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Evaluation of the Use of Prophylactic Antibiotics in Sectio Caesarea Patients at Scholoo Keyen Hospital, South Sorong Regency in 2022

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ABSTRACT

A caesarean section is an attempt to remove the fetus through surgery on the uterine wall. Problems during surgery are infection, bleeding, surgical complications, and morbidly adherent placenta. Approximately 90% of postoperative morbidity is caused by ILO. Treatment for ILO is by administering antibiotics. Prophylactic are antibiotics given 30-60 minutes before a caesarean section. The aim of this research is to find out what antibiotics are given and how to evaluate the use of prophylactic in cesarean patients based on medical record data at Scholoo Keyen Hospital in 2022. This research is a descriptive evaluative method to get an idea of the presentation rate of rofile and characteristics of medical data records at Scholoo Keyen Hospital in 2022. Data analyzed using descriptive data. The results show that from 152 samples, the most widely used prophylactic was ceftriaxone (69.7%). Evaluation of the appropriateness the use of prophylactic in cesarean patients with the hospital formulary being appropriate and compared with Gudline POGI, and ASHP therapeutic. The results were obtained according to the right indication, the right patient, the right route of administration, and the right time of administration was appropriate. While the right medicine and the right dose is not appropriate.

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INTRODUCTION

Caesarean section" comes from the Latin term "Caedere", which means "to dissect". Furthermore, the phrase "Lex caesarea" comes from Roman legal terminology and relates to medical interventions carried out on pregnant people who die with the aim of preserving the life of the fetus(Akmal et al. 2016).

A cesarean section is a surgery performed to remove the fetus through making an incision in the uterine wall. Caesarean section is widely recognized as an integral part of obstetric surgery, providing a realistic option in cases where vaginal delivery is not possible. Caesarean section technique is classified as clean contamination surgical operation(Husnawati and Wandasari 2016).

Repeated cesarean section is recommended if the patient has a history of previous cesarean sections. In general, surgical incisions are performed near the site of the previous surgical scar. In some hospitals in different countries, such as the United States, United Kingdom, New Zealand, and Australia, it is recommended that couples actively participate in the cesarean section process to provide accompaniment and emotional assistance to the mother. In usual practice, the anesthesiologist will lower the barrier fabric during delivery of the baby, thus allowing parents to visually witness the newborn. As stated by Subandi (2017), the implementation of policies in hospitals in Indonesia that limit the entry of medical personnel into the operating room is a widely observed practice(Subandi 2017).

According to the World Health Organization (WHO), in 2010, an estimated 10-15% of women living in developing countries had a cesarean delivery. The World Health Organization (WHO) presented information in 2015, which included examining cesarean section rates from 2007 to 2014 in many countries. The results showed that Australia showed an incidence rate of 32%, China showed an incidence rate of 27%, and Indonesia showed an incidence rate of 12%. The data shows a consistent upward trend in the number of cesarean sections in government and private health facilities in Indonesia. Based on the results of a comprehensive health survey conducted in 2013, it is known that the proportion of cesarean deliveries reached 9.9% of the total 49,603 births that occurred during the period 2010 to 2013. Among the many regions studied, DKI Jakarta is the city with the highest percentage of cesarean delivery, which is 19.9% of all births. In contrast, Southeast Sulawesi has the lowest proportion of cesarean births, which is only 3.3% of total births(World Health Organization 2015).

Current cesarean deliveries have raised concerns because of the possibility of exacerbating postoperative complications. Cesarean sections are associated with many dangers, including surgical complications, bleeding, infection, and detachment of the placenta. Surgical wound infection is a postoperative condition that raises great concern because of its adverse impact on the patient's well-being, as well as its financial implications and subsequent potential consequences. These consequences include extended duration of treatment, increased health care spending, and the possibility of disability or death(Murniati, Zulkarnaini, and Juwita 2020).

Surgical wound infections, also referred to as ILO (incisional or surgical wound infections), can be ascribed to two main categories of risk factors: patient-related risk factors and risk factors associated with the surgical procedure itself. Many factors are known to worsen the likelihood of surgical wound infection (ILO). Factors contributing to this situation include inadequate nutritional status, uncontrolled diabetes, tobacco use, obesity, pre-existing infections in places other than the operating room, decreased immune function, bacterial colonization, and a history of prolonged hospitalization before surgery. The incidence of surgical wound infection (ILO) may be influenced by a variety of surgical variables. Factors mentioned by Wardoyo, Tjoa, Ocvyanty, and Moehario (2014) include pre-operative considerations such as hair removal and skin preparation, extended surgical procedures, use of antibiotic prophylaxis, maintenance of sterilization in operating theatres and medical facilities, application of surgical drainage, and adherence to correct surgical techniques(Wardoyo et al. 2014).

