

# EVALUATION OF THE USE OF PROPHYLAXIC ANTIBIOTIC DRUGS IN HERNIA SURGERY PATIENTS IN MADIUN CITY HOSPITAL

Afif Mastur Muazzam<sup>1</sup>, Yanuar As'hari Cahyaningrum<sup>2</sup>, Zainal Abidin<sup>3</sup>

<sup>1</sup>Undergraduate Pharmacy Study Program, STIKES Bhakti Husada Mulia

<sup>2</sup>Pharmacy study program, STIKES Bhakti Husada Mulia

<sup>3</sup>Public Health Study Program, STIKES Bhakti Husada Mulia

[yanuarashcahya@gmail.com](mailto:yanuarashcahya@gmail.com)

## Abstract

Hernia ranks 14th as the disease accounting for the most outpatients and inpatients, according to the Ministry of Health. In 2021, hernia is a disease affecting a total of 20,400 patients. In 2018, the ten most common inpatient diseases include hernias, ranking 8th with a total of 286 patients, a percentage of 2.45% of the total number of inpatients. Therefore, it is necessary to evaluate treatment for hernias, especially in the selection and administration of drugs during surgery, such as the use of prophylactic antibiotics. This study aims to evaluate the use of prophylactic antibiotics in hernia surgery patients at Madiun City Regional Hospital. The research with approach cross-sectional, and data collection has been carried out retrospectively. The data taken has included patient medical record data with the criteria of patients diagnosed with a hernia, patients who have received surgical operations, patients over 18 years of age or adult patients, and patients with complete medical record data including treatment data and general patient data. The total results obtained in the study came from the total number of patients affected by hernias, 93% of which were dominated by male patients rather than women, who accounted for only 7%. The results obtained are of care for hernia surgery and which has the highest DDD (Defined Daily Dose) value and is the most frequently used antibiotic is Cefazolin, with a total of 17.05 DDD/100 hospital days, is the antibiotic most frequently given, with 72 out of 100 inpatients using cefazolin.

**Keywords:** ATC/DDD, Hernia, Antibiotic, Madiun.

## 1. INTRODUCTION

According to the Ministry of Health, hernia is the 14th most common disease suffered by outpatients and inpatients, and in 2021, hernia is a disease that attacks a total of 20,400 patients and is one of the causes of the increase in the number of patient admissions to public hospitals in Indonesia. The prevalence of age-related hernias is common, most often affecting men between the ages of 40 and 80 years. Hernias most often occur in men, with 95% of cases occurring in the area where the bulge occurs, namely the groin area (Nicholas 2023). The prevalence of hernias in the city of Madiun can be seen in patient data from one of the hospitals in the city of Madiun, namely at Dr. Soedono Madiun City Hospital, where the 10 diseases most

frequently treated in hospitals in 2019 were hernias which was ranked 8th with a total of 286 patients or contributing 2.45% of the total number of inpatientsp (Hospital dr.Soedono 2019).

Surgical procedures are often performed in the treatment of hernias, including gastrointestinal surgery which is one of the main abdominal operations, but almost all gastrointestinal operations fall into the "contaminated" (clean and dirty) category. Gastrointestinal surgery has various characteristics, such as herniotomy, cholecystectomy, colectomy, appendectomy and exploratory laparotomy. Abdominal surgery, including invasive procedures on the digestive system, especially the stomach, is a risk factor for infection in surgical wounds. During surgical procedures, open wounds can occur at the surgical site, which can cause infection in the patient (Sjahranie et al. 2021), therefore prophylactic antibiotic therapy is necessary to prevent infection.

The choice of antibiotic is influenced by the type of surgery to be performed, for prophylaxis most class antibiotics are chosen *cephalosporin* which is the first generation, is the antibiotic most often used for surgery in patients with no history of allergies (Lukito 2019). According to the 2021 Republic of Indonesia Minister of Health, antibiotics are a category of drugs that have the function of killing microorganisms and treating infections caused by microbes. Prophylactic antibiotics are given before, during and after surgical procedures which are useful in reducing the risk of infection and infectious complications resulting from surgical wounds. Cephalosporin antibiotics are antibiotics that are often prescribed for surgery or operations. A broad antimicrobial spectrum, a favorable pharmacokinetic profile, a low incidence of side effects, while wise and rational use of antibiotics can be taken into consideration against the spread of resistant bacteria (Republic of Indonesia Minister of Health 2021)

Evaluation of antibiotic use is used as a basis for determining the quantity of antibiotic use, knowing and evaluating the quality of antibiotic use, establishing systematic and standardized monitoring of antibiotic use, and is carried out with the aim of being an indicator of the use and quality of hospital services. To assess antibiotic use quantitatively, the World Health Organization (WHO) established the ATC/DDD system as an international measurement standard (Sjahranie et al. 2021).

