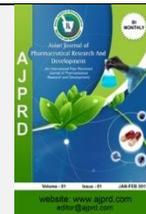


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Research Article

The Rationality of the Use of Intravenous Preparations in Diarrhea Patients in the Tk Ii Putri Hijau Kesdam I Bukit Barisan Hospital

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ABSTRACT

Objective: to evaluate the rationality of the use of intravenous preparations during diarrhea therapy which is limited to the right patient, the right indication, the right drug and the right dose.

Design: the study used descriptive and retrospective design by medical record of the TK II Putri Hijau KESDAM I Bukit Barisan hospital Medan. The criteria taken are patients with diarrhea with bacterial infections in the period of January – December 2018.

Interventions: the intervened variable were the rationality of the use of intravenous preparations during diarrhea with bacterial infections.

Main outcome measures: the main measurement in this study were the right patient, the right indication, the right drug and the right dose for diarrhea patients with bacterial infections..

Results: there were 885 diarrhea patients included in the inclusion criteria out of a total of 1,302 patients. Inaccurated of drugs used during diarrhea therapy were ceftriaxonee that overdosed in 36 cases and ciprofloxacin that overdosed by 14 cases.

Conclusion: it could be concluded that the inaccurate use of ceftriaxonee and ciprofloxacin were included in the incorrect criteria of the right dose for patients with diarrhea with bacterial infections.

Keywords: *Intravenous preparations, Diarrhea, Medical record*

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INTRODUCTION

Diarrheal disease is a public health problem in developing countries like Indonesia, because of its high morbidity and mortality. Diarrhea is one of the main causes of high child mortality in the world. It is estimated that more than 10 million children aged less than 5 years die each year, around 20% of children die due to diarrhea¹. The occurrence of diarrhea can occur throughout the world and cause 4% of all deaths and 5% of health loss causes disability. Diarrhea remains the leading cause of death in children under the age of 5 in Sub-Saharan countries in Africa. Risk factors for acute diarrhea vary by context and have important implications for reducing the burden of disease².

The most dangerous symptom of infectious diarrhea is dehydration, which is a direct cause of many diarrhea deaths,

especially in infants and young children⁴. Based on data from the United Nations Children's Fund (UNICEF) and the World Health Organization (WHO), globally there are two million children die each year from diarrhea. The number of people suffering from outbreaks of diarrhea in 2013 in Indonesia decreased significantly compared to 2012 from 1,654 cases to 646 cases in 2013. Outbreaks of diarrhea in 2013 occurred in 6 provinces with the most patients in Central Java, which reached 294 cases⁵. Intravenous (IV) therapy is one of the most frequently performed procedures in hospitals throughout the world. In the USA, nearly 20 million patients out of a total of 40 million patients treated receive intravenous therapy⁶. Intravenous therapy is a type of therapy that is widely given to children when treated, especially in intensive care rooms. About 80% of pediatric patients receive infusion therapy at the hospital⁷. This therapy aims to replace lost fluid, electrolyte correction,

blood transfusion, or for medication⁸. Prolonged intravenous therapy can cause complications. One of the most common complications is phlebitis. Phlebitis is inflammation of the tunica intima vein caused by chemical, mechanical, bacterial, and post infusion factors that cause the effects of pain, erythema, swelling and warmth in the puncture, layer formation, and hardening along the veins⁹.

Antibiotics are the most widely used class of drugs in the treatment of infections, in developing countries 30-80% of patients treated in hospitals receive antibiotics. Based on this percentage, 20-65% of its use is considered inappropriate. Prescription and improper use of antibiotics tends to be widespread. The Center for Disease Control and Prevention in the USA says there are 50 million prescription antibiotics that are not needed (unnecessary prescribing) of 150 million prescriptions each year¹⁰. Efforts to treat most diarrhea patients are by rehydration therapy or by giving ORS to replace body fluids lost due to dehydration. But diarrhea disease caused by infection requires antibiotics¹¹. From the data and evaluation of the disease in TK.II Putri Hijau Kesdam I / BB Hospital in 2017, the prevalence of diarrhea diseases ranks first in the top 10 types of diseases. Nearly 50% of patients undergoing hospitalization with diarrhea. Based on the description above and from the high percentage of diarrhea patients, the authors wish to conduct a study by evaluating the use of intravenous preparations for diarrhea disease in TK Hijau Putri II Military Hospital I Bukit Barisan.