A suggested solution to reduce the incidence of ILO is to prescribe antibiotics. Antibiotics are biologically active substances that can be derived from bacteria or made synthetically. Its main function is to eliminate or inhibit the growth of other bacteria (Katzung, 2010). Indiscriminate use of antibiotics can lead to the emergence of antibiotic resistance. The problem of antibiotic resistance is a very important problem in the field of public health, both on a national and world scale, because it is associated with an increase in mortality(World Health Organization 2014). Sinaga, Tjitrosantoso, and Fatimawali (2017) emphasized that the wise use of antibiotics is based on various factors, including the accuracy of dosage, accuracy of diagnosis, accuracy of disease indications, accuracy of drug selection, appropriate method of administration, timely administration, and appropriate duration of therapy(Sinaga, Tjitrosantoso, and Fatimawali 2017).

Prophylactic antibiotics are a category of antibiotics given within a certain period of time, usually 30-60 minutes before a medical procedure, with the main aim of reducing the chances of postoperative wound infection (Sjamsuhidajat and Jong 2016). In Indonesia, most people, ranging from 44% to 97%, use prescription antibiotics, often ignoring recommended indications(Centers for Disease Control and Prevention 2017).

Antibiotic prophylaxis deals with the use of antibiotics before or during surgical intervention, although no signs of infection are visible. Prophylactic efficacy is expected to be higher when performed over a short period of time, particularly targeting a single pathogen that has a well-documented pattern of susceptibility. On the other hand, if prophylaxis is carried out over a long period of time, it is expected to provide greater effectiveness against various species with variable or unknown patterns of susceptibility. Prophylactic antibiotics are given before surgical procedures to ensure that target tissues get sufficient antibiotic exposure, thus inhibiting bacterial development or eliminating bacteria during surgical intervention (Prawirohardjo 2018).

The reference of this study, judging from previous research on "Evaluation of the Use of Prophylactic Antibiotics in Sectio Caesarea Patients at RSUD Prof. Dr. Margono Soekarjo in 2020" the most widely used prophylactic antibiotics are group III cephalosporin antibiotics, namely ceftriaxone (5.4%), and group I antibiotics, namely cefazolin (94.6%).

METHOD

This research uses a descriptive evaluative approach to determine the speed of presentation by paying attention to the profile and characteristics of medical records and doctor's prescriptions at Scholoo Keyen Hospital, South Sorong Regency throughout 2022. Data collection in this study was carried out retrospectively using medical record equipment. This research was conducted at Keyen Regional Hospital

from 1 June to 25 July 2023 to determine data on the use of prophylactic antibiotics in caesarean section patients.

The population in this study were all patients who underwent SC surgery, namely 183 patients listed in the medical records of Scholoo Keyen Hospital, South Sorong Regency in 2022. The sample obtained in this study which had gone through the inclusion stage was 152 people and 31 people were excluded. The sample used in this study was 152 inclusion patients and the samples that were not taken were 31 exclusion patients because the data of the 31 included patients in the medical records was incomplete and unclear.

RESULTS AND DISCUSSION

Patient characteristics

Table 1 Patient Characteristics by Age

No	Age of patient	Number of patient	Precentage (%)
1	≤ 20	13	8,5%
2	20-35	103	68,%
3	≥ 35	23,5	23,5%
	Total	**152**	**100%**

Based on table 1. shows that those in the age range of 20 to 35 years show the largest percentage, 68% to be exact. This phenomenon can be attributed to the fact that in this crucial age group, the female reproductive organs have reached the peak level of maturity. The demographic group consisting of individuals aged 35 years and over has the second largest proportion, at 23.5% of the total population. In contrast, the demographic consisting of those aged 20 years and under showed the least proportion, amounting to 8.5% of the total.

