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Rationality of Antibiotic Drug Used to Medical Patient Post-Operatively in Selebe Solu Hospital Sorong City Papua Barat Province 2018

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ABSTRACT

Background: The rationality of using antibiotics is done to prevent the occurrence of resistance, effectiveness and efficiency of the use of antibiotics.
Subject Research: The aim to know rationality of antibiotic use in surgical patients at Selebe Solu Hospital in Sorong City for the period January - June 2018.
Research Method: Descriptive quantitative located in Sele Be Solu Hospital in November 2018. The population is surgical patients in April - June 2018 by observing the recipe and medical record. Data analyzed univariate using the Gyssens method.
The results of the study: Antibiotic use ratios in Sele Be Solu Hospital assessment of the accuracy of the results of prescription observations and medical records for rational categories of exactly 100% is the accuracy of the indications for antibiotics, types of antibiotics, antibiotic doses and method of administration. Inappropriate rationality was found in the condition of the patient as many as 5 people (6%), duration of use as many as 6 people (7.2%) and availability as many as 7 people (8.4%). Management of rationality on antibiotic use from data that meets the Gyssens category (0) Appropriate or rational antibiotic use is 79.5%.

Keywords: Rationality, Antibiotic, Medical Patient, Post Operative

1. INTRODUCTION

Irrational use of antibiotics will have a negative impact, one of which is the increasing incidence of bacterial resistance to antibiotics. For this reason, rational use of antibiotics is expected to have a positive impact, including reducing morbidity, mortality, economic losses and reducing the incidence of bacterial resistance to antibiotics.

Antibiotic sales in the world are estimated to be two-thirds done without prescription. The results of the study from the Antimicrobial Resistance in Indonesia (AMRIN study) from 2000 to 2004 showed that antibiotic therapy was given without indication in Sorong Hospital Selebe Solu as much as 20- 53% and prophylactic antibiotics without indications of 43-81%. The AMRIN study team also found that antibiotic prescribing occurred in surgical patients with a high prevalence of 91%. For this reason, the use of antibiotics in surgical patients requires special attention because of the absorption, distribution, metabolism and excretion of drugs including antibiotics in surgical patients different from non-surgical patients, and different organ maturation levels so that therapeutic responses or side effects can occur.

Increased prevalence of irrational use of antibiotics in various fields of Medical Sciences including Health Sciences Surgical patients are one of the causes of the emergence of resistance. Antibiotic resistance can occur because it can or is congenital. In congenital resistance, all bacterial species can be resistant to a drug before bacteria contact with the drug. Clinically resistance is a serious matter, where bacteria that have been sensitive to a drug become resistant. Cross resistance can

also occur between antibiotic drugs that have similar work.

Studies conducted in Indonesia during 1990 - 2010 regarding antibiotic resistance, resistance occurred in almost all important pathogenic bacteria. This is a negative impact of irrational use of antibiotics, the use of antibiotics with unclear indications, dosage or duration of use that is not appropriate, how to use improperly, unclear drug status, and excessive use of antibiotics. Other effects of irrational use of antibiotics can result in increased toxicity and side effects of these antibiotics, as well as increased hospital costs. So that it is necessary to use antibiotics based on diagnosis by professional medical personnel, monitoring and regulation of the use of antibiotics to increase antibiotic use rationally.

The problem of bacterial resistance has also become a growing problem throughout the world so that the WHO issued a statement regarding the importance of examining the factors associated with the problem and strategies for controlling the incidence of resistance. One way to control the incidence of bacterial resistance is to use antibiotics rationally. Based on the description above, irrational use of antibiotics in surgical patients also needs special attention. Therefore, the researcher was interested in conducting a study on the rationality of antibiotic use in the Ward of the Patient Surgical Hospital of Selebe Solu General Hospital, Sorong City.

2. MATERIALS AND METHODS

2.1. Type of Research

The type of research used is descriptive with a quantitative data approach, namely research conducted to determine the value of independent variables without making comparisons. Quantitative data is numerical or numerical data (Sugiyono, 2013).

