ANALYSIS OF ANTIBIOTIC USAGE IN PATIENTS WITH BACTEREMIA IN THE ICU UNIT OF DR. SOETOMO HOSPITAL SURABAYA

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ABSTRAK

Bakteremia merupakan infeksi nosokomial yang paling sering ditemukan di ICU. Adanya bakteri hidup dalam darah sangat penting secara klinis. Salah satu pendekatan yang dapat dilakukan untuk mengendalikan penggunaan antibiotik adalah dengan menyesuaikan terapi dengan pola bakteri dan sensitivitas antibiotik. Evaluasi penggunaan antibiotik dapat dilakukan dengan metode kualitatif menggunakan instrumen algoritma Gyssens, untuk mengevaluasi dan menjamin penggunaan antibiotik yang rasional, yaitu tepat indikasi, tepat penderita, tepat obat, tepat dosis regimentasi dan waspada terhadap efek samping obat obat. Penelitian ini bertujuan menganalisis penggunaan terapi antibiotik pada pasien dengan bakteremia di unit ICU RSUD Dr. Soetomo. Penelitian ini merupakan studi analisis deskriptif non-eksperimental (obsevasional) cohort dengan melakukan analisis penggunaan antibiotik pada pasien bakteremia di unit ICU RSUD Dr. Soetomo. Analisis penggunaan antibiotik dilakukan dengan mengidentifikasi pola bakteri penyebab bakteremia dan sensitivitas terhadap antibiotik, serta menyusun suatu antibiogram, sebagai dasar penilaian pemilihan antibiotik empirik, serta melakukan analisis kualitas penggunaan antibiotik definitif berdasarkan metode Gyssens. Antibiotika empirik yang paling banyak digunakan adalah Meropenem dan Sefoperazon Sulbaktam. Dari 22 pasien, hanya 11 pasien yang mendapat antibiotika definitif. Hasil evaluasi penggunaan antibiotika definitif menggunakan metode Gyssens, bahwa kategori 0 (penggunaan antibiotika tepat/rasional) pada 3 (27%) penderita, kategori II (tidak tepat dosis/interval/rute) pada 3 pasien (27%), dan kategori IV (ada antibiotik lain yang lebih sempit spektrumnya/lebih murah/kurang toksik/lebih efektif) pada 5 (45%) penderita. Pemilihan antibiotika empirik di ICU, Meropenem dan Sefoperazon Sulbaktam, telah sesuai dengan pola kuman dan sensitivitas antibiotika. Pada 11 pasien yang mendapat terapi definitif, berdasarkan kategori Gyssens, masih terdapat penggunaan antibiotika yang tidak tepat. ***(FMI 2014;50:254-261)***

Kata kunci: *ICU, bakteremia, antibiotik, evaluasi kualitatif, kategori Gyssens*

ABSTRACT

Bacteremia is one of major nosocomial infection happen in intensive care unit (ICU). It will increase patient's hospitalization rate and mortality. Inappropriate usage of antibiotic also can increase morbidity, mortality, cost and antibiotic resistance. The qualitative evaluation about the appropriateness of the choice, dosage and the duration of antibiotic therapy will be assessed using Gyssen's category. This study is to identified the pattern of bacterial causing bacteremia and their sensitivity to antibiotics, and to analyze antibiotic usage at Intensive Care Unit at Dr. Soetomo Teaching Hospital with qualitative method using Gyssens's category. This is a descriptive observational cohort, prospective study. Patients who have positive blood culture during observation in ICU, were evaluated from January-March 2013. From May-November 2012 period, retrospectively, the most frequently isolated microorganism was negative-gram bacteria, mostly Acinetobacter followed by gram-positive bacteria, mostly CoNS-Staphylodcoccus coagulase negative. Twenty two patients, with positive blood culture were analyzed prospectively from January-March 2013. The major empirical antibiotic treatment used in ICU were sefoperazon sulbactam and meropenem. The antibiotic usage qualitative evaluation using Gyssens's category, on eleven patients receiving definitive therapy, shows that 45% considered definitely appropriate; 27% were inappropriate regarding choice; 27% were inappropriate regarding dosage or duration. The empirical antibiotics used in ICU, meropenem and cefoperazone sulbactam, is already adequate according to the sensitivity pattern. The antibiotic usage qualitative evaluation using Gyssens's category, on eleven patients receiving definitive therapy, still shows inappropriateness regarding choice, dosage, or duration. ***(FMI 2014;50:254-261)***