Based on this explanation, the use and administration of antibiotics requires caution and serious research to find solutions to reduce risks and minimize inaccurate antibiotic therapy, especially when administering antibiotics to hernia surgery patients at the General Hospital in the Madiun City area.

## 2. METHOD

### Research Plan

This research design uses a quantitative descriptive method by collecting medical record data from patients diagnosed with hernia who were treated in hospital and treated surgically. The research design is *cross-sectional* and data collection is retrospective. Data were obtained from pharmacy facility medical records and antibiotic treatment therapy files.

### Research subject

The subjects used in this study were patients who met the inclusion criteria. Inclusion criteria included patients undergoing antibiotic treatment and hernia surgery, patients aged 18 years or older, and patients with complete medical records.

### Data analysis

The data obtained will be analyzed by examining antibiotic consumption in Madiun City Hospital inpatient facilities from 2022 to 2024. Data collected includes medical record number, patient name, gender, patient age, length of stay, name of drug, and drug dosage. The data was then calculated using the ATC/DDD method and entered into a table using Microsoft Excel 2013.

## 3. RESULTS AND DISCUSSION

This research was conducted at the Madiun City Regional Hospital from 2022 to 2024. Based on the research results, there were 100 patients who met the inclusion criteria.

**Table 1.** Patient characteristics by age

Patient Age	Number Of Patient	(%)
18 – 25 year	1	1 %
36 – 45 year	10	10 %
46 – 55 year	26	26 %
56 – 65 year	51	51 %
65 year above	58	58%
<b>Total</b>	<b>100</b>	<b>100 %</b>

The results obtained by researchers based on age showed that the highest number of patients aged 65 years and over was 58% (58 patients), while those aged 56 to 65 years were 51% (51 patients). Therefore, it can be said that hernias tend to occur in elderly patients. Regardless of age, most hernias originate from the embryo and metastasize from the testicles. This is due to the protrusion of the abdominal organs into the vaginal opening. Therefore, direct

inguinal hernia, also called congenital hernia, is the most common type of hernia. Furthermore, another cause of inguinal hernia is indirect inguinal hernia. It can be said that any condition that can cause an increase in intra-abdominal pressure can be the cause of an inguinal hernia (Putri et al. 2023).

**Table 2.** Patient characteristics by gender

Gender	Gender Number Of Hernia Patient	Percentage (%)
Male	93	93 %
Female	7	7 %
<b>Total</b>	<b>100</b>	<b>100 %</b>

Based on the gender of the patient, the majority of patients are male, namely 93% (93 patients), this is in accordance with research presented by (Reza Ika Meliani 2022) which explains that 90% of hernia patients are male. Men have a higher risk of developing hernias than women, this is caused by bad living habits such as smoking, drinking alcoholic drinks and doing heavy work. Hernias are also caused by men who do activities that require greater muscle function, such as farming or other heavy work. Regarding the risk factors for inguinal hernias, it was found that more men suffer from inguinal hernias than women because men do heavier work than women. This is in accordance with research results (Nugraha et al. 2022) which show that 98% of subjects are dominated by men. This is due to anatomical differences between men and women. Where the diameter of the inguinal canal is larger in women (Wirajaya, et al., 2023).

**Table 3.** Description of antibiotic use in patients

Antibiotics	Regimen Dose Flat - flat	Code ATC	Total Route Usage	Route	Percentage
Cefazolin	1 x 2 gram	J01DB04	72 Patient	IV (injection)	72%
Ampicilin	3 x 1 gram	J01CA01	10 Patient	IV (injection)	10%
Cefixime	2 x 0,1 gram	J01DD08	4 Patient	PO (oral)	4%
Ceftriaxone	2 x 1 gram	J01DD04	13 Patient	IV (injection)	13%
Ciprofloxacin	2 x 0,5 gram	J01MA02	1 Patient	PO (oral)	1%

