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THE EFFECT OF PRE-OPERATING ANTIBIOTIC PROPHYLAXIS ON POST C-SECTION INFECTION IN RSUD DR. SOETOMO PERIOD JANUARY 2021 – JUNE 2021

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Abstract

Cesarean section has some risk of around 90% post operative morbidity caused by Surgical Site Infection. The use of prophylactic antibiotics is one of the prevention of surgical wound infections with a decrease of about 30-65%. This study will use a prospective and cross-sectional study design, to determine the relationship between the use of preoperative prophylactic antibiotics on the prevention of infection after cesarean section. The results is From 72 cesarean section patients, it can be concluded that the age group of most cesarean section patients in this study was the age group of 20-35 years. The highest BMI group in cesarean section patients was with BMI > 30 by 43.1%. The most indications for cesarean section patients are patients with a history of previous cesarean section with a total of 30 people. The most prophylactic antibiotic use was cefazolin as much as 95.8% The incidence of infection in patients using cefazolin prophylactic antibiotics was 3 patients out of 69 patients, while the incidence of infection who did not use cefazolin was 1 patient out of 3 patients. There is a relationship between the use of preoperative prophylactic antibiotics on the prevention of infection after cesarean section.

Introduction

Cesarean section comes from the Latin caedere which means to cut or slash. In obstetrics, the term cesarean section refers to a surgical procedure that aims to give birth to a baby by opening the walls of the mother's abdomen and uterus (Todman, 2007). Cesarean section is divided into two, namely elective (planned) and cito (immediate). The reasons that led to an elective (planned) cesarean section were insufficient hip diameter for normal delivery, breech baby position, placenta previa, previous cesarean sections and at the request of patients without indications (Prasetya, 2014). According to WHO provisions, the prevalence of cesarean delivery is around 10-15% of the total delivery process. From the results of the 2017 Indonesian Demographic and Health Survey, Indonesia's cesarean delivery rate was 17.02% with the lowest cesarean delivery rate being East Nusa Tenggara with 5% and the highest being Bali with 34.7% (Yogatama & Budiarti, 2019). According to 2016 Riskesdas data in East Java, the rate of cesarean delivery has increased by 10%, while for post-date indications it has increased by 0.5% of the total population in East Java in 2016. C-section cases are included in the clean contaminated surgery (class 2). Clean contaminated operations are operations that penetrate the respiratory, gastrointestinal tract and urogenital tract but are still under controlled conditions and

without significant contamination (Berríos-Torres et al., 2017). Thus the use of prophylactic antibiotics is recommended for cases of cesarean section. There are several risks from cesarean section, but about 90% of postoperative morbidity is caused by Surgical Wound Infection (Hardiyanti, 2020).

Postpartum infection is common after cesarean section. Occurs due to surgical incision scars which are commonly called surgical site infections (SSI) which are characterized by the presence of several inflammatory symptoms such as fever, redness, pain and swelling, especially in the area around the surgical incision (Prasetya, 2014). The use of prophylactic antibiotics is one of the prevention of complications in sectio caesarea patients in the form of surgical wound infections with a decrease of about 30-65% (Hardiyanti, 2020).

Recommendations from WHO state that prophylactic antibiotics for surgery, especially cesarean section, are from the penicillin group, namely ampicillin and the first generation cephalosporin group, namely cefazolin. This is supported by a statement by the Ministry of Health (2011) which recommends the use of generation I and generation II cephalosporins for surgical prophylaxis. In certain cases suspected of involving anaerobic bacteria can be added with metronidazole. In addition, the use of prophylactic antibiotics in cesarean section is included in the Highly Recommended. In this category, antibiotics have been shown to be firmly proven to reduce morbidity, reduce treatment costs and reduce overall antibiotic consumption (Sumanti, Ayu, & Rusli, 2016).

The occurrence of a fairly large risk of infection has prompted researchers to evaluate the relationship between prophylactic antibiotics with infection prevention or the incidence of postoperative infections, especially in Soetomo hospitals. With this research, it is hoped that it can become a means of information for patients and hospitals in the use of prophylactic antibiotics in cesarean sections.

Method

This study is a non-experimental analytical observational study with a Prospective Case Control approach using observational data and patient medical records. The population in this study were hospitalized patients in the pigeon room who gave birth by cesarean section and used prophylactic antibiotics at RSUD Dr. Soetomo in January 2021 – June 2021. Researchers took research data from the population adjusted to the inclusion and exclusion criteria set. This study took data on age, BMI, indication for cesarean section, and prophylactic antibiotics used. All data were recorded on the medical record recording sheet, then the data received by the researcher was examined and sorted including inclusion or exclusion criteria.