Keywords: *ICU, Bacteremia, Antibiotics, Qualitative evaluation, Gyssens category*

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INTRODUCTION

Nosocomial infection is a condition that not found or not in the incubation period of the infection at the time of admission, then the development of infection appears 48-72 hours after hospital admission. Nosocomial infection patients in intensive care unit (ICU) were approximately 8%-15% of hospital patient population,

higher than the non-critical care patients. The severity of the disease, invasive diagnostic and therapeutic procedures, contaminates life support equipment, and the prevalence of resistant bacteria is an important factor in the high rate of infection in the ICU. Bacteremia is one of major nosocomial infection happen in intensive care unit (ICU). Nosocomial bacteremia was defined as the condition of patients with positive blood cultures of bacteria that obtained after hospital admission or are directly linked to the invasive hospital (Valles et al 2005). The presence of viable bacteria in the blood is clinically very important, as an indicator of infection, generally showed worse prognosis than localized disease, and significantly associated with mortality (Valles et al 2005, Pien et al 2010). The Usage of appropriate antibiotic regimen in early, has a positive effect on patient outcomes (Osih et al 2007). The usage of antibiotics that delayed, inappropriate, and ineffective in microbiology, increase length of hospitalization, costs, and mortality, (Corona et al 2010, Kang et al 2003, Peralta et al 2007, Kumar et al 2009). Inappropriate use of antibiotics in the hospital services facilitate the acceleration of microbes resistance, among others, the development of strains of methicillin-resistant aureus aureus (MRSA), Vancomycin-resistant Enteroccocus (VRE), and gram-negative bacteria producing Extended-Spectrum Beta Lactamase (ESBL). This phenomenon can be reduced with the use of appropriately antibiotics that accordance with guidelines integrated infection control program.

One approach that can be done to control the use of antibiotic therapy is to adjust the pattern of bacteria and antibiotic sensitivity. The results of the sensitivity of bacteria to antibiotics are summarized in tabular form called antibiogram. Antibiogram change based on the time and extent of the use of antibiotics, thus antibiogram forming should be done routinely and regularly. Evaluation of the antibiotics usage can be done by using a qualitative method algorithm Gyssens instrument, to evaluate and ensure the rational use of antibiotics, about the right indication, right patient, right drug, right dose regimentation and wary of the side effects of medicinal drugs. Gyssens qualitative evaluation criteria have been used widely in various countries to evaluate the use of antibiotics (AMRIN 2005, Hadi et al 2008).

MATERIALS AND METHODS

This study is a descriptive analysis non-experimental study (observational) cohort to identify the bacteria that cause of bacteremia and its sensitivity to antibiotics, and analyze antibiotics usage quality based Gyssens method in patients with bacteremia at ICU unit of Dr. Soetomo. The inclusion criteria in this study were patients with positive blood cultures of bacteria during hospitalization in intensive care units, and sampling was conducted microbiological culture and antibiotic sensitivity observations during the study.

Identification of Bacteria's patterns causing bacteremia and sensitivity to antibiotics, antibiogram production, as the basis for empirical antibiotic suitability have done retrospectively of culture results data on May-November 2012. Analysis of the antibiotics usage with Gyssens method determined based time limited sampling during January to March 2013.

RESULTS

Identifying bacteria patterns that causing bacteremia and sensitivity to antibiotics in patients with bacteremia in intensive care units in Dr. Soetomo hospital from May to November 2012, 128 isolates obtained from the blood of 57 patients. Of the 128 blood isolates obtained 78 isolates of gram-negative bacteria (60. 94%) and 50 isolates of gram-positive bacteria (39. 06%). Most of the gram-negative bacteria was *Acinetobacter baumannii* (15 isolates), while from gram-positive bacteria was Coagulase negative Staphylococci (35 isolates).