The results for the type of antibiotic cefazolin with total drug use were 72% (72 patients). In antibiotics, ampicillin was 10% (10 patients), cefixime 4% (4 patients), ceftriaxone 13% (13 patients) and ciprofloxacin only 1% (1 patient). Each antibiotic is most often given in

injection form, only cefixime and ciprofloxacin are given by the oral route. The table above shows that out of 100 inpatients at Madiun City Regional Hospital, the antibiotics used with a total of 72 (72%) were cefazolin as the most widely used antibiotic out of the total of all antibiotics used by patients at Madiun City Regional Hospital. Based on *Guideline ASHP (American Society of Health-System Pharmacists)* regarding the management of prophylactic therapy, the recommended choice of therapy for prophylactic antibiotics for hernia surgery is to using first-line cephalosporin antibiotics, namely cefazolin which is given intravenously. It is also explained that the use and administration of therapy is adjusted to body weight and risk factors for infection. The type of antibiotic used in hernia surgery patients is a single antibiotic. The cause lies in the bacteria that pose a risk of infection in this case, namely the normal flora of the skin, or gram-positive bacteria. Additionally, the risk of infection was lower, ranging from 1.0 to 5.4%, for the type of surgery performed in surgery-only patients. Therefore, the use of a single dose of the antibiotic cefazolin is considered appropriate as this is in accordance with ASHP guidelines (*American Society of Health System Pharmacists*) which in the ASHP guidelines recommends one dose of a first generation cephalosporin which in its application is the antibiotic cefazolin given within 60 minutes before the hernia repair is carried out.

**Table 4.** Results of Quantitative Evaluation of Antibiotics for Inpatients with Hernia

No	Code ATC	Antibiotics	Total DDD	$\frac{\text{total DDD}}{\text{inpatient}} \times 100$	percentage
1	J01DB04	cefazolin	3	17,05	45,9%
2	J01CA01	ampicilin	12	10,84	29,2%
3	J01DD08	cefixime	2,64	1,78	4,8%
2	J01DD04	ceftriaxone	12,94	6,25	16,8%
5	J01MA02	ciprofloxacin	0	1,25	3,4%
TOTAL				37,17	100%

Calculations to find the DDD value (Defined Daily Dose) calculated by dividing the total dose by the WHO DDD value, where the total dose is taken from the length of stay and the antibiotic dosing regimen taken by the total daily dose, so that the DDD value for antibiotics can be found and then all the DDD based on each antibiotic can be added up. Cefazolin results were obtained with a total value of 17.05 DDD/100 days of treatment, and ampicillin 10.84

DDD/100 days of treatment, cefixime 1.78 DDD/100 days of treatment, ceftriaxone 6.25 DDD/100 days of treatment, ciprofloxacin 1.25 DDD/100 days of care.

The results of research on the use of antibiotics in Madiun City Hospital in 2022 - 2024 are in accordance with the latest Minister of Health regulations in 2021, which published regarding surgical and hernia prophylaxis therapy to use a 2 gram dose of cefazolin given 60 minutes before infusion and surgery (Republic of Indonesia Minister of Health 2021). The results obtained by researchers related to antibiotic prophylaxis using the ATC/DDD method were that the most frequently given drug was cefazolin which was used by 72 patients out of a total of 100 patients. The application of cefazolin therapy was appropriate and in accordance with the latest Minister of Health Regulations for 2021. The results of research for 2 months at the Madiun City Regional Hospital showed that the most prescribed antibiotic in the hernia surgery ward at the Madiun City Regional Hospital in 2022 - 2024 in general was cefazolin with a value of 17.05 DDD/100 treatment days and was the most frequently prescribed antibiotic.

#### **4. CONCLUSION**

Description of the characteristics of patients in the hernia surgical ward at Madiun City Regional Hospital with a total of 100 patients, in 2022 - 2024 there are 93% more males (93 patients) than females, namely only 7% (7 patients) with the highest age. The number of hernias affected by those aged 65 years and over was 58% (58 patients). Characteristics of drug use using the ATC/DDD calculation method were obtained. The total result of cefazolin was 17.05 DDD/100 treatment days as the antibiotic most frequently given with the average use of the drug per patient being 3 days. The use of cefazolin injection as a prophylactic antibiotic was most often given to 72 patients at a dose of 2 grams. The administration of antibiotics was considered appropriate and appropriate based on the recommendations of the 2021 Minister of Health Regulation as the main choice of prophylactic antibiotic therapy.

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