Research Paper

Study of Antibiotic Usage and Length of Stay (LOS) for Pneumonia Inpatients at Internal Medicine Department of Semen Padang Referral Hospital (SPRH)

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ABSTRACT: *Pneumonia is an acute infectious disease affecting the lungs (alveoli), with symptoms of coughing accompanied by shortness of breath or rapid breathing. This disease has a high mortality rate. The purpose of the study was to study the profile of antibiotic use and length of Stay (LOS) of pneumonia patients in the inpatient room of Internal Medicine, Semen Padang Referral Hospital (SPRH) in Padang City. The research method was observational, data were taken retrospectively from patient medical records from January 1 to December 31, 2020. Data were taken randomly from patient medical records on the 1st, 10th, 20th, and 30th of each month. A total of 132 medical records were obtained, then the analysis was carried out descriptively. The results showed that pneumonia was most common in male patients (59.84%) with the most types of antibiotics used being levofloxacin (40.15%), ceftriaxone (26.51%), and ampicillin + sulbactam (10.60%), then obtained LOS data at 4-14 days (53.03%).*

KEYWORDS: *pneumonia, antibiotic, levofloxacin, semen padang referral hospital*

I.   INTRODUCTION

Hospitals are healthcare institutions that organize comprehensive individual health services that provide inpatient, outpatient, and emergency care services. General hospitals are hospitals that provide health services for all types of diseases. The basic essence of the hospital is the fulfillment of the needs and demands of patients who expect to solve their health problems at the hospital. Patients view that hospitals can provide medical services as an effort to cure and recover from the pain they suffer. Patients expect services that are ready, fast, responsive, and comfortable for patient complaints [1].The high increase in the number of hospitals has not been followed by an increase in the quality of nursing services in hospitals so contraindications often arise, so that hospitals get a lot of attention and complaints from the public as an expression of dissatisfaction due to the lack of level of service provided by health workers. Health efforts are a series of activities carried out in an integrated, integrated and sustainable manner to maintain and improve public health status in the form of disease prevention, health improvement, treatment of illness and restoration of health by the government and/or the community.Hospitals as an advanced level of service after health centers must of course have better services. Not only as health support within a small area such as a sub-district but in a wider scope such as a district or city. Someone who comes to the hospital has high expectations of the health services provided. Because the community assumes that the quality of hospital services must be of high quality and supported by facilities, human resources in the hospital are more able to overcome their health problems [1].

Pneumonia is an acute infectious disease that affects the lungs (alveoli), with symptoms of coughing accompanied by shortness of breath or rapid breathing. This disease has a high mortality rate. Clinically in children, it is always accompanied by coughing and rapid breathing. However, infants often do not have a cough. Pneumonia is an inflammation of the lung parenchyma, distal to the terminal bronchioles that include the respiratory bronchioles and alveoli and causes consolidation of lung tissue and local gas exchange disturbances. The etiology of pneumonia differs in various types of pneumonia, which affects the drugs to be administered.

The most common causative microorganisms are bacteria.Streptococcus pneumoniae is the most common cause of pneumonia, although many other bacteria (including Staphylococcus aureus, Hemophilus influenzae, Chlamydia pneumoniae, Moraxella catarrhalis, and Legionella) can cause pneumonia.pneumophila, Klebsiella pneumoniae, Mycoplasma pneumoniae, and Coxiella burnetti), besides that viruses can also cause pneumonia, parainfluenza, and influenza [2].

Pneumonia is the presence of inflammation, swelling, or inflammation of the lung parenchymal tissue which is usually associated with the filling of alveoli with fluid caused by microorganisms, namely bacteria, viruses, fungi, and parasites. Symptoms include a cough and cold accompanied by shortness of breath or rapid breathing, this disease often affects children under five, but can also be found in adults, and in the elderly. Some factors increase the risk of developing pneumonia, including Upper Respiratory Tract Infection (URTI), old age, malnutrition, incomplete immunization, non-exclusive breastfeeding, and air pollution (Wahid, 2013). There are 3 classifications of pneumonia based on where it occurs and how it is acquired: Community-acquired pneumonia (CAP), Hospital-acquired pneumonia (HAP), and Ventilator-acquired pneumonia (VAP).