The result of the sensitivity of bacteria to antibiotics is summarized in the form of antibiogram. Antibiogram shows the total number of bacterial isolates were tested against a variety of antibiotics, and show the percentage of sensitivity or resistance on any antibiotics tested (CDC 2003). The most potential antibiotics against bacteria determined from the percentage of sensitivity at any of the tested antibiotics. The percentage of the potential < 30%, it's not recommended; 30-60%, limited usage; > 60%, recommended its use. An obtained antibiotic that still has good potential (> 60%) of the bacteria Cons include chloramphenicol, Doxycycline, Quinupristin-dalfopristin, Vancomycin, and Linezolid. While for *Acinetobacter baumannii*, there are no antibiotics that have good potential (> 60%).

Patients with bacteremia during hospitalization in the intensive care unit of Dr. Soetomo Hospital Surabaya from January to March, 2013, the results of micro-biological culture sampling obtained a total of 22 patients, with 35 blood isolates.

Table 1. The type of bacteria causing bacteremia in the ICU Dr. Soetomo Hospital periods May-November 2012

Pathogens	Number of Isolate	Percentage (%)
Gram-Positive		
Coagulase negative staphylococci (CoNS)	35	27.34
- *Staphylococcus haemolyticus* (7)		
- *Staphylococcus coagulase negative* (13)		
- *Staphylococcus saprophyticus* (12)		
- *Staphylococcus hominis* (1)		
- *Staphylococcus capitis* (1)		
- *Staphylococcus equorum* (1)		
Staphylococcus aureus	7	5.47
- *Staphylococcus aureus* (2)		
- MRSA (*Methicillin-resistant Staphylococcus aureus*) (5)		
Corynebacterium spp	3	2.34
- *Corynebacterium spp* (2)		
- *Corynebacterium urealyticum* (1)		
Enterococcus spp	3	2.34
- *Enterococcus faecalis* (2)		
- *Enterococcus galinorum* (1)		
Streptococcus non haemolyticus	1	0.78
Streptococcus pneumonia	1	0.78
Gram-Negative		
Acinetobacter baumanii	15	11.72
Burkholderia cepacia	15	11.72
Klebsiella pneumonia	10	7.81
- *Klebsiella pneumonia* (1)		
- *Klebsiella pneumonia ESBL+* (9)		
Enterobacter cloacae	9	7.03
Acinetobacter spp	7	5.47
- *Acinetobacter spp* (4)		
- *Acinetobacter baumanii calcoaticus complex* (3)		
Pseudomonas spp	5	3.91
Enterobacter aerogenes	4	3.12
Pseudomonas aeruginosa	3	2.34
Eschericia coli	2	1.56
- *Eschericia coli* (1)		
- *Eschericia coli ESBL+* (1)		
Raoutella omithinolytica	2	1.56
Stenotropomonas maltophilia	2	1.56
Salmonella spp	2	1.56
Klebsiella oxytoca	1	0.78
Eikenella corrodens	1	0.78
Total Isolates	128	100

Table 2. Antibiotics potentials against gram-positive that most causes bacteremia in ICU Dr. Soetomo Hospital in May-November 2012

% Antimicrobial potency	Gram-Positive Organisms			
	CoNS (N = 35)	SAu (N = 7)	CorynSpp (N = 3)	Ent (N = 3)
< 30%	Oxacillin Penicillin Levofloxacin Clindamycin Erythromycin Azithromycin Rifampicin	Cefoxitin Oxacillin Penicillin Levofloxacin Tetracycline Rifampicin	Oxacillin Penicillin Levofloxacin Tetracycline Clindamycin Azithromycin	Gentamicin Quinupristin-Dalfopristin Vancomycin
30 – 60%	Gentamicin Cotrimoxazole Moxifloxacin Tetracycline	Cotrimoxazole Moxifloxacin Erythromycin Quinupristin-Dalfopristin	Erythromycin	
>60%	Doxycycline (66,67%) Quinupristin-Dalfopristin (72,22%) Vancomycin (100%) Linezolid (100%)	Gentamicin (85,71%) Minocycline (100%) Clindamycin (71,43%) Vancomycin (100%) Linezolid (100%)	Cefotaxime (100%) Ampicillin (100%) Amikacin (100%) Gentamicin (66,67%) Doxycycline (100%)	Penicillin (66,67%) Ampicillin (100%)