MATERIALS AND METHODS

Research Design

The research used an observational (non-experimental) method with descriptive research design and data collection with purposive sampling technique, namely: sampling of certain characteristics or characteristics by taking data of patients diagnosed with microbial diarrhea.

Research Location

This research was conducted at the Installation Inpatient at TK Hijau Putri II Hospital, KESDAM I / BB Medan. This research was conducted using a retrospective approach obtained from data on medical records / medical records of patients suffering from diarrhea infected with microbes undergoing hospitalization at TK Hijau Putri II Hospital Green KESDAM I / BB Medan for the period January-December 2018.

Population

The population were patients with microbial infected diarrhea who were hospitalized at TK Hijau Putri II Hospital KESDAM I / BB Medan.

Determination of drugs

The drugs to be evaluated are intravenous preparations which are used during inpatient treatment at TK Hijau Putri II Hospital KESDAM I / BB Medan.

Data retrieval

The data taken was the medical record data of diarrhea patients who used intravenous therapy for the period of

January - December 2018 who was hospitalized in TK Hijau Putri II Hospital KESDAM I / BB Medan.

Medical and laboratory record data needed include:

1. Patient Identity: Name, gender, age, weight, height.
2. Treatment data: Medications used.
3. Laboratory Data
4. History of patient's disease.
5. Other supporting data.

Sampling

a. Inclusion Criteria

Inclusion criteria are general requirements that can be included in research¹². Included in the inclusion criteria were:

1. Patients with diarrheal diseases infected with microbes treated with intravenous treatment who were hospitalized in TK Hijau Putri II Hospital KESDAM I / BB Medan during the period January - December 2018.
2. Patients with diarrheal diseases infected with microbes given intravenous therapy.
3. Patients with complete medical record data.

b. Exclusion Criteria

Exclusion criteria are conditions that cause subjects who meet the inclusion criteria cannot be included¹². As for the exclusion criteria were:

1. Patients with diarrheal disease who are treated on the road and not patients with intravenous therapy at the Putri Hijau TK II Putri KESDAM I / BB Medan Hospital.
2. Patients with incomplete medical record data.

RESULT AND DISCUSSION

Observation of Medical Record Data

From the medical record data there are 1,302 patients with diarrhea, with 885 patients due to bacterial infections and 374 patients not due to bacterial infections undergoing hospitalization at the Level II Hospital of Putri Hijau KESDAM I Bukit Barisan Medan period January - December 2018. While the record data incomplete medical data of 43 data. From the medical record data that was studied according to the inclusion criteria were patients with diarrhea caused by bacterial infections that had complete medical record data. The criteria for diarrhea patient were presented in the following table 1:

Table 1: The criteria for diarrhea patient

Criteria	Total	Percentage (%)
Inclusion	885	67,97
Exclusion	417	32,03
∑ Patient	1.302	100

The table above showed that from 1,302 patient diarrhea data, the inclusion criteria were greater (67.97%) than the exclusion criteria (32.03%).

Diarrhea Patients Based on Gender

The results showed that of the 885 diarrhea patients whose data were retrospectively taken, the most sex was female (51.53%) and the rest were male (48.47%). The data is in line with other studies that show the occurrence of diarrhea outbreaks in 2011 between women (51%) and men (49%). However, based on these studies there is not enough evidence to conclude that the incidence of diarrhea is related to gender¹³.

