

# Therapeutic and Clinical Outcome Evaluation Cefazoline as a Prophylactic Antibiotics in the Central Operating Room in a National Hospital West Jakarta Period October – December 2022

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**Keywords:** Cefazoline, Clean Contaminated Surgery, Clinical Outcome.

**Abstract:** Prophylactic antibiotics are commonly used to prevent and treat surgical site infections. Cefazolin is a commonly used prophylactic antibiotic due to its effectiveness in various surgical procedures. The objective of this study was to evaluate the therapeutic and clinical outcomes of clean-contaminated surgical patients at West Jakarta National Hospital. The research was conducted retrospectively using an observational cohort that met the inclusion criteria during the period of October-December 2022. The clinical outcome factors were analysed using the chi-square test of SPSS. The study included 106 patients who met the inclusion criteria. Most patients (43.5%) were aged between 46-60 years and female (60.4%), had a normal BMI (52.9%), were non-smokers (89.6%), non-drinkers (84.9%), had no comorbidities (84.9%), and had no family history of the disease (82.1%). Approximately 93.4% of patients were hospitalized for 10 days or less. 98.1% of the patients had a positive clinical outcome, while 1.9% experienced a decrease. Statistical analysis revealed that the length of treatment ( $p=0.001$ ) significantly affected the clinical outcome. On the other hand, patients' sociodemographic factors did not have a significant impact on the clinical outcome.

## 1 INTRODUCTION

Surgery is a medical procedure that involves invasive techniques, such as incisions, to access and treat internal body parts. Proper handling and closure of the surgical wound is crucial to prevent microbial infections in the patient. In Southeast Asia, surgical wound infections have a high incidence rate of 7.8%, second only to nosocomial infections. Antibiotics can be used to treat infections in surgical wounds.

Prophylactic antibiotics, such as cefazolin, can be administered to patients to prevent surgical wound infections. It is well-tolerated when administered intramuscularly or intravenously. Cefazolin is the preferred antibiotic for surgical prophylaxis due to its broad-spectrum activity, favorable pharmacokinetic profile, low incidence of side effects, and relatively low cost. Additionally, cefazolin exhibits activity against certain Enterobacter species. Cefazoline has a half-life of approximately 2 hours. Compared to other first-generation cephalosporins, such as cefalexin, cephalothin, cefapirin, and cefadroxil, cefazoline has the advantage of being more lipophilic, which allows

for better penetration into bone. Therefore, cefazolin is recommended as an antibiotic in surgery.

Antibiotic therapy is commonly used to evaluate the appropriateness of antibiotics in patients. The 'right drug, right dose, right indication, right patient' tool is widely used to assess the quality of antibiotic use in various countries. Clinical outcomes are the results experienced by patients after receiving treatment and are a key determinant of therapy success. The US Food and Drug Administration states that clinical outcome assessments evaluate symptoms, mental condition, and the impact of disease on patient activity. These assessments can determine whether drugs provide benefits or not.

The aim of this study is to investigate the factors associated with clinical outcomes of clean contaminated surgical patients. Specifically, the study evaluates the therapeutic and clinical outcomes of using cefazolin as a prophylactic antibiotic in the central surgical room at West Jakarta National Hospital during the period of October to December 2022.

## 2 METHODS

This research was conducted retrospectively using a cohort design. The data was obtained from primary sources in the form of medical records of patients who received clean-contaminated surgical therapy at West Jakarta National Hospital between October and December 2022.

The collected data includes the patient's diagnosis, age, sex, BMI, smoking, and alcohol consumption status, personal and family medical history, length of treatment, cefazolin dosage, antibiotics administered post-surgery, and clinical outcome. The data was collected from the time of the patient's admission for cancer diagnosis and treatment until their discharge or death.

## 3 RESULTS & DISCUSSIONS

Table 1: Sociodemographic of Cleanly Contaminated Surgical Patients (n=106).