	Chloramphenicol (63,64%)	Chloramphenicol 71,43%)	Vancomycin (100%) Fosfomycin (100%) Chloramphenicol (100%)

Table 3. Antibiotics potentials against gram-negative that most causes bacteremia in ICU Dr. Soetomo Hospital in May-November 2012

% Antimicrobial Potency	Gram-Negative Organisms				
	KPneu (N=10)	ABau (N=15)	ASpp (N=7)	ECloa (N=9)	BurCep (N=15)
< 30%	Cephalothin Cefuroxime Ceftazidime Cefotaxime Ceftriaxone Aztreonam Ampicillin Amox-clavu Ampi-sulbac Tobramycin Gentamicin Cotrimoxazole Ciprofloxacin	Ceftazidime Cefotaxime Ceftriaxone Cefepime Aztreonam Ticar-clavu Pipe-tazo Imipenem Amikacin Gentamicin Ciprofloxacin Levofloxacin	Ceftazidime Cefotaxime Ceftriaxone Cefepime Ticar-clavu Pipe-tazo Amikacin Tobramycin Gentamicin Cotrimoxazole Ciprofloxacin Levofloxacin Doxycycline	Cephalothin Cefoxitin Cefuroxime Ceftazidime Cefotaxime Aztreonam Ampicillin Amox-clavu Ampi-sulbac Ticar-clavu Tobramycin Gentamicin Ciprofloxacin	Ticar-clavu
30 – 60%	Levofloxacin	Ampi-sulbac (50%) Meropenem (42,86%) Tobramycin (46,67%) Cotrimoxazole (33,33%)	Ampi-sulbac Imipenem Meropenem	Levofloxacin	
>60%	Pipe-tazo (80%) Cefo-sulbac (80%) Meropenem (100%) Amikacin (70%) Chloramphenicol (88,89%)		Minocycline (100%)	Pipe-tazo (75%) Imipenem (100%) Meropenem (100%) Amikacin (100%) Cotrimoxazole (66,67%)	Ceftazidime (100%) Meropenem (100%) Cotrimoxazole (100%) Levofloxacin (70%) Chloramphenicol (83,33%)

Tabel 4. Profil of patient with bacteremia in ICU of Dr. Soetomo Hospital Surabaya on Januari-Maret 2013 periods

Characteristics	Number of Patient	Percentage (%)
Gender		
• Male	10	45
• Female	12	55
Age		
• 0 – 8 years	7	32
• 25 – 40 years	4	18
• 41 – 55 years	7	32
• > 55 years	4	18
Diagnosis		
• Surgery	6	27
• Trauma	2	9
• Interna	6	27
• Nerve	6	27
• Heart	1	4
• Obsgyn	1	4

Tabel 5. Final condition of patient treatment with bacteremia in ICU of Dr. Soetomo Hospital Surabaya on Januari-Maret 2013 periods

Final Condition	Amount	Persentase (%)
Dead	11	50
Move to other room	9	41
Stay in ICU	1	4
Enforcement return	1	4

Of the 22 patients with bacteremia obtained 35 blood isolates, the 21 isolates were gram-negative bacteria and 14 isolates were gram-positive bacteria. Most of the gram negative bacteria was *Acinetobacter baumannii* calcoaticus complex (5 isolates), while the most gram positive bacteria was Coagulase negative Staphylo-coccie (9 isolates). When viewed concordance between the results of blood culture with other cultures in

patients with bacteremia in the ICU unit of Dr. Soetomo hospital from January to March, 2013, found 16 patients with primary bacteremia, 4 patients with secondary bacteremia, and 2 patients with primary and secondary bacteremia. Then the number of bacteria found in the incidence of bacteremia, obtained 18 patients with monobacterial, and 4 patients with polybacterial.