Diarrhea Patients Based on Age

The results showed that of the 885 diarrhea patients whose data were taken the most visible age was 45 - 64 years old by 379 patients (42.83%), followed by ages 1 - 14 years by 251 patients (28.36%), age 15-44 years of age 188 patients (21.24%), aged under 1 year of 58 patients (6.55%) and aged over 65 years of 9 people (1.02%). The above age groupings according to ICD-10 WHO⁴.

In line with research conducted by Emma¹⁴, it shows that in her study the most diarrhea patients were in the 26-65 years age range, 32.71% of 214 diarrhea patients. This is because in that age range is a productive age range, where people are busy doing activities and work. If you lack rest, stress or irregular nutrition, it will weaken the immune response, thus damaging the body's defense system which results in a person being very easily infected.

Diarrhea Patients Based on Duration of Therapy

This study shows that the percentage of patients with the most duration of therapy is 5-8 days, which is 53.67% of 885 patients, followed by the duration of therapy for 4 - 4 days, 34.58%, 9-12 days, 9.83% and more than 12 days as much as

1.92%. Duration of therapy is the length of time the patient undergoes treatment. The duration of optimal antibiotic therapy is not always known, because it depends on the severity and type of infection that occurs¹⁴.

Diarrhea Patients Based on Duration of Treatment

This study shows that the duration of treatment for 5-8 days is the most, namely 56.84% of 885 patients, followed by the length of treatment 1-4 days as much as 29.72%, 9-12 days as much as 11.07% and more than 12 days as much 2.37%. Length of stay is one element or aspect of care in hospital services that can be assessed and measured. The length of the length of stay can be caused by the patient's medical condition or the presence of a nosocomial infection which extends the length of the day of treatment which can reach 5-10 days¹⁵. Richard Johnson and Jennifer Simpson stated that the length of stay could increase due to nosocomial infection to 13.3 days, 2 times longer than normal. Apart from medical conditions, length of stay can also be caused by non-medical conditions, such as administrative delays in hospitals, lack of planning in providing services to patients (patient scheduling) or medical policy¹⁶.

Evaluation of the use of intravenous preparations in diarrhea patients

Right patient

Treatment was appropriated for the patient if the drug given was in accordance with the patient's physiological and pathological conditions or the absence of contraindications to the patient's condition¹⁷. The exact analysis results of patients in this study can be seen in table 2 below:

Table 2: The exact analysis results of patients

Drug	Total of patients	Percentage (%)	Right Patient	
			Yes	No
Ceftriaxonee	584	16,37	√	-
Ciprofloxacin	306	8,58	√	-
Ranitidin	631	17,68	√	-
Ondansetron	790	22,14	√	-
Ozid	254	7,12	√	-
Ketorolac	53	1,49	√	-
Novalgin	17	0,48	√	-
Paracetamol	48	1,34	√	-
Ringer Lactat	683	19,14	√	-
NaCl 0,9%	202	5,66	√	-
Total	3.568	100%		
∑ Patient	885			

Analysis of drug administration based on the patient's exact parameters were evaluated on the use of drugs adjusted to the patient's condition whether or not there are contraindications in patients¹⁸. Based on intravenous therapy given to diarrhea patients in this study, no contraindications were found to the patient's condition.

Right drug and indication

The results of observations precisely indicated in this study can be seen in table 3 below:

Table 3: Appropriate Evaluation of Indications for Use of Intravenous Products in Diarrhea Patients

No	Drug	Category		Percentage (%)	
		Right Indication	Wrong Indication	Right Indication	Wrong Indication
1	Ceftriaxone	584	-	16,37	-
2	Ciprofloxacin	306	-	8,58	-
3	Ranitidin	631	-	17,68	-
4	Ondansetron	790	-	22,14	-
5	Ozid	254	-	7,12	-
6	Ketorolac	53	-	1,49	-
7	Novalgin	17	-	0,48	-
8	Paracetamol	48	-	1,34	-
9	Ringer Lactat	683	-	19,14	-
10	NaCl 0,9%	202	-	5,66	-
Total		3.568		100%	
∑ Patient		885			