2.2. Location and Time of Research

The research was conducted on the 19th - 23rd November 2018 in the Ward of the Surgery of the Selebe Solu General Hospital in Sorong City.

2.3. Population and Samples

a. Population

Population is the overall object of research or object under study (Notoatmodjo, 2012). The population in this study were all inpatients in the Surgical Ward in April - June 2018 as many as 83 documented medical prescription data.

b. Samples

The sample is partially taken from the entire object studied and considered to represent the entire population called the research sample (Notoatmodjo, 2012). The sampling technique in this study used purposive sampling, namely all medical records prescribing antibiotic drugs in hospitalized patients on the surgical ward with complete data over the age of 15 years.

3. RESULTS

3.1. Results of Data Analysis Based on the Use of Antibiotics in Inpatients after Post Surgery

a. Types of Antibiotics

The results of the observation showed that out of 83 medical records of post-surgical inpatients in Sele Be Solu Hospital during the period of April - June 2018 there were 13 types of antibiotics used in post-surgical patients whose data is presented in table 1

Table 1. Distribution of Antibiotic Groups used by patients at Sele Be Solu Hospital in Sorong City (April - June 2018)

No	Antibiotic Groups	Antibiotika		
1	Cephalosporin	Ceftriaxone	10	12,05
2		Cefixime	0	0
3		Cefotaxime	0	0
4	Aminoglycoside	Gentamicin	9	10,84
5	Flouroquinolone	Ciprofloxacin	0	0,00
6		Levofloxacin	4	4,82
7	Penicillins	Ampicillin	0	0
8		Amoxcillin	15	18,07
9	Antibiotik lain	Metronidazole	0	0
10		Meropenem	9	10,84
11		Doxycycline	11	13,25
12		Trimetophrim	11	13,25
13		Chloramphenicol	2	2,41
Number			83	100

The availability of antibiotics in hospitals has been guided by the regulation of the Minister of Health of the Republic of Indonesia No.2406 / Menkes / Per / XII / 2011, with the drug management cycle from planning to monitoring and evaluation based

on the Formulariu Selebe Solu General Hospital, Table 4.3 shows that the types of antibiotics used include antibiotics cephalosporin, aminoglycoside, penicillin, fluoroquinolone and several other antibiotics such as metronidazole, doxycycline, meropenem, trimethoprim and chloramphenicol.

b. Intravenous Antibiotics

Table 2. Distribution of the Use of Antibiotics in Post-Surgical Patients in General Hospital with a Form of Intravenous and Oral Preparation for the period April - June 2018

No	Preparation	Antibiotics	n	%
1	Intravenous Preparation	Ceftriaxone	10	12
		Gentamicin	9	10,8
		Meropenem	9	10,8
2	Oral Preparation	Amoxicillin	15	18,1
		Chloramphenicol	2	2,4
		Ciprofloxacin	12	14,5
		Doxycycline	11	13,3
		Levofloxacin	4	4,8
		Trimethoprim	11	13,3
			83	100

The policy of limiting the use of antibiotics includes retention and saving of antibiotics. The types of antibiotics are limited depending on the germ field pattern in the room or hospital in question, in Table 4.4 shows that from 83 medical record records of postoperative inpatients in Sele Be Solu General Hospital whose data is retrospectively retrieved, there are types of intravenous antibiotics available widely used in patients during the period April - June 2018 is Ceftriaxone (12%). Ceftriaxone is a third generation cephalosporin antibiotic with a wider anti-bacterial spectrum, which has a longer half-life than other cephalosporin groups. These antibiotics, including anti-gram negative bacteria, are strong except for pseudomonas. Because of the ability of ceftriaxone to be able to encourage superinfection with resistant or fungal bacteria and also be able to concentrate throughout the network, it is considered in the selection of antibiotics for treatment of infection management and now ceftriaxone is a first line antibiotic for the treatment of infections in Sorong General Hospital Sele Be Solu. The most widely used antibiotic as empirical therapy, prophylactic and definitive therapy is ceftriaxone. Based on the Drug Information literature, second and third generation cephalosporins are no better than the first generation. Because of consideration of costs and concerns about the potential for emergence of resistance due to the use of broad-spectrum anti-infectious (McEvoy, 2004).