The number of deaths caused by pneumonia in the world is estimated at 935,000 per year and more than 2,500 per day. Nearly one million adults die each year from pneumonia in Asia alone. Most of them are elderly and 160,000 of them are aged 15 to 59 years. In Indonesia in 2010, 7.6% of patients died from pneumonia[3]. Then in 2013 pneumonia death cases reached 22,000 in Indonesia, ranking it eighth in the world. According to data from the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF), the main cause of pneumonia is 50% Streptococcus pneumonia (pneumococcal bacteria), 20% caused by Haemophilus influenza type B (HIB), the rest are viruses, fungi, and parasites [4]. Streptococcus pneumonia is a normal flora in the esophagus of healthy humans. However, when the body's resistance decreases, which can be caused by old age, nutritional problems, or health problems, the bacteria will immediately multiply after infecting. This infection can quickly spread throughout the body through the bloodstream. Pneumonia caused by bacteria requires empirical therapy, namely antibiotic agents. Empirical antibiotic use for Community-acquired pneumonia (CAP) is Beta-lactams (Cefotaxim, Ceftriaxone, or Ampicillin sulbactam) plus macrolides (Azithromycin, Clarithromycin, Roxithromycin). While empirical antibiotics for Hospital-acquired Pneumonia (HAP) and Ventilator-acquired Pneumonia (VAP) are Beta-lactams plus beta-lactamase (Amoxicillin clavulanate)[5].Inappropriate use of antibiotics results in detrimental things such as less effective treatment, decreased patient safety, high medical costs, and widespread resistance[6].

Antibiotic resistance is the ability of bacteria to survive the effects of antibiotics so that they are not effective in clinical use, bacteria that were originally sensitive to an antimicrobial can change their genetic properties to become insensitive (resistant) or less sensitive[6]. Resistance to antibiotics will endanger the lives of patients because infections become difficult to treat, the longer the length of hospital stay, and the cost of health services will increase along with the need for new, stronger antibiotics.Evaluation of the quality of antibiotic use is carried out to determine rationality and develop its evaluation in assessing the accuracy of antibiotic use, including the accuracy of indications and selection based on effectiveness, toxicity, price, spectrum, duration of administration, dose, interval, route and time of administration. To evaluate the quality of antibiotic use, a certain method is needed which has been widely used in various countries called the Gyssens method [7].

Medical records are documents that contain records of patient identity, examination, treatment, actions, and medical services that have been provided to patients and serve requests or loans from patients for other purposes. Medical record documents belong to healthcare facilities and are responsible for loss, damage, forgery, or use by persons or entities that are not entitled to medical records. [1].Medical records facilitate and reflect the integration of care. Each health professional, nurse, doctor, therapist, dietician, and other health professionals record observations, treatment, results, or conclusions from patient care team meetings in the patient's progress notes in SOAP form with the same form in the medical record, to improve communication between health professionals.

II.   RESEARCH METHODS

The study was conducted at Semen Padang Referral Hospital (SPRH) located at Jalan Bypass Km 7 Pisang, Padang City. This research was conducted from September to December 2022 in the medical record room of SPRH. This research is a descriptive-analytic type of research with a retrospective approach, taking and collecting data by random sampling.The data collected were data from medical records from pneumonia inpatient at internal medicine department of Semen Padang Referral Hospital (SPRH) from January 1 to December 31, 2020, who received antibiotic therapy for the treatment of pneumonia. The sampling technique used was the Random Sampling technique. The number of data samples to be analyzed was 132 medical record data taken from all patients who entered the hospital every 1st, 10th, 20th, and 30th each month. .Data analysis was carried out in the form of descriptive analysis, the results of which were presented in table.