Based on research conducted on the evaluation of the precise indication of the use of intravenous preparations in diarrhea patients in TK. II Putri Hijau Kesdam I / BB Medan Hospital Period January - December 2018 obtained data table 3 which explains that the class of drugs used as diarrhea therapy include antibiotics, H2 receptor antagonists, antiemetics, proton pump inhibitors, NSAIDs, antipyretic analgesics and electrolyte / catalyst fluids.

Antibiotics are chemical compounds produced by microorganisms specifically produced by fungi or produced synthetically that can kill or inhibit the development of bacteria and other organisms. The use of antibiotics in patients with acute diarrheal infections is needed to overcome infections caused by bacteria¹. Based on table 3 above, patients receiving ceftriaxone antibiotic therapy were 16.37% and ciprofloxacin were 8.58%. Antibiotics used as a therapy are sepalosforin and quinolones. Sepalosforin and quinolone class of antibiotics are broad-spectrum antibiotics that can kill gram-positive and gram-negative bacteria that are proven to be able to overcome diarrhea due to bacterial infections so that it is stated precisely the indication¹⁷.

H2 receptor antagonists in treating gastric and duodenal ulcers by reducing gastric acid secretion as a result of inhibition of H2 histamine receptors. Giving this class of drugs in the treatment of diarrhea in order to overcome comorbidities arising from diarrhea, so that it is stated exactly the indication¹⁹. In this study the H2 receptor antagonist class used is ranitidine by 17.68%.

Antiemetics are used to reduce the symptoms of nausea and vomiting so as not to lose fluid due to stomach disorders caused by diarrhea¹⁸. Ondansetron is not recommended in children with moderate to severe acute gastroenteritis, because one of the most common side effects of ondansetron is an increase in the frequency of diarrhea²⁰. Based on the results of the study, the antiemetic used was ondansetron with the most widely used amount of 22.14%.

Proton pump inhibitors are effective for short-term treatment of gastric and duodenal ulcers, but they are also used to prevent and treat ulcers that accompany NSAID use. Similar to H2 receptor antagonists, proton pump inhibitors can also overcome concomitant diarrheal diseases associated with gastric disorders¹⁷. In this study the proton pump inhibitors used were ozides containing 7.12% omeprazole.

Non-steroidal anti-inflammatory drugs (NSAIDs) is one of the most widely prescribed and most commonly prescribed classes of drugs in Indonesia and other countries²¹. In a single dose of non-steroidal anti-inflammatory (NSAID) has analgesic activity equivalent to paracetamol. NSAIDs are given in low doses if paracetamol fails to cope with pain. NSAIDs used in the treatment of diarrhea in this study were ketorolac whose use was 1.49% and novalgin (metamizol Na) by 0.48%. Ketorolac is used in the short-term management of moderate to severe pain.

Analgesics were drugs that are indicated as pain relievers while antipyretics are indicated as fever-lowering. Antipyretic analgesics used in the treatment of diarrhea in this study were paracetamol as much as 1.34 %%. In the use of paracetamol rarely occur side effects but a skin rash is reported¹⁷. However, in this study no side effects were found in the use of paracetamol in diarrhea patients.

In the condition of diarrhea, a patient will experience hyper / hypokalemic metabolic acidosis with dehydration, thus requiring the addition of electrolytes rich in sodium, bicarbonate and potassium. The main objectives of rehydration are returning bodily fluids to normal volume, effective osmolarity and the right composition for acid-base balance. The majority of patients will improve with ORS, but some patients with severe diarrhea and shock require intravenous fluid electrolytes to overcome the dehydration experienced. The use of RL and siringe solution is widely given to diarrhea patients and is most suitable for improving dehydration²². In Table 4.8 above, it is known that the use of RL is 19.14% and NaCl 0.9% is 5.66%. Ringer lactate is an

electrolyte / mineral group that is used as a rehydration therapy due to diarrhea. Rehydration therapy is an effective method for the treatment of acute diarrhea and can accelerate healing²³.