The high use of ceftriaxone as definitive therapy is contrary to the rules of the Republic of Indonesia Minister of Health Regulation. Based on RI Minister of Health Regulation No. 2406 in 2011, which stated that the use of antibiotics for definitive therapy should prioritize the selection of antibiotics with a narrow spectrum. The same use of antibiotics too often should be avoided; this is confirmed by Setiabudy (2007) who states the latest antimicrobials such as third generation cephalosporin, fluoroquinolones, aminoglycosides, preferably not too often used for routine purposes in order to maintain the availability of effective antimicrobials when resistance problems arise. Intravenous antibiotics can be replaced orally, if after 24-48 hours by seeing the patient's clinical condition improve, there is no impairment of digestive function (vomiting, malabsorption, swallowing disorders and severe diarrhea), good awareness and no fever (temperature> 36 and <38 degrees Celsius), from Table 4.4 above shows that out of 83 medical records of post-surgical inpatients at Sele Be Solu General Hospital whose data was taken retrospectively, it was seen that the type of oral antibiotics that are widely used in patients during April - June 2018 is Amoxicillin (18.1%). Many reasons for using Amoxicillin because the Penicillin group by giving antibiotics orally which has a working mechanism in time dependent, which is the level in serum depending on the interval of administration is a therapy recommended as broad spectrum therapy that includes gram positive included in antibiotics, because organisms such as S. aureus, S. haemolyticus and Staphylococcus epidermidis.

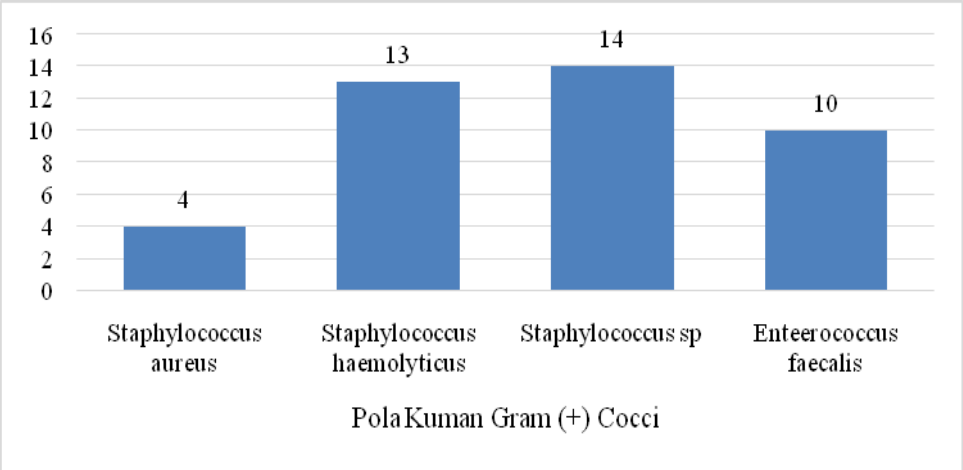
3.2. Results of Data Analysis Based on Culture Results in Post-Surgical Patients

Bacterial culture is a method used to determine the bacteria that cause infection in an illness. Based on medical records of post-surgical inpatients at Sele Be Solu General Hospital (RSU) whose data was taken retrospectively, it was seen that patients who had data on culture results were (49.4%). The data is presented in table 4.6 to find out the type of infection, microbiological data needed to get the use wisely with effective results.