III.   RESULTS AND DISCUSSION

Based on age demographics, the age group 0-5 years as much as 34.0 9 %   (45 patients), 6-11 years old 23.48% (31 patients), 12-17 years old2.27% (3 patients), aged 18-25 years old as much as 0.75% (1 patient), aged 26-35 years old as much as 0.75% (1 patient), age 36-45 years as much as 3.78% (5 patients), age 46-55 years as much as 9.09% (12 patients), age 56-65 years as much as 10.60% (14 patients), and age > 65 years as much as 15.15% (20 Patients).In the results obtained, the highest rate of inpatient pneumonia occurred in patients aged 0-5 years, as many as 45 patients (34.09%). The majority of pneumonia patients were male as many as 79 patients with a percentage of (59.84%) (table 1), while in women as many as 53 patients (40.15%). inwomen as many as 53 patients (40.15%) According to Indonesia's 2019 health profile, pneumonia is more likely to affect children and toddlers. This is due to the low or weak immune system in toddlers and children. Malnutrition can cause a child's immune system to be very weak, especially in infants who are not exclusively breastfed. A toddler's chance of developing pneumonia also increases if there is a history of infections such as measles and active HIV infection. Environmental variables, such as cooking activities, living in small spaces, heating with biomass fuels (such as wood and animal dung), and heavy exposure to cigarette smoke are some common causes of indoor air pollution.The results showed that male pneumonia patients (59.84%) outnumbered female pneumonia patients (40.15%).

A factor that can influence the number of male patients suffering from pneumonia at Semen Padang Referral Hospital (SPRH) is the high activity or work performed by men compared to women. Men are more susceptible to pneumonia because they often have activities outside the home to work. This causes men to be more easily contaminated with dirty air, which is air pollution containing chemicals that trigger infections in the lungs.Another factor that causes pneumonia is smoking. The results of previous studies state that consuming cigarettes and other pathogenic substances triggers a decrease in the immune system in men which further increases the incidence of infections, especially ARI (Upper Respiratory Tract Infection). Healthy adult men who are exposed to continuous cigarette smoke can have an increased risk of lung infection. Clinical manifestations that can occur include bronchitis, pneumonia, and other lung diseases. The results of the Basic Health Research (Riskesdas) in 2013 noted that smoking behavior in the population aged 15 years and over continued to increase from 34.3% in 2007 to 36.3% in 2013. The Rikesdes results also showed that 64.9% of the male population were smokers[8].The profile of antibiotic use in pneumonia patients was categorized based on the type of therapy given, which could be single or combination antibiotics.

Table 1. Antibiotic Profile

Type of Therapy	Antibiotics	Total Prescription	Percentage (%)
Single Antibiotic	Levofloxacin	53	40,15
	Moxifloxacin	1	0,75
	Azithromycin	6	4,54
	Metronidazole	1	0,75
	Ceftriaxone	35	26,51
	Cefoperazone	3	2,27
	Cefixime	12	9,09
Antibiotics Combination	Ampicillin + Sulbactam	14	10,60
	Ceftriaxone + Azithromycin	1	0,75
	Levofloxacin + Cefoperazon	3	2,27
	Levofloxacin + Cefixime	1	0,75
	Meropenem + Metronidazole	1	0,75
	Moxifloxacin + Sefaperazon	1	0,75
Total antibiotic prescriptions		132	100%

Based on Table 1, the most common antibiotic therapy given to inpatients at Semen Padang Referral Hospital (SPRH) in Padang City was Levofloxacin as much as 40.15%. The Indonesian Lung Doctors Association (PDPI) also recommends that levofloxacin antibiotics be used as the first line of empirical therapy for *community-acquired pneumonia* and the third line of empirical therapy for nosocomial pneumonia (*Hospital-Acquired Pneumonia*) [3].Levofloxacin is a quinolone (fluoroquinolone) antibiotic that inhibits bacterial DNA synthesis. Levofloxacin has a broad spectrum, so it can be used to inhibit gram-positive bacteria and gram-negative   bacteria.   Levofloxacin   can   inhibit   *Streptococcus   pneumoniae*   and   *Pseudomonas aeruginosa*.Ceftriaxone and ampicillin-sulbactam were the second and third most commonly used antibiotics, with Ceftriaxone (26.51%) and ampicillin + sulbactam (10.60%) being the combination antibiotics.