Table 2 Patient Characteristics based on Length of Treatment

No	Duration of patient treatment	Number of Patient	Precentage (%)
1	2 hari	37	24,5%
2	3 hari	77	50,6%
3	4 hari	30	19,7%
4	≥ 4 hari	8	5,2%
Total		**152**	**100%**

Based on table 2 The study conducted at Scholoo Keyen Hospital in South Sorong Regency produced findings showing that the longest hospitalization period after cesarean section was three days, representing the largest percentage of cases at 50.6%. The group of patients with the second largest proportion, which is 24.5% of the total is the group of patients with a length of hospitalization of 2 days. The third highest proportion was observed in patients with a 4-day length of stay of 19.7%. The longest duration of stay, at 5.1% of the total, occurred over four days or more. The variability of the duration of hospital stay depends on the patient's health condition, mother and newborn. If the mother and her baby show an improvement in health status characterized by the absence of infection or complications, such as unhealed surgical scars, chronic pain, or severe bleeding, it is more likely that the patient will require less intensive care and, consequently, a shorter duration of hospitalization. At Scholoo Keyen Hospital, located in South Sorong Regency, health practitioners offer ongoing supervision and counseling to improve the overall health condition of patients.

Table 3. Patient Characteristics by Diagnosis

No	Indication of C- section	Number of patient	Precentage (%)
1	Oligohidramnion	35	23,1%
2	Fetal distress	25	16,4%
3	Obesity	2	1.2%
4	Anemia	12	7,8%
5	Inpartu kala 1	5	3,5%

6	Dystocia kala 1	8	5,2%
7	Induction failure	16	10,2%
8	History of heart disease	1	0,6%
9	Breech location	14	9,2%
10	Fetal adhesions	6	3,9%
11	Premature	2	1,2%
12	HBSAG on	3	1,9%
13	Big baby	6	3,9%
14	SC history	17	11,1%
Total		**152**	**100%**

Based on the table of research results, the most indications at Scholoo Keyen Hospital, South Sorong Regency in 2022 are oligohydramnios indications, namely by percentage (23.9%). Oligohydramnios are amniotic fluid less than 500 cc. Oligohydramnios are not good for fetal growth because growth can be disrupted by adhesions between the fetus and the amnion or because the fetus experiences uterine wall pressure. Research conducted by Sagita (2016) shows a relationship between premature rupture of membranes with cesarean delivery with the incidence of asphyxia due to oligohydramnios, which is a condition where amniotic fluid is less normal, oligohydramnios also cause cessation of lung development (hypoplastic lungs), so that at birth, the lungs do not function properly(Sagita 2016).

Use of prophylactic antibiotics in cesarean patients

Table 4. Distribution of Prophylactic Antibiotics

No	Antibiotic criteria	Number of patient	Precentage (%)
1	Single Prophylactic Antibiotic	150	98,6%
2	Combination Prophylactic Antibiotics	2	1,4%
Total		**152**	**100%**

Based on table 4 the results obtained showed (98.6%) getting a single antibiotic and (1.4%) getting a combination antibiotic, giving a single antibiotic is effective for all patients undergoing cesarean section because it can reduce endometritis in reducing the rate of infection after cesarean section (American Society of Health-Systems Pharmacists 2013). While the administration of combination antibiotics aims to expand or strengthen the spectrum of antibiotic activity.prophylactic antibiotics are recommended if the infection is caused by more than one type of microbe(Zazuli, Sukandar, and Lisni 2015).

Table 5 Distribution of prophylactic antibiotics by type of antibiotic

No	Types of antibiotics	Antibiotics Class	Number of Patient	Precentage %
Single Antibiotics				
1.	Ceftriaxone	Sefalosporin generasi ketiga	106	68,9%
2.	Cefotaxime	Sefalosporin generasi ketiga	44	28,9%
Combination Antibiotics				
3.	Ceftriaxone + metronidazole		2	1,4%
	Total		**152**	**100%**

Based on the patients in table 5, patients who performed cesarean sections at Scholoo Keyen Hospital, South Sorong Regency in 2022 received the most antibiotics, namely ceftriaxone (69.7%) and the second highest cefotaxime (28.9%). Ceftriaxone and cefotaxime are class III cephalosporin antibiotics. Cephalosporins generation III are generally less effective against gram-positive cocci (*staphylococcus* and *streptococcus*) than first-generation, but are more effective and potent against gram-negative bacteria including *enterobacteriaceae, pseudomonas, bacteroides* including *peninsilinase-producing species.* The range of bacteria is wider than the previous bacteria. In general this method works against gram-negative, beta-lactamase-resistant bacteria, but is not effective against gram-positive. Cefotaxime and ceftriaxone are also indicated in patients with serious infections caused by sensitive bacteria including

septicaemia, pneumonia and meningitis and are also indicated for surgical antibiotic prophylaxis(Ikatan Dokter Anak Indonesia 2011).

The purpose of combination antibiotics is to increase antibiotic activity in specific infections, overcoming mixed infections that cannot be overcome by one antibiotic alone(Zazuli, Sukandar, and Lisni 2015). Metranidazole has been used for 45 years for anaerobic infentons, metronidazole is also used as a prophylactic before caesarean section.