Table 2. Distribution Based on Culture Results

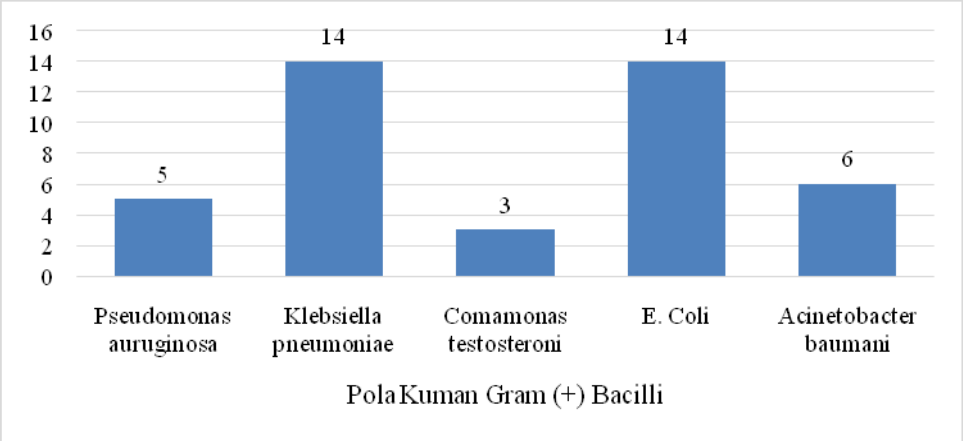
No	Results	n	%
1	Culture	41	49,4
2	Not culture	42	50,6

From the results of the culture data have been concluded and distinguished by gram negative and gram positive categories. And these data are presented in Graphs 1 and 2 below.



Grafik 4.1 Pola Kuman Gram (+) Cocci

Most patterns of gram (+) Cocci in Staphylococcus sp and lowest Staphylococcus aureus.



Graph 2. Bacilli Gram (+) Germ Pattern

The highest pattern of gram (+) Bacilli in E. Coli and Klebsiella Pneumonia and lowest Comamonas testoteroni

3.3. Rationality of Using Antibiotics Patients Inpatient Post-Surgery appropriately

a. Rationality of the Use of Antibiotics

The rationality of antibiotic use in post-surgical inpatients at Sele Be Solu Hospital in the period April - June 2018 can be seen in table 4.6

Table 3. Proper Distribution of Indications for Antibiotic Use in Post-Surgical Patients at Sele Be Solu General Hospital in April - June 2018

No	Rationality	Accurate		Not accurate		Number	
		n	%	n	%	n	%
1	Accurate of indication	83	100	0	0	83	100
2	Patient condition	78	94	5	6	83	100
3	Drug type	83	100	0	0	83	100
4	Doses	83	100	0	0	83	100
5	Administered	83	100	0	0	83	100
6	Period use	77	92,8	6	7,2	83	100
7	Availability	76	91,6	7	8,4	83	100

The results of the assessment of the accuracy of the results of prescription observations and medical records for the rational category of exactly 100% are the accuracy of the indications for antibiotics, the type of antibiotics, the dose of antibiotics and the method of administration. Inappropriate rationality was found in the condition of the patient as many as 5 people (6%), duration of use as many as 6 people (7.2%) and availability as many as 7 people (8.4%).

b. Management of antibiotic use

Quality of Use of Antibiotics

Table 4. The Quality of the Use of Antibiotics in Post-Surgical Patients in the Sele Be Solu General Hospital in the April-June 2018 period

No	Quality Use of Antibiotics	n	%
1	ADE (*Antimicrobial Drug Empiric*)	42	49,4
2	ADD (*Antimicrobial Drug Definitive*)	41	50,6
Number		83	100

Based on the table above shows that the type of therapy that is used most is the type of definitive therapy or antibiotic therapy with an indication of the known type of infection with a total of 49.4%. The use of antibiotics is divided into several types of therapy, namely empirical and definitive therapy. In this study, using the type of empirical therapy which is the use of antibiotics in cases of infection used for the first 48-72 hours of treatment and the type of bacteria that is not known is 49.4%. Whereas those using the type of definitive therapy amounted to 50.6%, which is the use of antibiotics in infectious cases with known types of bacteria and their resistance patterns whose treatment aims to inhibit the growth of bacteria that cause infection based on the results of culture.