Table 2. Length of Stay (LOS) Data

LOS	Number of medical records	Percentage (%)
1-3 Days	62	46,96
4-14 Days	70	53,03
>14 Days	-	-
Total	132	100%

Based on Table 2, the highest LOS is in 4-14 days as many as 70 patients with a percentage of 53.03% while the smaller number of hospitalizations in 1-3 days as many as 62 patients with a percentage of 46.96%. If the patient's condition is not severe, then outpatient services can be continued for 4-7 days after the patient is discharged, this is often the case for patients with a LOS of 1-3 days. The condition of each patient, including comorbidities, usually has an impact on the length of stay (LOS) of pneumonia patients. *Length of Stay (*LOS*)* is the number of days a patient is hospitalized, from the day of admission to the day of discharge, and is used by hospitals as an indicator of service.The results of this study are the same as similar research that has been conducted by Effendi and friends in 2022 who conducted research in Bangil hospital, East Java Province and comrades in 2022 who conducted research in Bangil hospital, East Java Province as well as Farida and friends' research in 2020 at the Sukoharjo academic area hospital, Central Java. who conducted a study on the use of antibiotics in hospitalized pneumonia patients with the results of the highest drug use was Levofloxacin. [9,10]

IV. CONCLUSION

Study of antibiotic usage for pneumonia inpatient at internal medicine department of Semen Padang Referral Hospital (SPRH) was mostly in male patients as much as 59.84% with the most widely used single antibiotic being Levofloxacin in 40.15% of patients, while the most combination antibiotics were ampicillin + sulbactam for 10.60% patients, and the longest LOS was 4-14 days as much as 53.03% patients

REFERENCES

[1]   Permenkes RI. 2008. Keputusan Menteri Kesehatan RI Nomor 129/MENKES/SK/II/2008 Tentang Standar Pelayanan Minimal Rumah Sakit.
[2]   Bradley J. S., Byington C. L., Shah S. S., Alverson B. 2011. The Management of Community-Acquired Pneumonia in Infants and Children Older Than 3 Month og Age: Clinical Practice Guidelines by the Pediatric Infectious Diseases Society and   the Infectious Diseases Society of America. Clinical Infectious Diseases. 1-52.
[3]   [PDPI] Perhimpunan Dokter Paru Indonesia 2014. Pedoman Diagnosis dan Penatalaksanaan Pneumonia Komuniti di Indonesia. Perhimpunan Dokter Paru Indonesia. Jakarta.
[4]   Rachmawati S, Rizki L, Fazeri dan Ika N. Gambaran Penggunaan Antibiotik di Bangsal Penyakit Dalam RSUD Bangil Kabupaten Pasuruan. JPSCR :Journal of Pharmaceutical Science and Clinical Research. 2020; 01: 12- 21
[5]   [PDPI] Perhimpunan Dokter Paru Indonesia 2005. Pneumonia Nosokomial Pedoman Diagnosis & Penatalaksanaan di Indonesia, Perhimpuan Dokter Paru Indonesia, Jakarta.
[6]   [Kemenkes RI] Kementrian Kesehatan Republik Indonesia 2011, Pedoman Pelayanan Kefarmasian Untuk Terapi Antibiotik. Depkes   RI. Jakarta.
[7]   Gyssens, IC 2005. Audit for Monitoring the Quality of Antimicrobial Prescription. Dalam: Gould, IVM. penyunting, Antibiotic Policies: Theory and practice. Kluwer Academic Publishers. New York.
[8]   [Kemenkes RI] Kementrian Kesehatan Republik Indonesia 2013a. Pedoman Umum Penggunaan Antibiotik. Kemenkes RI. Jakarta
[9]   Effendy RY, et al. 2022. Analisis penggunaan antibiotika dan peta kuman   pada pasien pneumonia di rawat inap rumah sakit umum daerah bangil, Syntex Literate: Jurnal Ilmiah Indonesia Vol.7 (7): 9068-9081
[10}   Farida Y, et al. 2020.Profil Pasien dan Penggunaan Antibiotik pada Kasus Community-Acquired   Pneumonia Rawat Inap di Rumah Sakit Akademik Wilayah Sukoharjo, Journal of Pharmaceutical Science and Clinical Research,J Pharm Sci Clin Res, 2020, 02 :151-164, DOI: 10.20961/jpscr.v5i2.3976