Results and Discussion
1. **Characteristics of patiens cesarean section**

Based on the total research subjects, there were 72 pregnant women divided by age classification. The age group of cesarean section patients in this study was 20-35 years old (68%). The largest number was in the BMI group > 30 (obesity grade II) with a total of 31 people (43.1%). The most indications for cesarean section patients are patients with a history of previous cesarean section with a total of 30 people (30%). Most patients were found in only 1 indication with a total of 37 people (51.4%). The highest use of prophylactic antibiotics was cefazolin as many as 69 people (95.8%).

Table 1
Characteristics of patiens cesarean section

Variable	Frequency (n=100)	Percentage
Age		
<20	2	2,8%
20-35	49	68%
>35	21	29,2%
Body Mass Index		
<18,5	1	1,4%
18,5-22,9	6	8,3%
23-24,9	8	11,1%
25-29,9	26	36,1%
>30	31	43,1%
Indications for cesarean section		
C-section history	30	30%
Antepartum Bleeding	11	11%
Location Abnormalities	9	9%
HT induced preeclampsia	28	28%
Heart Abnormalities	6	6%
Other Indications	16	16%
Distribution Combination Indications for cesarean section		
1 indication	37	51,4%
2 indication	16	22,2%
3 indication	5	7%
Other indications	14	19,4%
Prophylactic use of antibiotics in cesarean section patients		
Cefazolin (<15 minute)	33	45,8%
Cefazolin (15-60 minute)	32	44,4%
Cefazolin (>60 minute)		5.6%
Non Cefazolin	3	4,2%

2. Analysis of the incidence of infection in patients with cesarean section

Table 2
Analysis of the incidence of infection in patients with cesarean section

Variable	No infection	Infection	Total	Percentage
Prophylactic administration				
Cefazolin	66	3	69	95,8%
Non Cefazolin	2	1	3	4,2%

In table 2 it can be seen that the incidence of infection in patients who used cefazolin as prophylactic antibiotics was 3 of the total patients given Cefazolin, namely 69 people, while the incidence of infection who did not use cefazolin prophylactic antibiotics was 1 patient out of 3 patients. Based on the percentage of 72 samples of post-cesarean patients, it was found that 3 patients (4.2%) had Surgical Site Infection and 69 patients (95.8%) did not.

3. Analysis of the types of prophylactic antibiotics on the occurrence of infection after cesarean section

Table 3
Analysis of the types of prophylactic antibiotics on the occurrence of infection after cesarean section

Variable	*p-value*	OR (95% CI)
Prophylactic Antibiotics	0,160	11.000(0,766-158.008)

In this study, bivariate analysis was also carried out to compare the types of prophylactic antibiotics used in RSUD Dr. Soetomo for patients after cesarean section. Based on table 3, the significance value of p or p-value is 0.160, which means p> 0.05 which indicates that there is no significant or statistically significant relationship between the incidence of infection with the use of cefazolin and non-cefazolin antibiotics. It can also be seen that the relationship strength parameter used in this study is the odds ratio (OR) which is 11,000 with a 95% confidence interval (CI) having a lower limit of 0.766 and an upper limit of 158.008.

According to the characteristics of the subjects based on the patient's age in table 1, it can be seen that the total research subjects amounted to 72 pregnant women who were divided based on age classification. The age group of cesarean section patients in this study was 20-35 years old (68%). While the least age group is <20 years (2.8%). This age group of cesarean section patients is based on the risk of pregnancy, i.e. patients aged less than 20 years and more than 35 years have a greater risk than those aged 20-35 years (Barutu, 2018). The age group of 20-35 years has a smaller risk because they have psychological and biological readiness in dealing with pregnancy and childbirth. At this age range, the risk of pregnancy and childbirth is minimal, because at that range the reproductive system has matured (Cunningham, 2005). According to (Kartikasari & Apriningrum, 2020) research, it was found that out of 59 post-cesarean patients in the risky age category, there were

9 respondents (31.0%) who had surgical wound infections. The age of pregnant women has no significant relationship with the incidence of surgical wound infection in cesarean section patients. However, this is different from the results of previous studies which showed that the average age of mothers who experienced Surgical Site Infection was at the average age of 31 years and 32.5 years, which was the age not at risk (Wardoyo, Tjoa, Ocvyanty, & Moehario, 2014).