4. DISCUSSION

4.1 Right Indications

The results of the assessment of the accuracy of the diagnosis using antibiotics as a whole are appropriate (100%). The accuracy of this diagnosis is due to administration of antibiotics through culture examination. Rational, effective and safe treatment must actually apply to all medical actions carried out by the medical profession and not only limited to the use of antibiotics. Rational means that the diagnosis of the disease must be determined appropriately so that the selection of drugs can be done appropriately and regarding the target with minimal side effects. The main thing that needs attention in giving antibiotics is effectiveness, toxicity and price (cost). Effectiveness is the most important thing in choosing antibiotics. Effective antibiotics must be active against pathogens that cause infection and must be able to reach the site of infection with sufficient concentration. All antibiotics have potential toxicity. Toxic effects can be idiosyncratic, such as allergic or bone marrow aplasia caused by chloramphenicol, or damage to organs or tissues such as kidneys due to aminoglycosides and ototoxic by amphotericin B. Antibiotics can also resulting in changes in microbial ecology in hospitals that cause resistance, a problem that often occurs in ICU intensive care.

The problem of cost (cost) is something that also needs attention in the selection of antibiotics. The choice of antibiotics is not only determined by the drug price (drug acquisition cost), but it is necessary to consider the cost of administration, time of administration, fluids and infusion equipment and monitoring costs (drug delivery costs).

4.2. Appropriate assessment of the patient's condition

The results of the assessment of the accuracy of the assessment of the diagnosis of the patient using antibiotics in the right category were 78 people (94%) and incorrect as many as 5 people (6%). Efforts

to make appropriate drug selection can be done after the diagnosis is properly enforced. Thus, the selected drug must have a therapeutic effect in accordance with the spectrum of the disease (Ministry of Health, 2011a). Reference AAFP (2011) does not provide the choice of aminoglycoside class antibiotics as a therapy for cystitis. Amikacin is used as a therapy for serious infections in gram negative aerobic bacilli bacteria that have been identified as resistant to gentamicin and tobramycin so that it can be said that antibiotic selection is not appropriate (Hopkins, 2012). Although the selection is not right, Rossetti (1986) said that the use of amikacin can be a therapeutic and rational for patients with cystitis with a total effectiveness of 99.3% but it should be noted that side effects that can occur in patients.

If a urinary tract infection is suspected to be caused by more than one microorganism, the use of combination antibiotics can broaden the spectrum of antimicrobial activity so that the effect achieved is greater than the use of a single antibiotic. When patients are hospitalized for quite a long time, gram negative bacilli microorganisms can grow in blood culture so that patients can get nosocomial infections. Combination of beta-lactam agent with fluoroquinolone can be used to prevent nosocomial infections (Leekha, 2011). Combinations of different cephalosporin groups with different generations can be given due consideration of their effectiveness with infectious bacteria. 2nd generation cephalosporin is more effective in community-acquired infections while 3rd generation Cephalosporin is more effective in hospital-acquired infections. Giving a combination of cephalosporin generation 2 and 3 is expected to have a greater effect than a single administration (Agbor, 2011). However, the same combination of Cephalosporin groups with the same generation can increase resistance because bacteria can quickly adapt to new environments. The principle of combination antibiotics is the administration of more than one type of antibiotic to treat certain infections, the aim is to increase antibiotic effectiveness in specific infections (synergistic or additive effects), overcome mixed infections that cannot be overcome by only one type of antibiotic and overcome life-threatening cases of infection unknown bacterial cause. (Sun, 2012).

4.3 Exact Type of Medicine

The results of the assessment of the accuracy of the exact assessment of the type of drug in patients using antibiotics as a whole in the right category were 83 people (100%). Choosing an antibiotic agent for the treatment of infection is far more complicated than matching a drug to a known or suspected pathogen. One of the abuses of antibiotic use is giving when actually the antibiotic is not needed, such as for example in a viral infection that is actually not need antibiotics. The initial selection of antibiotic use is almost always empirical where antibiotic empirical selection is usually based on information collected from the patient's history and physical examination. Selection of agents is usually chosen by broad-spectrum antibiotics if bacterial culture is not carried out (Dipiro et al, 2015).