Of the 22 patients, there were 15 patients who received empiric antibiotics during treatment in intensive care units of Dr. Soetomo hospital Surabaya. The duration empirical antibiotic therapy was divided into two, ≤ 5 days and > 5 days (extended empirical). The most commonly used antibiotics were Sefoperaon sulbactam and Meropenem, with duration of empiric antibiotic therapy approximately 2-12 days.

DISCUSSION

At the previous report of pattern of bacteria causing bacteremia, during the month of January to October 2011 in the intensive care unit of Dr. Soetomo hospital, they are group of Staphylococcus and Klebsiella pneumonia, group of Candida, Pseudomonas, Acinetobacter, Enterobacter, E. coli, and Streptococcus. In comparison, there were similar patterns of bacteria causing bacteremia in intensive care units of Dr. Soetomo hospital Surabaya in 2011 and 2012.

Antibiogram can assist in determining the appropriate antibiotics early. Antibiogram change based on the time and extent of the use of antibiotics, thus making of antibiogram should be performed routinely and regularly. Antibiogram in this study are based on patterns of bacteria and sensitivity to antibiotics in the period May-November 2012. From the table of antibiogram obtained most potential antibiotic against bacteria, these results can be used as a basis for determining the empirical antibiotics.

The enzyme beta-lactamase has been produced by *Escherichia coli*, *Klebsiella pneumoniae*, *Klebsiella oxytoca* and *Proteus mirabilis*. Microbial properties of beta-lactamase-producing enzymes were found, *Escherichia coli* and *Klebsiella pneumoniae*, infection-causing microbes in intra-abdominal, urinary tract infections, and nosocomial pneumonia. *Escherichia coli* were commensal bacteria in the human colon. *Klebsiella pneumoniae* was a microbial pathogen, commonly found in the ICU and surgical patients taking especially nasogastric tube, elderly, immunocompromised, patients with chronic lung disease and postoperative patients in the surgical ward. The use of antibiotics causes microbes trying to defend themselves, to replicate produce resistant offspring and become resistant to antibiotics.

Previous studies, AMRIN (2005) Dr. Soetomo Hospital, DALIN (2010) in the Internal Medicine ward Dr. Soetomo Hospital and a hospital in North Carolina, USA in 2005-2008, has shown a trend of increasing incidence of ESBL infection by microbes *Escherichia coli* and *Klebsiella pneumoniae*. MDR Acinetobacter was one of the major bacterial pathogens that plague in the world (Gaynes & Edwards 2005). *Acinetobacter baumannii* bacteria commonly found as a cause of nosocomial urinary tract infections, surgical site infections, vascular infections, ventilator-associated pneumonia (VAP) and meningitis, especially in patients who were immunocompromised in ICU (Pollack 2010, Hidron et al 2008). Study in Indonesia found Acinetobacter as one gram-negative bacterium most commonly infects the amount of 25.8% (Moehario et al 2009). The mortality rate increased from 26% to 68% in patients infected with MDR Acinetobacter (Maragakis & Perl 2008). Prevalence higher mortality was also found in patients with colonization *A. baumannii* than controls without colonization *A. baumannii* (Falagas et al 2006).

The emergence of Acinetobacter resistance to carbapenem provide considerable problem in the health world because carbapenem currently the first-line therapy for patients infected with Acinetobacter in hospitals. Carbapenem (primarily imipenem and meropenem) were the main antibiotics used to treat patients infected by Acimetobacter, thus causing these bacteria resistance to carbapenem. According to the Centers for Disease Control and Prevention (CDC), A. baumanii against carbapenem resistance increased from 9% in 1995 to 40% in 2004 (Kraniotaki et al 2006). This resistance was due to a gene of oxacillin-hydrolyzing beta-lactamase-(OXA). Bacteremia caused by Acinetobacter infection associated with morbidity and mortality. Mortality caused by infection with carbapenem-resistant Acinetobacter sp. by 41.4% (Suneshine et al 2007). Factors that influence the carbapenem-resistant Acinetobacter infection include the use of CVC, malignancy, use of cephalosporin group III, the use of carbapenem, APACHE II score, length of stay, intensive care and cross-transmission.

