e-ISSN 2745-7818

Oral Presentation
SYEDZA SAINTIKA INTERNATIONAL CONFERENCE ON NURSING, MIDWIFERY, MEDICAL LABORATORY TECHNOLOGY, PUBLIC HEALTH, AND HEALTH INFORMATION MANAGEMENT (SeSICNiMPH)

COMPARING THE NUMBER OF RETICULOCYTES IN PATIENTS WITH IRON DEFICIENCY ANEMIA BEFORE AND AFTER TREATMENT WITH IRON PREPARATIONS

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ABSTRACT

Reticulocytes are young erythrocytes that have lost the nucleus, and contain the remains of ribonucleic acid in their cytoplasm, and can still synthesize hemoglobin. Reticulocyte count is an indicator of bone marrow activity. This study aims to determine the comparison of the number of reticulocytes in patients with iron deficiency anemia before and after treatment. Iron is part of the hemoglobin molecule, with reduced iron, the hemoglobin synthesis will be reduced. This research was conducted from June 2012 to July 2013 on iron deficiency anemia patients in RSUP. DJAMIL Padang. The number of samples is 30 people. This research is descriptive in nature, reticulocytes count directly. Data analysis using T test. And the research that has been done shows that there is a significant difference between the number of reticulocytes before and after treatment. Examination showed an increase in reticulocytes after administration of Fe preparations after 5-7 days of treatment. The reticulocyte value before treatment was normal or low.

Keywords: Reticulocytes, Iron Deficiency Anemia, Fe Preparations

INTRODUCTION

Blood is a suspension of particles in a liquid colloid solution containing electrolytes. Its role is as a medium of exchange between fixed cells in the body and the external environment and has protective properties against the organism as a whole and especially to the blood itself. The liquid component of blood, called plasma, consists of 91% to 92% water which acts as a transport medium, and 7% to 9% consists of solid substances. Solid substances are proteins, inorganic elements, organic elements, and enzymes. If the blood has abnormalities it is necessary to do a laboratory examination. (Sylvia, 1994).

Clinical laboratory examination is one of the important diagnostic supports in the medical field. Laboratory examinations are divided into routine examinations, complementary examinations and special examinations. Of the three tests, only the complementary examination can provide an accuracy that is not found in routine examinations. A follow-up examination is a diagnosis if there is an abnormality in a routine examination and is carried out to confirm the presence of a disease. One of the complementary examinations is the reticulocyte count. Reticulocyte examination is used to assess bone marrow activity in producing erythrocytes, to evaluate anemia and is performed to determine effective erythropoesis. (Barbara, 1980; Effendy, 2001)

Reticulocyte count is done by counting the number of reticulocytes in the peripheral blood, which is expressed as a percentage of one thousand erythrocytes. Reticulocytes containing RNA, are slightly larger than mature cells, these cells contain various fragments of mitochondria and other organelles as well as ribosomal RNA. Under normal circumstances the number of reticulocytes in the peripheral blood is only 1 to 2%. The peripheral blood

smear is then stained with a supravital stain which gives blue color to any RNA in immature red blood cells, cells like this appear to have webs or reticulum in them. (Jones, 1995).

The stain used for reticulocyte examination is a special dye, namely Brilliant Cresyl Blue (BCB) or New Methylene Blue. With Brilliant Cresyl Blue, reticulocytes are dark blue in color with a lighter reticulum structure, whereas with New Methylene Blue reticulocytes are pale blue-green in color with a blackish-blue reticulum structure. The blood sample for reticulocyte examination is fresh blood because of the short age of reticulocytes. (Effendy, 2001; Gandrasoebrate-R, 1992)

Anemia is a condition in which the hemoglobin (Hb) level in the blood is less than normal. Iron deficiency anemia is anemia that occurs due to a lack of iron in the blood, which means that the hemoglibin concentration in the blood is reduced due to disruption in the formation of red blood cells / due to a lack of iron levels in the blood. (Hoffbrand, 2005; Supandiman, 1997).

