An Elsevier Indexed Journal ISSN-2230-7346

Journal of Global Trends in Pharmaceutical Sciences

STUDY OF USE IRON CHELATION DRUGS IN CHILDREN'S THALASEMIA AT ONE OF THE KUNINGAN HOSPITALS

Ani Anggriani [1], Astrid Meida Tanzani[1], Ida Lisni[1]

Faculty Pharmacy Bhakti Kencana University, JL Soekarno Hatta No 754 Cibiru Bandung

Corresponding author E-mail: ani.anggriani@bku.ac.id*

ARTICLE

Key Words

Drug Use, Iron Chelation, Thalassemia

ABSTRACT

Thalassemia is a chronic disease that requires transfusion every month, because erythrocytes are faster than normal erythrocytes. Iron chelation therapy is effective in reducing iron levels in the body. This study was conducted to determine the pattern of drug use and assess the accuracy of drug administration. The study was conducted non-experimental and retrospective. This research method complements data collection, examines data and draws conclusions and suggestions. The number of patients taking the drug during 2018 was 102 patients. The most patients were male patients (54,90%) in elementary school-aged children (44,12%) with the most widely used iron chelation drug was Deferipron 100mg /5ml (48,04%), The iron chelating drugs given are in accordance with the indications (100%). Deferipron dosage given with more doses (20,00%) and the right dose (80,00%) and Deferasirox dose with less dose (5,88%), more dose (76,47%), and right dose (17,65%). While the potential for drug interactions that occur is nonexistent (0%).

INTRODUCTION

The world population is estimated at 3% (150 million people) the carrier of Thalasemia genes. In Indonesia, a thalassaemia-β carrying rate is 3%-5%, even in a certain area reaches 10% (Mirsa, 2015). Data obtained from the District General Hospital (RSUD) Arifin Achmad Pekanbaru, Thalasemia disease was ranked first in the child's hospital room. The number of thalassaemia patients in 2013 were 485 people and in 2014 the number of Thalassaemia patients was 488 (Safitri dkk., 2015) Thalassaemia is a disorder of hemoglobin synthesis due to the production of one or more chains of globin and is a hereditary disease that is derived by autosomal recursive. The disease was first discovered between the years 1925-1927 in Italy and the Americas (Mirsa, 2015). In patients with thalassaemia occurred chronic anaemia, hemolytic process, and decreased Synthesis of hemoglobin (Hb), so that thalassaemia requires a lifetime transfusion. Lifelong transfusion management and the occurrence of cell damage caused by anemia chronic cause the occurrence of iron in the body of the sufferer so that there are dysfunction of organs such as heart, liver, muscles and endocrine glands. Dysfunction of these body organs will eventually become the cause of death of thalassaemia sufferers (Anggorini, 2010). Three types of iron in the market, namely (1) Desferoxamin (desferal, DFO), is the standard therapy of iron ripening the first choice for the iron-filling due to repeated transfusions, (2) Deferiprone (Ferriprox, DFP), a second choice of treatment Administered orally for the treatment of iron in Thalassemia major patients when there is contraindication to Desferoxamin, (3) Deferasirox (Exjade), is a new oral treatment of iron that is

administered once a day. Seaman preparation works by eliminating or reducing the serum bonds of non transferrin iron. Capellini and friends in his research provided a deferasirox per oral one time a day in patients with thalassemia beta get decreased levels of ferritin occurring after twelve weeks of therapy (Ratih, 2011). The drug of iron-Rizzer is one of the hard drugs at an expensive price, and requires periodic monitoring of the impacts of the main adverse effects during use. These side effects cause uncomfortable use for the sufferer. Such use at therapeutic doses of Deferoxamin administered parenterally causes pain during administration and use of Deferipron and Deferasirox causes nausea so that the use of drug evaluation (EPO) is necessary during use The drug. Based on the above statement, it is important to review the iron-leaky drug in minimizing damage to organs caused by excess iron heap.

MATERIALS AND METHOD

Design Research: The design of the research study is a non-experimental study with a descriptive method carried out retrospectively.

Population and research samples: the criteria of the patient's inclusion include: a child patient who is diagnosed with Thalasemia major and Thalasemia major child patients who regularly use iron-and-piece therapy with all dosage forms

Exclusion Patient criteria: thalassaemia major patients suffering from other diseases

Materials and tools research source of the data used is the medical record of the outpatient Thalasemia patient in one of the hospitals in Kuningan with predefined criteria.

Data Collection: Data collection stage research retrieval was conducted retrospectively with data taken in March 2019.

Data Analysis: Data analysis data analysis is done quantitatively and qualitative :

a. Quantitative analysis by analyzing the number of patients using iron-leaky drugs based on gender, age group, drug name and given dosage form. The Data obtained is then calculated in the form of percentages.

b. Qualitative analysis is conducted by analyzing the data obtained by comparing the conformity of doses and potential drug interactions based on criteria of use of the drug to assess the accuracy of the use of the drug.

RESULTS AND DISCUSSIONS

The total number of children with thalassaemia patients on outpatient use of iron chelation medicine during 2018 years of 102 patients. Reviewed from the most genders, the study in table 1 was obtained by the most thalassaemia men's gender.