When viewed concordance between the results of blood culture with other cultures in patients with bacteremia in the ICU unit of Dr. Soetomo hospital from January to March, 2013, found 16 patients with primary bacteremia, 4 patients with secondary bacteremia, and 2 patients with primary and secondary bacteremia. Primary bacteremia appears without any infection with the same bacteria at another location at the time of

blood culture, while secondary bacteremia develops from an infection with the same bacteria at another location. Then from the number of bacteria found in the incidence of bacteremia, 18 patients with monobacterial obtained and 4 patients with polybacterial. A condition of polybacterial infection was one of the factors of failure on antibiotic therapy, influence to severity of bacteremia, and the outcome of systemic infection (Hessen & Kaye 2004). The severity of bacteremia arising from varied between asymptomatic until the cause of death, with morbidity and high mortality (21-56 %), mainly because it deals with severe sepsis or septic shock (Corona et al 2010).

Empirical antibiotic therapy is therapy that election based on educated guess (based on suspicion of the source of infection and germs local terrain map), so that the selected broad-spectrum antibiotics according to the data epidemiologically (Diagnostic and Therapeutic Guidelines, or the pattern of antibiotic sensitivity map germs and local), given while awaiting inspection culture results. The results obtained from the microbiology laboratory culture for about 5 days, so it can then be given antibiotics based on the sensitivity of definitive antibiotic against germs that cause infections. If the administration of empiric antibiotics over 5 days, it was categorized as an extended empirical therapy.

Empiric antibiotics most commonly used were Meropenem and Sefoperazon sulbactam, given as empiric therapy single or in combination with other antibiotics. Based on the antibiogram period from May to November 2012, the antibiotic Meropenem has good potential (> 60%), except in *Acinetobacter spp* infections. Sefoperazon sulbactam has good potential (> 60%) of the bacteria Klebsiella pneumonia. Other antibiotics used as empiric therapy, namely Amikacin, Ampicillin sulbactam, Ceftriaxone, Cefuroxime, and Levofloxaci, had adverse potential (<60%), so it was not recommended as empiric antibiotic therapy in conditions with bacteremia.

In the empirical antibiotic therapy, duration of therapy has a range of 2-12 days. Occurs empiric therapy extended with reasons: (1) delay obtained culture examination, (2) The duration of waiting for results of culture, (3) From the results of cultures were not obtained good antibiotic sensitivity against microbes. The use of broad-spectrum empiric antibiotics were extended would increase drug-resistant bacteria and can cause a super infection. This needs to be evaluated, socialized examination procedure microbial cultures treated with antibiotics before the examination or as soon as possible in order to know the type of microbial cultures and treated definitively. Tazobaktam piperacillin and Co-trimoxazole has great potential (> 60%) and can be defined as empiric antibiotics in the ICU, but were not widely used in this study due to factors related to the availability of drugs, where piperacillin tazobaktam not included in the drug formulary list in JAMKESNAS patients (mostly patients in this study were patients Assurance), and Co-trimoxazole was not available in Indonesia in an intravenous dosage form.

Metronidazole in this study was not determined its potential against anaerobic bacteria. Based on research on anaerobic test showed that metronidazole has the potential for 99% of all anaerobic bacteria tested were resistant and have a low level compared with clinda-mycin. Some antibiotic related to the emergence of resistance during therapy use antimicrobes. Therefore, initially still sensitive isolates can become resistant after therapy usage. It occurs in 3-4 days, especially in Enterobacter, Citrobacter, and Serratia spp. with the use of third-generation cephalosporins; *Pseudomonas aeruginosa* with all classes of antibiotics, and staphylo-cocci with quinolones or vancomycin.

One method that can be used to evaluate the use of antibiotics is the Gyssens method, method of qualitative analysis through classification of antibiotic prescribing multiple categories. Six categories based on the completeness of the data samples to be processed, become an important part of beginning to advance to the next category; category five, antibiotic use not in accordance with the indication (an infection); category four, the presence of an antibiotic that was more sensitive to the culture (category IV A), less toxic (category IVB), cheaper (category IVC), and a narrower spectrum of activity (category IVC); Category three, assessment duration of antibiotic treatment was too long (category III A) or too short (category IIIB); Category two, giving the regimentation of antibiotic dose (category II A), the interval of use (category II B), and these antibiotics were not appropriate (category II C); category one, the time of administration of antibiotics, and category 0 chosen after a thorough assessment category VI-I, then prescribing antibiotics can be said to be rational.