Table 6 Duration of use of prophylactic antibiotics

No	Durations of use antibiotics	Number of patient	Precentage (%)
1.	1 days	71	46,7%
2.	2 days	81	53,3%
	Total	**152**	**100%**

Based on table 6, it can be seen that the length of prophylactic antibiotics at Scholoo Keyen Hospital, South Sorong Regency, is 1 day with a percentage of 46.7% and 2 days with a percentage of 53.3% and continued with oral antibiotics. This is in accordance with the 2016 hafizah study evaluating the use of prophylactic antibiotics based on the duration based on the duration of administration that the duration of administration is 2-3 days(Revita, Priyanto, and Agus 2013). Giving antibiotics for too long can result in resistance to certain bacteria(Noor 2013).

Tabel 7 Antibiotic use by route of administration

No	Antibiotics route of administration	Precentage (%)
1.	IV	100%
2.	Oral	0%
	Total	**100%**

Based on table 7, the results of the route of administering prophylactic antibiotics at Scholoo Keyen Hospital, South Sorong Regency in 2022 are through intravenous routes (100%). The intravenous route is in accordance with that set by WHO, according to WHO to avoid unexpected risks recommended intravenous administration of psrophilaxis antibiotics. The advantage of intravenous administration of prophylactic antibiotics is that it does not go through the absorption stage, so the drug levels in the blood are processed quickly, precisely and adjusted tothe patient's situation.

Conformity of the Prophylactic Antibiotic List with Hospital Formularies, POGI guidelines, and ASHP therapeutic guidelines

Table 8. Conformity of prophylactic antibiotics based on hospital formularies

No	Antibiotics name	The amount of antibiotics	Precentage (%)	apropriate	not
1.	Ceftriaxone	106	69,9%	✓	-
2.	Cefotaxime	44	28,9%	✓	-
3.	Ceftriaxone + metronidazole	2	1,4%	✓	-
	Total	**152**	**100%**		

A hospital formulary is a list of agreed drugs and their information that must be applied in the hospital. Hospital formularies are prepared by hospitals pharmacy and therapy commite (KFT) based on DOEN and refined by considering other scientifically proven drugs needed for services at the hospital(Aritonang 2017).

Based on table 8, it was found that the use of prophylactic antibiotics at Scholo Keyen Hospital, South Sorong Regency in 2022 underwent cesarean section in accordance with the hospital formulary that had been determined.

Table 9 Suitability of prophylactic antibiotics based on POGI guidelines

No	Antibiotic Name	The amount of antibaotics	Precentage (%)	Apropriate	not
1.	Ceftriaxone	106	69,9%	-	✓
2.	Cefotaxime	44	28,9%	-	✓
3.	Ceftriaxone + metronidazole	2	1,4%	-	✓
	Total	**152**	**100%**		

Based on table 9, it was found that the use of prophylactic antibiotics at Scholoo Keyen Hospital, South Sorong Regency in 2022 was not in accordance with the POGI guideline guidelines because the guideline guidelines recommended first-generation cephalosporins, namely cefazolin and metronidazole+gentamicin combination antibiotics, while at Scholoo Keyen Hospital, South Sorong Regency, using third-generation cephalosporin antibiotics, namely cefotaxime, ceftriaxone, and combination antibiotics ceftriaxone+metronidazole.

Table 10 Prophylactic antibiotic suitability based on ASHP *therapeutic guidelines*

No	Antibaiotic name	The amount of antibiotics	Precentage (%)	apropriate	Not
1.	Ceftriaxone	106	69,9%	-	✓
2.	Cefotaxime	44	28,9%	-	✓
3.	Ceftriaxone + metronidazole	2	1,4%	-	✓
	Total	**152**	**100%**		

Based on table 10, it was found that the use of prophylactic at scholoo Keyen Hospital, South Sorong regency in 2022 was notw in accordance with ASHP (American Of Hospital Phaemacist) guidelines, because the prophylactic antibiotics recomemmended by ASHP (American Of Hospital Phaemacist) were first-generation cephalosporin antibiotics, namely cefazolin and clindamycin+Aminoglycoside combination antibiotcs,while at Scholoo Keyen Hospital, south s0rong in south sorong year; Using third-generation cephalosporin antibiotics namely ceftriaxone, cefotaxime and ceftriaxone + metronidazole combination antibiotics.

