gram negative as the most common blood culture result but there were different type in different place, such as Enterobacter in Surakarta 14, Acinetobacter calcoaceticus in Jakarta 15 and Serratia marcescens in Bali 16.

Besides gram negative, also found gram positive as result from bacterial isolates in neonatal ward. The most common pathogen in this study was Staphylococcus coagulase negatif, while previous study reported Staphylococcus aureus as the major pathogen gram positive isolates.³

Bacterial resistance to commonly used antibiotics such as ampicillin and ampicillin-sulbactam as empiric therapy was found quite high in case of gram negative and gram positive. In previous study, Gram- positive and negative bacteria have demonstrated high resistance against 3rd generation cephalosporins, cefotaxime and ceftriaxone were found to be resistant in 63.1% and 66.9% of cases respectively, whereas ceftazidime was resistant in 56.9% of the cases. In this study, based on sensitivity result most of the gram negative bacteria was resistant to Ampicillin-Sulbactam 224(88.2%), Ampicillin 178(70,1%), Gentamycin 154(60.6%), Amikacin 134(52.8%), Trimetroprim-sulfametoxazole 52(20.5%), and Meropenem 20(7.9%). While the gram positive bacteria was resistant to Clindamycin 41(65.1%), Trimetroprim-sulfametoxazole 33(52.4%), Ampicillin 32(50.8%), Ampicillin-sulbactam 9(14.3%) and Azithromycin 9(14.3%).

It is important for clinician to be updated with current data concerning the efficacy of commonly prescribed agents, and selection of anti-microbial to be used for empiric therapy based on rate of susceptibility and site of infection.

In Conclusion a regular epidemiological study of blood culture isolates and determination of susceptibility to antibiotics are necessary to improve empirical therapy.

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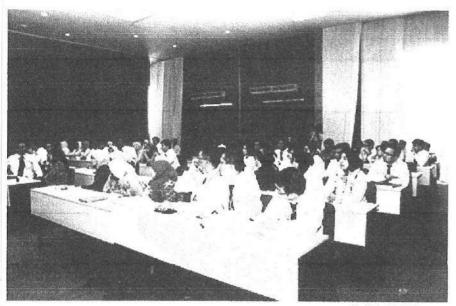
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