Next in table 1 the subjects were divided based on the characteristics of BMI in post-cesarean patients. Body Mass Index (BMI) is a standard ratio of weight to height, and is often used as an indicator of general health. BMI is calculated by dividing body weight (in kilograms) by the square of height (in meters). The distribution of BMI is divided into 5 groups according to WHO, a normal person's BMI is 18.5 – 22.9, a BMI less than 18.5 is said to be underweight, a BMI of 23-24.9 is said to be overweight and if it is more than 25 it is said to be obese. Obesity is divided into obesity grade 1 (BMI 25-29.9) and obesity grade 2 (BMI > 30) (Yuliasih, 2017). The group of patients who are obese is at twice the risk of developing Surgical Site Infection compared to mothers with normal weight (Rivai, Koentjoro, & Utarini, 2013) and according to (Husen, 2012) Four pharmacokinetic studies stated that the administration of cefazolin 2 grams was inadequate in obese patients undergoing cesarean section because the drug concentration was below the minimum inhibitory level so that it could increase the

risk of surgical wound infection. From Table 1, we can see that the research subjects were divided into several based on the WHO BMI classification. The largest number was in the BMI group > 30 (obese grade II) with a total of 31 people (43.1%), while the smallest number was in the BMI <18.5 (underweight) group with a total of 1 person (1.4%) and a total of 1 person (1.4%) Normal BMI is group 18.5-22.9 only 6 people (8.3%). According to the research of Makani and Andayani (2019), 13 patients with obese BMI experienced Surgical Site Infection (23.6%), and 8 patients with non-obese BMI status experienced Surgical Site Infection (27.6%) and according to research by (Rivai et al., 2013) BMI shows that most respondents are in the non-ideal category (90.3%), either because they are overweight or underweight.

C-section patients have a higher risk of infection. Based on the risk, there are several factors or indications that cause a cesarean delivery to be performed. The indications for cesarean section are umbilical cord prolapse, placenta previa, placental abruption, disease in the mother with pregnancy and repeat cesarean section, prolonged labor, malpresentation or malposition, cephalopelvic disproportion, fetal distress (Cunningham, 2005). In this study, the researchers divided into 5 categories, namely hypertension induced preeclampsia, heart defects, location abnormalities, antepartum bleeding and history of cesarean section. In this study, the researchers divided into 5 categories, namely hypertension induced preeclampsia, heart defects, location abnormalities, antepartum bleeding and history of cesarean section. Based on table 1, it can be seen that the research subjects were divided into several categories based on the indications for cesarean section. The most indications for cesarean section patients were patients with a history of previous cesarean sections with a total of 30 people (30%) and the least indications for patients with cesarean section were cardiac abnormalities with a total of 6 people (6%).

According to research Begum et al. (2017), a history of cesarean delivery is a common indication. In this study, 24.1% of the total patients had an indication of a previous cesarean delivery. Similar to (Barutu, 2018), patients with an indication of a previous cesarean section had the highest percentage of 39%, however, in this study, those with the same percentage were indications for pre-eclampsia cesarean section. Indications for cesarean section can be divided into two, namely absolute and relative. Absolute indications are in the form of narrow pelvis, eclampsia and HELLP syndrome, placenta previa, uterine rupture, and so on. If a patient has one absolute indication, then the patient must undergo a cesarean section and relative indications, namely a history of previous cesarean delivery, cardiotocographic pathology, and so on (Mylonas & Friese, 2015). Cesarean patients who already have one of the indications may have other indications for a cesarean section. The indications set in this study are in accordance with table 1. Based on table 1 it can be seen that patients undergoing cesarean section are not only based on 1 indication. Most patients were found in only 1 indication with a total of 37 people (51.4%) and the least patients were in patients who had 3 indications at the same time with a total of 5 people (7%). In (Barutu, 2018) the indications for cesarean section were grouped into four, namely a group of one indication to a group of four indications. The group of two indications was the highest percentage of indication combinations in the study, which was 40%.