Right Dose

The right dosage is the selection of drugs according to the size, frequency, usage and duration that are appropriate for the patient. Analysis of drug administration based on the exact parameters of the dose was evaluated in patients who

received drugs with the right criteria for drugs¹⁸. The success of a therapy one of which is the provision of appropriate and rational doses. According to the Ministry of Health of the Republic of Indonesia¹, the administration of drugs with excessive doses can cause the risk of side effects and toxicity, while the maximum effectiveness of therapy will not be achieved if the drugs are given with less doses. Analysis of dose accuracy based on the administration of diarrhea patients in TK. II Putri Hijau Kesdaam I / BB Medan Hospital for the period January - December 2018 can be seen in the following table 4:

Table 4: Analysis of dose accuracy

No	Drug	Information	Total	Percentage (%)
1	Ceftriaxone	Under dose	-	-
		Right dose	548	15,36
		Overdose	36	1,01
2	Ciprofloxacin	Under dose	-	-
		Right dose	292	8,18
		Overdose	14	0,4
3	Ranitidin	Under dose	-	-
		Right dose	631	17,68
		Overdose	-	-
4	Ondansetron	Under dose	-	-
		Right dose	790	22,14
		Overdose	-	-
5	Ozid	Under dose	-	-
		Right dose	254	7,12
		Overdose	-	-
6	Ketorolac	Under dose	-	-
		Right dose	53	1,49
		Overdose	-	-
7	Novalgin	Under dose	-	-
		Right dose	17	0,48
		Overdose	-	-
8	Paracetamol	Under dose	-	-
		Right dose	48	1,34
		Overdose	-	-
9	Ringer lactat	Under dose	-	-
		Right dose	683	19,14
		Overdose	-	-
10	NaCl 0,9%	Under dose	-	-
		Right dose	202	5,66
		Overdose	-	-
Total		Under dose	-	-
		Right dose	3.518	98,59
		Overdose	50	1,41

Based on table 4 above, there were several cases of incorrect dosage of antibiotic treatment in diarrhea patients, namely 36 cases of overdosing of ceftriaxone antibiotics or as many as 1.01% of the total 3,568 antibiotic cases. Subsequently 14 cases (0.4%) overdose on ciprofloxacin antibiotics.

Overdose is the dose or frequency that is given beyond the standard dose according to the Pediatric Dosage Handbook guidelines. Whereas the dose is less than the dose or frequency given is less than the standard dose according to Pediatric Dosage Handbook guidelines. The accuracy of the dose is very necessary in the success of therapy, if the dose of the drug is less can lead to suboptimal therapy. Whereas in more doses can cause toxic. From the analysis of the accuracy of drug dosages, 3,518 cases (98.59%) were obtained precisely from a total of 3,568 drug administration cases.

CONCLUSION

Based on the discussion and results of the study, it could be concluded there were 885 patients (67.97%) patients with diarrhea who entered the inclusion factor out of a total of 1,302 patients, with male patients numbered 429 patients (48.47%) and female patients amounted to 456 patients (51.53%), where age <1 year amounted to 58 patients (6.55%), 1 - 14 years 251 patients (28.36%), 15 - 44 years 188 patients (21.24%), aged 45-64 years as many as 379 patients (42.83%) and age > 65 years as many as 9 patients (1.02%). The results showed inaccuracies in the administration of ceftriaxone doses in 36 cases and inaccuracy in ciprofloxacin doses in 14 cases. The inaccuracy was related to incorrect dosage where the dose given exceeds the dose stated in the literature.

CONFLICT OF INTERESTS

All author have no to declare.

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