According to the Ministry of Health (2011a), what is intended is an indication of disease is the administration of antibiotic agents is only given to patients diagnosed with bacterial infection. The diagnosis of urinary tract infection can be ascertained by looking at the main diagnosis on the summary sheet of patients entering and leaving, the results of abdominal ultrasound examination and urine leukocyte sediment results on the urine examination laboratory results sheet. In this study the accuracy of the indications for antibiotic use showed 100% results, which means that all patients get the right therapeutic treatment as indicated by urinary tract infection. The use of antibiotics in accordance with the indications can prevent or reduce the risk of antibiotic resistance (Ministry of Health, 2011).

Choosing an antibiotic agent for the treatment of infection is far more complicated than matching a drug to a known or suspected pathogen. One of the abuses of antibiotic use is giving when actually antibiotics are not needed, such as for example in viral infections that actually do not need antibiotics. The initial selection of antibiotic use is almost always empirical where Empirical antibiotic selection is usually based on information collected from the patient's history and physical examination. Selection of agents is usually chosen by broad-spectrum antibiotics if bacterial culture is not carried out (Dipiro et al, 2015).

4.4. Right Dosage

The results of the exact dose assessment in patients using antibiotics as a whole in the right category were 83 people (100%). `Dosage is very influential on the effects of drug therapy. Giving a dose excessive risk is very risky for side effects. Conversely a dose that is too small will not guarantee the achievement of the level of therapy expected by an antibiotic (Ministry of Health, 2011a). Accuracy of dosage is adjusted by adult dose reference in the literature on Diagnosis and Treatment of Acute Uncomplicated Cystitis (AAFP, 2011), Diagnosis and Management of Acute Pyelonephritis in Adults (AAFP, 2005) and IONI (BPOM, 2014) with dose ranges referring to the Drug literature. Information Handbook 24th (APA, 2015)

According to Paterson et al. (2016), using excessive doses of antibiotics has been identified as the main cause of resistance. While the use of antibiotics with less doses can result in therapeutic effects that are expected to be unattainable because antibiotics do not reach the Minimum Inhibition Level (MIC) (Lisni et al, 2015). Antibiotic treatment appropriately depends on value parameters and types of bacteria that infect and select and optimize the dose of pharmacodynamic use of antibiotics. During treatment, monitoring needs to be done to see whether the antibiotics given have reached therapeutic levels or not (Connors et al., 2013).

4.5. Proper Way of Giving

The results of the exact assessment of how to administer antibiotics in the right category were 77 people (92.8%) and incorrect as many as 6 people (7.2%). The duration of administration of antibiotics in the management of infections must always be considered. Giving the drug in a parenteral and oral manner by looking at the patient's clinical condition. The study was carried out in line with what Fazriayh (2017) conducted who evaluated the use of prophylactic antibiotics in surgical appendectomy patients with the ATC / DDD method and 90% DU which revealed that based on various guidelines, prophylactic antibiotic administration routes should be given intravenously. Administration of prophylactic antibiotics intravenously proved effective in avoiding the incidence of surgical wound infections (ASHP 2013, SIGN 2014). In this study all patients were given prophylactic antibiotics intravenously, so that the assessment of the accuracy of prophylactic antibiotic routes in 119 patients (100%) was considered appropriate.

4.6. Exactly Usage Length

The increasing prevalence of irrational use of antibiotics in various fields of medicine includes being wrong one cause of resistance. This is a negative impact of irrational use of antibiotics, the use of antibiotics with unclear indications, inappropriate dosage or duration of use, improper usage, unclear drug status, and excessive use of antibiotics. Other impacts from irrational use of antibiotics can result in increased toxicity and antibiotic side effects, and increased hospital costs (Kakkilaya, 2010). The results of the assessment of the exact duration of antibiotic administration in the right category were 77 people (92.8%) and incorrect as many as 6 people (7.2%). The duration of administration of antibiotics in the management of infections must always be considered. Provision of drugs with recommendations and time intervals by

looking at the clinical condition of patients who are too short or too long from those that should have an effect on the outcome of treatment (Ministry of Health, 2011).