Quantitative Analysis

Table 1. Distribution of Pediatric Thalassemia Patients Outpatient Based on Gender

Gender	Number of patient	Percentage of change (%)
Male	56	54,90
Female	46	45,10
Total	102	100,00

Table 2. Distribution of Pediatric Thalassemia Patients Outpatient Based on Age

Age	Number of patient	Percentage of change (%)
Toodler (0-4 year)	17	16,67
Pre School (5-6 year)	11	10,78
Elementary School (7-12 year)	45	44,12
Produktif Age (13-17 year)	29	28,43
Total	102	100,00

Central Data and Information, Kemenkes RI, 2017

Table 3. Distribution of Children Thalassemia Patients Outpatient Based on the name of the Iron Chelation Drugs Given

Iron Chelation Drugs	Number of patient	Percentage of change (%)
Deferipron 100 mg/5ml	49	48,04
Deferipron 500 mg	36	35,29
Deferasirox 500 mg	17	16,67
Total	102	100,00

Table 4. Distibution of Children Thalassemia Patients Based on The Accuracy Indication

Iron Chelation Drugs	Appropiate Indicated		Misindicated	
	Σ	(%)	Σ	(%)
Deferasirox	17	16,67	0	0,00
Deferipron	85	83,33	0	0,00
Total	102	100,00	0	0,00

The results of this research in accordance with the results of the research of Peony in the hospital general education Cipto Mangunkusumo Jakarta in 2004, from 68 thalassaemia cases studied obtained 35 cases or as many as 51.5% of male gender, While 33 cases or 48.5% are female gender (Yayasan Thalasemia Indonesia, 2012). Thalassaemia is a genetic disease caused by a factor of an autosomal recursive single allellar cell, not a genetic disease caused by an allel factor that is linked to a sex or genital chromosome (Aryuliana, 2004). This is in accordance with Mendel's theory of law in which the Thalassemia beta gene is inherited autosomal recolcive, so that the child of the talent partner has a 25% probability of the normal, 50% as a talent bearer and 25% likelihood of a sufferer The possibility is not dependent on gender, where the synthesis of polypeptide globin beta chains only takes place inside cells of the Eritroid series, although the beta globin gene is also found in other cells of the chromosome (month, 2009). So men and women have the same potential to get the risk of being lowered from both parents who are carriers of thalassaemia. (Brough H dkk dan Bakta IM ., 2006). The results of the research in table 2 in accordance with the research conducted by Syarifunama Dewi di RSUP H. Adam Malik Medan Year 2009 with a number of cases for 3 years as many as 120 people, obtained the most age of Thalasemia sufferers is age 6-15 year is As many as 79 people (65,8%). The theory which states that thalassaemia clinical symptoms have been seen at the age of 2, but new thalassaemia sufferers may have medication at the age of 4-6 years as it becomes more paler, resulting in a periodic tranfusion (Dewi, 2009). At this age, the patient has shown a clinical symptom that will make the elderly patient become obedient to encourage their children to make repeated blood transfusions so that symptoms such as anemia and pale may decrease and routinely consume iron chelation medication to Avoid excess iron on the body.

Table 5. Distibution of Children Thalassemia Patients Based on The Accuracy Drug Doses

Iron Chelation Drugs	Sub Therapy Doses		Over Doses		Appropiate Doses	
	Σ	(%)	Σ	(%)	Σ	(%)
Deferipron	0	0,00	17	20,00	68	80,00
Deferasirox	1	5,88	13	76,47	3	17,65
Total	102					

Table 6. Distibution of Childrean Thalassemia Patients Based on The Number of Potential of Drug Interaction

Iron Chelation Drugs	Number of patient	Percentage of change (%)
Deferoksamin	0	0,00
Deferipron	0	0,00
Deferasirox	0	0,00
Total	0	0,00

Table 3 is the result of the three types of iron chelation drugs currently used are desferoksamin, Deferipron, and Deferasirok. Desferoksamin is a first-line therapy in children. However, Desferoksamine is not recommended for children under the age of 2 years due to higher risk of toxicity at a younger age and in patients with minimal iron deposits. If a poor level of compliance or patient declines, deferipron or deferaksiroks may be an alternative. (Kepmenkes, 2018). According to table 4, the drug used is according to its indicative of 100%. This means the treatment of children's Thalassemia patients has been rational according to their indications, there is no drug administration without any indication. prescribed in the criteria of drug use. The provision of iron moles starts when the level of serum ferritin ≥ 1,000 ng/mL, or blood transfusion 10-15 times, and has received blood as much as 3 liters (Safitri dkk., 2015). However if calculated based on the number of times less significant transfusion of ferritin levels in the body so more prioritized carrying out ferritin levels. Thalasemia major child patients with excess iron transfusions are given therapeutic treatment of iron-rifters, namely Deferasirox and Deferipron, to remove excess iron in the body. So that excess iron in the body can be solved and avoid complications. This means that the therapy given to the patient is in accordance with the indicative. Based on the results of the study table 5 patients receiving less than 1 patient dose (0.98%), dose more than 32 patients (31.37%) and proper dose of 69 patients (67.65%). The evaluation of the rationality against precise dosing is carried out by comparing the number of doses administered to patients with several therapeutic standards used as a reference in dosage calculations. If the drug is administered under the supposed dose, then the therapeutic efficacy will not be achieved. If the drug is administered at an excess dose it will appear the risk of unwanted effects. To improve the therapeutic quality of patients need to be done monitoring therapy and dose adjustment conducted by the pharmacist by working with the doctor. Pharmacist involvement in dose adjustment is also known to provide economical benefits (Tachi et al. 2013). From such data can be seen that there is still less dosing and more than the usual dose stated in the criteria of use of the drug, wherein the dose for children Deferipron 25-33 mg/kgBb orally 3 times a day and Deferasirox 20-40 mg/KgBb/ Day. The way of counting the dose there are several ways such as by using the age, weight, and surface area of the body. Drug interactions are a modification of the effect of a drug caused by other drugs so that the effectiveness and toxicity of one drug or more change (Fradgley, S. 2003). Based on table 6 patients Thalassemia children do not have any potential interactions with other additional medications.