To complete the assessment on the four categories, the assessment of antibiotic selection based on culture results, only patients who received definitive antibiotic which will be evaluated by the Gyssens method. Of the 22 patients there were 11 patients who received definitive antibiotic therapy for hospital care in the ICU unit Dr. Soetomo. A total of 8 patients died and 3 patients moved rooms without definitive received antibiotics. Definitive therapy based on blood culture results, applied in 5 patients, while other definitive therapy can be given based on the results of culture of

sputum, urine, pus, or rectal swab. Assessed with gyssens category, it was found that the category 0 (appropriate use of antibiotics/rational) in 3 patients (27%), category II (not exact dosage/interval/s) in 3 patients (27%), and category IV (no other antibiotics narrower spectrum/cheaper/less toxic/more effective) in 5 patients (45%).

Evaluation of the use of antibiotics in intensive care units using Gyssens methods, encountered some obstacles. Among the many considerations that affect the individual decision making antibiotic treatment, patients in ICU patients was critically ill condition and often with multiple disease conditions. So that the use of antibiotics using a broad spectrum most. The results of the evaluation of 5 patients were in category IV mainly because there was a narrow spectrum antibiotic. In addition, the economic aspects of the treatment in the intensive care unit were often ignored because it was a top priority in life saving services. The use of antibiotics should be controlled so as not to trigger resistance, among others, controlling the use of antibiotics appropriate antibiotic sensitivity patterns, conducted surveillance on an ongoing basis, the use of a controlled form of antibiotic prescriptions, education and promotion to the clinician, the use of hospital formulary. PPRA role, team DALIN, Pharmacy and Therapeutics Committee, Clinicians, SMF Clinical Microbiology and hospital management needs to be integrated and consistent efforts to control infections and antibiotic use in Dr. Soetomo hospital.

CONCLUSION

Based on the pattern of bacteria and antibiotic sensitivity (antibiogram) from a blood culture results of patients with bacteremia in the ICU unit of Hospital Dr. Soetomo (period May-November 2012), found that most bacteria that cause bacteremia in intensive care units of hospitals Dr. Soetomo Surabaya is a gram-negative bacteria, namely *Acinetobacter spp*. While most groups of gram-positive bacteria are CoNSS. No antibiotics with good potential (> 60%) against Acinetobacter. But for bacteria that can be recommended cons including Vancomycin and Linezolid.

In the analysis of the quality of antibiotic use in patients with bacteremia in the ICU unit of Dr. Soetomo hospital (from January to March 2013), obtained the most widely used empirical antibiotics are Sefoperazon Meropenem and Sulbactam. Based on the antibiogram of bacteria causing bacteremia in intensive care units of Dr. Soetomo Surabaya hospital from May to November 2012, the antibiotic Meropenem has good potential (> 60%), except in *Acinetobacter spp*. infections. Sefoperazon sulbactam has good potential (> 60%) of the *Klebsiella pneumoniae*e bacteria. The selection of empiric antibiotics is accordance with the pattern of bacteria and antibiotic sensitivity. While other antibiotics used as empiric therapy, namely Amikacin, Ampicillin sulbactam, Ceftriaxone, Cefuroxime, and Levofloxacin, based on antibiogram of bacteria causing bacteremia in intensive care units of Dr. Soetomo hospital Surabaya from May to November 2012, have the poor potential (< 60%), so it is not recommended as empiric antibiotic therapy in conditions with bacteremia.

The results of the evaluation of the use of antibiotics by Gyssens method, it was founded that the category 0 (the use of appropriate antibiotics/rational) in 3 (30%) patients, category II (not acurate dosage/interval/ distance) in 3 patients (30%), and category IV (there are other antibiotics that narrower spectrum/cheaper/less toxic/more effective) to 4 (40%) patients.

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