Cesarean delivery is a clean operation contaminated with a risk of infection of more than 10% with the main risk of delivery by cesarean section, namely the occurrence of surgical site infection. Infection can cause complications after cesarean section which results in morbidity and mortality, so prophylactic antibiotics are used to prevent the infection. Pathophysiology Surgical wound infection is caused by microorganisms from

the patient's normal flora and the operating room environment. The potential for surgical wound infections due to incisions in the abdominal and uterine walls, bacteria will contaminate and infect the incision wound during surgery. Prophylactic antibiotics are antibiotics given to patients who have not had an infection. The purpose of giving prophylactic antibiotics is to prevent infection in patients or prevent the emergence of dangerous diseases that are triggered by infection (Brunton, Chabner, & Knollmann, 2018). Table 1 shows that the most prophylactic antibiotics used were cefazolin as many as 69 people (95.5%) while the antibiotics used were not cefazolin as many as 3 people (4%). This is in accordance with (Barutu, 2018). In cesarean delivery at SMF Obgyn RSUD Dr. Soetomo for the period of July-December 2017, there were two types of antibiotics used as prophylaxis, namely cefazolin and ceftriaxone, Cefazolin was the prophylactic antibiotic with the highest percentage, namely 96% and ceftriaxone with a percentage of 4%. According to (Aufa, 2018), the most prophylactic antibiotics for post-cesarean section patients used by RSUD Dr. Moewardi were cefadroxil as many as 34 patients, after that cefaozlin as many as 16 patients, and the least was vicillin-amoxicillin, dexamethasone, ceftriaxone-metronidazole, ampicillin-metronidazole and vicillin-ampicillin 1 patient each. In accordance with the guidelines for the use of prophylactic antibiotics in obstetric and gynecological surgery, cefazolin is the antibiotic of choice for prophylaxis, because the bacterial spectrum covers the area of the surgical wound (Barutu, 2018) and Based on the accuracy of the selection of prophylactic antibiotics, POGI (2013) recommends cefazolin as a prophylactic antibiotic (Soejoenoes, A., Moegni, E. M., Kuntaman, Santoso, B. I., & Hadi, 2013). The use of prophylactic antibiotics must be used rationally, there are several things that need to be known with the use of prophylactic antibiotics in cesarean section patients,

namely the 4T, namely the right indication, the right drug, the right time and method of administration, and the right dose according to the standards of the Minister of Health of the Republic of Indonesia Number 2406/Menkes/ Per/XII/2011 concerning Guidelines for the Use of Antibiotics Clinical Practice Guidlines for Antimicrobial Prophylaxis in Surgery.

In table 2 it can be seen that the infection in patients who used cefazolin as a prophylactic antibiotic was 3 of the total patients who were given Cefazolin, namely 69 people, while the incidence of infection who did not use cefazolin prophylactic antibiotics was 1 patient out of 3 patients. Based on the percentage of 72 samples of post-cesarean patients, it was found that 4 patients (4.2%) had Surgical Site Infection and 69 patients (95.8%) did not. According to research by (Rivai et al., 2013) from 154 patients who underwent cesarean section, it was found that 12 (7.8%) had Surgical Site Infection and 142 (92.2%) did not. The risk factors that increase the occurrence of Surgical Site Infection according to the Ministry of Health in 2011 include the patient's condition, operating procedures, types of surgery, and post-infection care.

In this study, bivariate analysis was also carried out to compare the types of prophylactic antibiotics used in RSUD Dr. Soetomo for patients after cesarean section and obtained a significant p value or p-value of 0.160 which means p> 0.05 which indicates that there is no statistically significant or significant relationship between the incidence of infection with the use of cefazolin and non-cefazolin antibiotics. In this study, it was found that P was not significant, it could be due to the very small number of patients using non-cefazolin prophylactic antibiotics. It can also be seen that the relationship strength parameter used in this study is the odds ratio (OR) which is 11,000 with a 95% confidence interval (CI) having a lower limit of 0.766 and an upper limit of 158.008. This shows that patients with

cesarean section who use cefazolin antibiotics are 11 times more likely to not get infection compared to patients with cesarean sections who use non-cefazolin prophylactic antibiotics. So in this study, although p does not mean that the use of non-cefazolin antibiotics is more at risk of infection than cefazolin antibiotics. In addition, based on the accuracy of the selection of prophylactic antibiotics, (Soejoenoes, A., Moegni, E. M., Kuntaman, Santoso, B. I., & Hadi, 2013) recommends cefazolin as a prophylactic antibiotic, so that the antibiotic cefazolin is appropriate to be used as a prophylactic antibiotic in RSUD Dr. Soetomo.

Conclusion

There is a relationship between the use of pre-operative prophylactic antibiotics to the prevention of infection after cesarean section at RSUD Dr. Soetomo Surabaya in the period January 2021–June 2021.

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