Sociodemographics Patient	Sum n (%)
<b>Age</b>	
18 – 30 Years	7 (6,6)
31 – 45 Years	33 (31,1)
46 – 60 Years	46 (43,5)
61 - 75 Years	19 (17,9)
≥ 76 Years	1 (0,9)
<b>Gender</b>	
Male	42 (39,6)
Female	64 (60,4)
<b>BMI</b>	
Underweight (< 18,4)	22 (20,7)
Healthy Weight (18,5 – 25,0)	56 (52,9)
Overweight (≥ 25,1)	28 (26,4)
<b>Smoker</b>	
Yes	11 (10,4)
No	95 (89,6)
<b>Alcohol Drinker</b>	
Yes	16 (15,1)
No	90 (84,9)
<b>Own Medical History</b>	
Yes	16 (15,1)
No	90 (84,9)
<b>Family History of Disease</b>	
Yes	19 (17,9)
No	87 (82,1)
<b>Length of Stay</b>	
≤ 10 Days	99 (93,4)
> 10 Days	7 (6,6)

The study's results were obtained from the medical records (RM) of 106 patients diagnosed with cancer who received clean contaminated surgical therapy at the West Jakarta National Hospital between October and December 2022.

Table 1 shows the distribution of age categories among the patients. The age groups are 18-30 years (7 patients, 6.6%), 31-45 years (33 patients, 31.1%), 46-60 years (46 patients, 43.5%), 61-75 years (19 patients, 17.9%), and ≥ 76 years (1 patient, 0.9%). Many patients belonged to the 46-60 years age group, which had 46 patients. Out of the total number of patients, 60.4% were women and 39.6% were men. The BMI variable was divided into three categories: underweight (20.7%), healthy weight (52.9%), and overweight (26.4%). Most of the patients (52.9%) were in the healthy weight category. Within the smoker variable, 95 patients (89.6%) did not smoke, while 11 patients (10.4%) were smokers. Concerning the alcohol drinking variables, 90 patients (84.9%) did not consume alcohol, while 16 patients (15.1%) were alcohol drinkers. Out of the total number of patients, 84.9% (90 individuals) had no history of the disease, while the remaining 15.1% (16 individuals) had a history of the disease. In terms of family history, 82.1% (87 individuals) did not have a family history of the disease, while the remaining 17.9% (19 individuals) had a family history of the disease. Of the patients, 99 (93.4%) received treatment for 10 days or less, while 7 (6.6%) received treatment for more than 10 days.

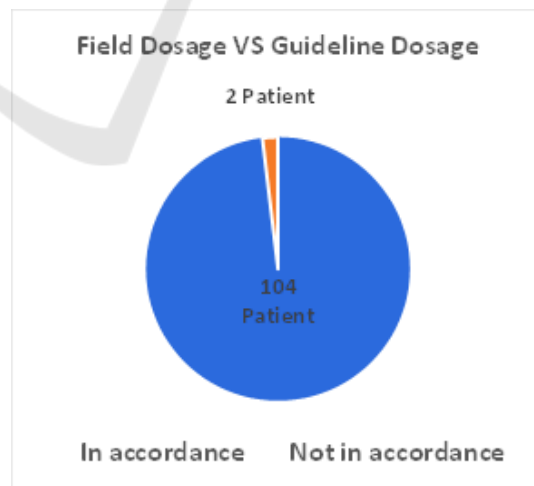


Figure 1: Shows the distribution of dosage conformity in the field with guideline n=106.

Based on Figure 1, the data shows that 98.1% of clean surgical cancer patients who received cefazolin therapy at West Jakarta National Hospital

were compliant with the existing guidelines, which was 104 patients. The remaining 1.9% of patients had dose discrepancies with the existing guidelines, with appropriate and inappropriate ratios of 52:1. There is a discrepancy in dosage due to the rescheduling of surgical elective patients who were previously allocated to the operating room.

According to the regulation of the Ministry of Health (Peraturan Menteri Kesehatan) No. 28 of 2021, chapter IV, page 29, recommends the use of prophylactic antibiotics for surgery. The first choice is generally a systemic cephalosporin from the first generation, such as 2 grams of cefazolin. for patients weighing over 120 kg, a dose of 3 grams of cefazolin was administered.

### 3.1 Statistical Analysis of Relationship Factors Influencing Clinical Outcomes of Cleanly Contaminated Surgical Patients

Table 2: Relationships Affecting Clinical Outcomes.