CONCLUSION

Based on the research conducted in one of the Kuningan hospital, it can be concluded that the patients who receive the most treatment of iron-chelation are male patients (54.90%) In elementary school children (44.12%) With the most widely used drug is Deferipron 100mg/5ml (48.04%). The drug of iron is given in accordance with its indication (100%). Deferipron dose given there is more dose (20.00%) and proper dosage (80.00%) And the dose of Deferasirox also given there is less dose (5.88%), more doses (76.47), and proper dose (17.65). While the potential interacation of the drug is no (0%).

REFERENCES:

1. Anggororini, D., Fadlyana, E., & Idjradinata, P. (2009). Korelasi kadar feritin serum dengan kematangan seksual pada anak penyandang thalassemia mayor. Diperoleh tanggal 5 Januari 2015 dari http://indonesia.digitaljournals.org
2. Brough H, Alkurdi R, Nataraja R, Surendranathan A. Rujukan Cepat Pediatri dan Kesehatan Anak, Sam AH ed. Jakarta : Buku Kedokteraan EGC; 2006: 291-2.
3. Bulan, S. (2009). Faktor-faktor yang berhubungan dengan kualitas hidup anak thalasemia beta mayor. Diperoleh tanggal 10 Januari 2015 dari http://www.undip.ac.id
4. Dewi, S. (2009). Karakteristik penderita thalasemia yang rawat inap di Rumah Sakit Umum Pusat Adam Malik Medan.
5. Dona Mirsa.,2015.Jurnal Kesehatan Andalas.Universitas Andalas Padang:Jurnal.fk.unand.ac.id
6. Dr. Ratih P,D.2011. Pengaruh Deferasirox Terhadap Kadar T4 dan TSH pada beta thaslasemia mayor dengan kadar ferritin tinggi. Sari Pediatri.Vol. 12.No. 6.Semarang
7. Drugs.2019.Prescription drug information. Terdapat di https://www.drugs.com/drug_interactions.php. Diakses pada 12 April 2019.
8. Fradgley, S. 2003. Interaksi Obat, Dalam Farmasi Klinis (Clinical Pharmacy) Menuju Pengobatan Rasional dan Penghargaan Pilihan Pasien. PT Elex Media Komputindo Kelompok Gramedia. Jakarta. Halaman 119.
9. Kemenkes RI.2017. Pusat Data dan Informasi Profil Kesehatan Indonesia.
10. Kepmenkes. (2018). Keputusan menteri kesehatan republik indonesia nomor hk.01.07/menkes/1/2018 tentang pedoman nasional pelayanan kedokteran tata laksana thalasemia.
11. Menkes. (2018). Keputusan menteri kesehatan republik indonesia nomor hk.01.07/menkes/1/2018 tentang pedoman nasional pelayanan kedokteran tata laksana thalasemia.
12. Rahayu, H. (2012). Faktor-faktor yang mempengaruhi performa sekolah pada anak dengan thalasemia *yang* menjalankan tranfusi di RSUP Dr. Cipto Mangunkusumo. Diperoleh tanggal 3 Januari 2015 dari http://lontar.ui.ac.id.
13. Safitri,R;Ernawati,J;Karim,D.2015. Hubungan kepatuhan tranfusi dan konsumsi kelasi besi terhadap pertumbuhan anak dengan thalasemia. JOM.Vol 2.No 2. Universitas Riau.
14. Stockley., Baxter, K., 2010. Stockley's Drug Interactions: 9th Edition. Pharmaceutical Pr, London.
15. Whitney EN; Cataldo CD; Roifes SR Understanding Normal and Clinical Nuirition. Second Edition. New York: West Publishing Company, 1987
16. WHO, 2011, Sickle-cell disease and other haemoglobin disorders, diakses 14 Juli 2013;http://www.who.int/mediacentre/factsheets/fs3 08/en/.
17. YTI (Yayasan Thalassaemia Indonesia), 2012, Diakses 17 Juli 2013; http://www.thalassaemia-yogyakarta.org.