In practice, the optimal duration of antibiotic therapy depends on clinical syndromes, causative microorganisms and the patient's response to therapy (Gilbert 2015). Duration of drug administration in post-surgical patients given antibiotics with a duration of days between 3 days 8 days (Permenkes, 2011). Research conducted by Zakiya (2017) in Bhakti Dharma Husada Hospital Surabaya that antibiotic use that is too short falls into the category IIIB which indicates that antibiotic use is too short or less than 48 hours, 2 days or not according to the antibiotic rules. In the results of this study in the Sele Be Solu General Hospital, 2 cases of antibiotic use were used that were too fast and long on gentamycin antibiotics on the grounds that it was recommended to consume gentamycin within 7-10 days but only consumed 3- Just 5 days. Category IIA is a category that shows the use of antibiotics with inappropriate doses.

In this study, there were 2 cases with improper administration intervals including administration of chloramphenicol antibiotics only given 2x / day which should be the interval of administration of chloramphenicol antibiotics which is 4x / day. The use of appropriate antibiotics, namely the use of antibiotics with a narrow spectrum, in strict conditions with adequate doses, intervals and the duration of appropriate administration (PERMENKES, 2011).

4.7. Proper Availability

The results of the assessment of the exact availability of antibiotic use in the right category were 76 people (91.6%) and incorrect as many as 7 people (8.4%). The basis for choosing the type of antibiotic is according to sensitivity and pattern of the most pathogenic bacteria in the case concerned, narrow spectrum to reduce the risk of bacterial resistance, low toxicity, do not cause adverse reactions to the administration of anesthetic drugs, are bactericidal, affordable prices (Permenkes, 2011). The most microorganisms isolated from infections that occur after an appendectomy are Gram negative aerobic and anaerobic bacteria. Bacteroides fragilis is the most commonly found anaereobic bacterial culture, and E. coli is the most aerobic bacteria (Bratzler et al., 2013). In addition, other bacteria associated with appendicitis are K. pneumonia, Streptococcus, Enterococcus and P. aeruginosa (Chen et al, 2012).

4.8. Proper Management

Based on the research data, there are only a few categories of Gyssens (IVA, IVC, IIIA, IIA, IIB, 0) from 13 Gyssens categories that enter the assessment of the quality of antibiotic use in postoperative patients at Sele Be Solu Hospital in April - June 2018, the results of the Gyssens assessment showed that the use of antibiotics that met the Gyssens 0 category (appropriate use of antibiotics) was 79.5%. Of the 83 medical records of post-surgical inpatients who used antibiotic therapy all cases had laboratory tests and diagnostic data, only 42 of 83 patients had bacterial culture examination data to see antibiotic sensitivity to certain bacteria. If based on completeness of data, most medical records will be categorized as VI (incomplete data).

4. CONCLUSION

Based on the results of evaluating the quality of antibiotic use in postoperative inpatients at the Sele Be Solu General Hospital (RSU) in April - June 2018 the results can be concluded with the following accuracy:

1. Indications according to the diagnosis of using antibiotics as a whole are appropriate (100%).
2. The condition of patients using antibiotics in the right category was 78 people (94%) and incorrect as many as 5 people (6%).
3. Type of drug in patients using antibiotics as a whole in the right category as many as 83 people (100%).

4. The dose in patients using antibiotics as a whole in the right category is 83 people (100%).
5. How to give antibiotics as a whole in the right category as many as 83 people (100%).
6. The duration of use in the right category is 77 people (92.8%) and incorrect as many as 6 people (7.2%).
7. Availability of antibiotic use in the right category is 76 people (91.6%) and inaccurate as many as 7 people (8.4%).
8. Management of rationality on the use of antibiotics from data that meets the Gyssens category (0) the use of appropriate or rational antibiotics is as much as 79.5%

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