Sociodemographics Patient	Clinical Outcome		Total (N %)	P-Value
	Healed (%)	Die (%)		
<b>Age</b>				
18 – 30 Years	7 (100)	0 (0)	7 (100)	0,503
31 – 45 Years	33 (100)	0 (0)	33 (100)	
46 – 60 Years	44 (95,5)	2 (4,5)	46 (100)	
61 - 75 Years	19 (100)	0 (0)	19 (100)	
≥ 76 Years	1 (100)	0 (0)	1 (100)	
<b>Gender</b>				
Male	42 (100)	0 (0)	42 (100)	0,250
Female	62 (96,8)	2 (3,2)	64 (100)	
<b>BMI</b>				
Underweight (< 18,4)	22 (0)	0 (0)	22 (100)	0,629
Healthy Weight (18,5 – 25,0)	55 (98,2)	1 (1,8)	56 (100)	
Overweight (≥ 25,1)	27 (96,4)	1 (3,6)	28 (100)	
<b>Smoker</b>				
Yes	11 (0)	0 (0)	11 (100)	0,802
No	93 (97,9)	2 (2,1)	95 (100)	
<b>Alcohol Drinker</b>				
Yes	16 (100)	0 (0)	16 (100)	0,720
No	88 (97,8)	2 (2,2)	90 (100)	
<b>Own Medical History</b>				
Yes	16 (100)	0 (0)	16 (100)	0,610
No	88 (97,8)	2 (2,2)	90 (100)	
<b>Family History of Disease</b>				
Yes	19 (100)	0 (0)	19 (100)	0,567
No	85 (97,7)	2 (2,3)	87 (100)	
<b>Length of Stay</b>				
≤ 10 Days	99 (100)	0 (0)	99 (100)	0,001
> 10 Days	5 (71,4)	2 (28,6)	7 (100)	

Table 2 shows that the length of treatment (p=0.001) is the significant factor affecting clinical outcome. Raths et al. identified several factors that influence the length of patient treatment, including the type and severity of the disease, age, secondary diagnosis, and medical action. Sociodemographic factors, including age, gender, BMI, smoking, alcohol consumption, personal medical history, and family medical history, have no significant relationship with the clinical outcomes of clean-contaminated surgical patients.

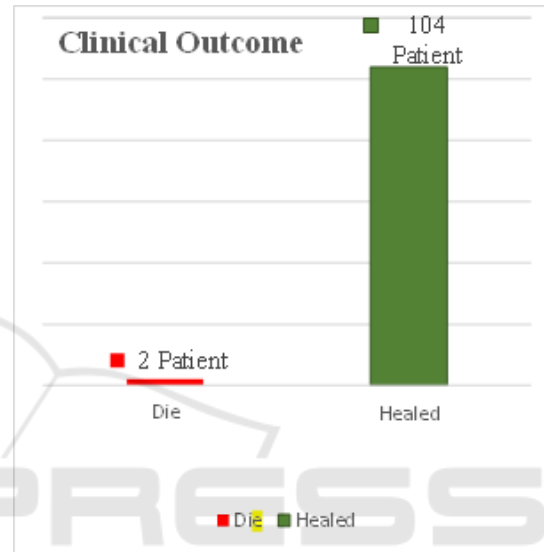


Figure 2: Number of Clinical Outcomes with Cefazoline Therapy.

Figure 2 shows that during the period of October to December 2022, the majority of surgical cancer patients who received cefazoline therapy at West Jakarta National Hospital were contaminated. Out of 106 patients, 104 (98.1%) were cured, while the remaining 2 (1.9%) died. The ratio of cured to dead patients was 52:1. Patients who experience negative clinical outcomes do not necessarily die because of antibiotic use. Instead, they may be affected by decreased body resistance, sepsis, or neutropenia.

## 4 CONCLUSION AND ADVICE

The study analyzed data from 106 patients. Most patients were female (60.4%) and aged between 46-60 years (43.3%). The average BMI was 22.827 kg/m<sup>2</sup>. Most patients were non-smokers (89.6%) and non-drinkers (84.9%). Additionally, 84.9% had no history of disease, and 82.1% had no family history of disease. The average length of treatment was 4.87 days. The statistical analysis indicates that there is no

sociodemographic relationship with clinical outcomes. However, the length of treatment ( $p=0.001$ ) is a significant factor affecting clinical outcomes.

The treatment administered to surgically treated cancer patients who were contaminated with cefazolin therapy at the West Jakarta National Hospital mostly adhered to the dosage guidelines outlined in Regulation of Ministry of Health / Peraturan Menteri Kesehatan (PMK) No. 28 of 2021, Chapter IV, page 29.

During the period of October to December 2022, at West Jakarta National Hospital, surgical cancer patients who were contaminated and received cefazoline therapy mostly had positive clinical outcomes (98.1%). It is important to note that patients who did not have positive clinical outcomes were not affected by antibiotics, but rather by decreased body resistance, sepsis, or neutropenia.

The researcher suggests that similar studies should be conducted prospectively at the West Jakarta National Hospital for comparison purposes based on the study results.

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