Proper Evaluation of Drugs

Based on table 9 and table 10 in this study, no criteria that meet the exact drug were compared with POGI guidelines (Indonesian Society of Obstetrics and Gynecology and ASHP therapeutic guidelines. This is due to the absence of prophylactic antibiotics ceftriaxone, cefotaxime and ceftriaxone + metronidazole used in the treatment of sectio caesarea patients in the POGI guidelines (Indonesian Society of Obstetric Gynecology and ASHP therapeutic guidelines.while at Scholoo Keyen Hospital, South Sorong Regency in 2022, most of them use antibiotics Ceftriaxone, cefotaxime and a combination of ceftriaxone + metronidazole. This may happen because of different types of infectious germs and supported by evidence from each doctor's clinic and their availability in empty pharmacy rooms because see the price of cefazoline is relatively expensive. The antbiotic recommended by POGI is cefazolin and the combination of gentamicin + metronidazole and antibiotics recommended by ASHP therapeutic guideline is cefazolin and clindamycin + aminoglycoside combination antibiotics(Perkumpulan Obstetri Ginekologi Indonesia 2013).

Cefazolin is a first-generation antibiotic that is active against staphylococcus aureus bacteria and staphylococcus epidermidis is a gram-positive bacterium found in surgical wounds, so cefazolin is effective for cesarean section patients(Hardiyanti 2020).

Proper Dosage

Evaluation of dosage accuracy is carried out by comparing the number of doses given to patients with the standard of therapy used as a reference. This study shows that the suitability of the dose of ceftriaxone, cefotaxime and ceftriaxone + metronidazole combination is not in accordance with the POGI guideline, and therapeutic ASHP because in the POGI guideline, and therapeutic ASHP is not recommended ceftriaxone, cefotaxime and ceftriaxone + metronidazole combination.

Exact Indications

Drugs are called appropriate indications if the drug is given according to the diagnosis and condition of the patient. In this study, the results show that antibiotic therapy at Scholoo Keyen Hospital, South Sorong Regency in 2022 with 167 patients (100%) is an appropriate indication because all cesarean section patients are given prophylactic antibiotics before surgery to prevent infection.

Exact Patient

In this study, patients at Scholoo Keyen Hospital, South Sorong Regency in 2022 showed 100% patient accuracy, because before giving antibiotics, a previous skin test was carried out to ensure there was no allergic reaction and none of the 167 patients had complaints or hypersensitivity to certain antibiotics or prophylactic antibiotics, so that the administration of prophylactic antibiotics was safe and did not cause contra indications due to no side effects, changes in vital signs, allergic reactions and in this case meet the patient's criteria.

Timely Giving

According to the POGI guideline, prophylactic antibiotics are given 15-30 minutes before surgery, while according to ASHP therapeutic prophylactic antibiotics are given to cesarean section patients 30-60 minutes before surgery. Administering prophylactic antibiotics at 30-60 minutes before a skin incision can result in better maternal mortality when infectious morbidity and postoperative hospitalization are considered, without affecting neonatal outcomes(Apriani and Tasminatun 2019).

The results of this study were 152 patients (100%) on time because based on medical record data at Scholoo Keyen Hospital, South Sorong Regency, they were given prophylactic antibiotics 30-60 minutes before surgery. Exact route of giving.

Right Route of Giving

Prophylactic antibiotic administration must reach peak concentrations within time constraints then intravenous administration as an appropriate selection(DiPiro et al. 2020). Based on **7**, the route of administration in this study was 100% correct based on the guidelines of POGI and ASHP therapeutic guidelines, which were given intravenously. The results of this study indicate that all patients at Scholoo Keyen Hospital, South Sorong Regency have received prophylactic antibiotics on the right route in accordance with the POGI giudline, and therapeutic ASHP.

CONCLUSION

The types of antibiotics used in South Sorong Regency Scholoo Keyen Hospital in 2022 were single antibiotics ceftriaxone, cefotaxime and combined antibiotics ceftriaxone + metronidazole with intravenous route of administration. The most widely used antibiotic is the third generation cephalosporin antibiotic ceftriaxone.

The suitability of the use of prophylactic antibiotics in cesarean section patients at Scholoo Keyen Hospital, South Sorong Regency in 2022 with the Hospital formulary is in accordance and compared with the POGI Guideline, and ASHP therapeutic obtained the results of the right indication, the right patient, the right route of administration, the right time of administration is appropriate while the right drug is not and the right dose is not appropriate because ceftriaxone, cefotaxime and ceftriaxone + metronidazole antibiotics are not recommended by the POGI guideline, and ASHP therapeutic.

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