Based on the above background, the authors are interested in conducting a study entitled: "Comparing the number of reticulocytes in patients with iron deficiency anemia before and after treatment with iron preparations"

MATERIAL AND METHODS

This research is a descriptive study that is conducting direct research and statistically processing data. This research was conducted from June 2012 to July 2013, at Dr.M Djamil Padang Hospital. The population was iron deficiency anemia patients. A sample of 30 people was taken from the population as patients. The method used is the conventional method with BCB staining. The collected data were processed manually and the reticulocyte count comparison test was carried out before and after treatment with Fe preparations. Data analysis with T test.

RESULTS

From the results of research carried out at Dr. M. Djamil from June 2012 to July 2013 found an increase in the number of reticulocytes which can be seen in the following table:

No.	Name	Reticulocyte count	
		Before treatment (%)	After treatment (%)
1.	Rk	1.6	1.9
2.	Ety	1.1	1.3
3.	Ns	0.7	1.0
4.	Zr	1.5	1.9
5.	Hn	2.3	2.6
6.	Re	1.4	1.7
7.	Nr	0.5	1.1
8.	As	2.2	3.1
9.	Ym	1.0	1.1
10.	Ht	1.3	1.5
11.	Fm	1.1	1.4
12.	Mm	0.8	1.0
13.	Nb	2.1	2.8
14.	Mg	1.4	1.6
15.	Dy	2.5	2.9
16.	Ws	1.6	1.9
17.	Ptr	0.5	0.7
18.	Ds	1.2	1.7
19.	Ln	2.4	2.7
20.	Wy	0.6	1.1
21.	Str	1.8	2.0
22.	Dv	1.4	1.6
23.	Sa	0.9	1.2
24.	Et	0.7	1.1
25.	Ad	2.2	2.5
26.	Hdl	1.3	1.5
27.	Vd	1.1	1.3
28	Dw	1.4	1.7
29.	Nt	0.6	1.8
30.	Crs	0.7	1.3
Mean		1.33	1.70

DISCUSSION

In the results of the study, comparing the number of reticulocytes in patients with iron deficiency anemia before and after treatment with Fe preparations (5-7 days), found a significant difference. Where there is an increase in the number of reticulocytes after 5 to 7 days of drug administration, which indicates an erythropoises response. As we know, the reticulocyte count is an indicator of bone marrow activity. The number of reticulocytes in the peripheral blood represents an almost accurate erythropoises. And an increase in the number of reticulocytes in the peripheral blood describes the acceleration of erythrocyte production in the bone marrow. Conversely, persistently low reticulocytes may indicate bone marrow hypofunction or aplastic anemia.

Iron is part of the hemoglobin molecule, with the reduction of iron, the

hemoglobin synthesis will decrease and the hemoglobin level will decrease. Hemoglobin is a very vital element for the human body, because low hemoglobin levels affect the ability to deliver O¬¬2 which is needed by all body tissues. So that less or loss of iron in the body will have a lot of effect in the body. Some foods that are high in iron are meat, eggs, fish, liver, soybeans, tofu, shellfish and wheat. What can help iron absorption are vitamin C, vinegar, soy sauce. And what can inhibit is consuming lots of vegetable fiber, absorption of iron tea, coffee.

Iron deficiency anemia is caused by the human body having a limited ability to absorb iron and often the body experiences excessive iron loss as a result of bleeding. The need for iron needed every day to replace the iron lost from the body and for this growth varies, depending on age, gender. The needs increase in infants, adolescents, pregnant, lactating and menstruating women. (Hoffbrand, 2005).

The exchange of iron in the body is a closed circle. Iron that is absorbed by the intestine every day is about 1-2 mg, the excretion of iron through exfoliation is the same as the amount of iron absorbed by the intestine, which is 1-2 mg. Iron that is absorbed by the intestine in the form of transferrin together with iron carried by macrophages is 22 mg with the total amount carried by transferrin, namely 24 mg to be carried to the bone marrow for erythropoesis. The erythrocytes that are formed require 17 mg of iron which is erythrocyte circulating throughout the body, while the 7 mg will be returned to macrophages because they are ineffective. (Devotees, 2007).

In the results of the study, there were some samples whose improvement was more than others. This is due to differences in Fe absorption and is related to the treatment given. The absorption of Fe through the gastrointestinal tract takes place mainly in the duodenum; the more distal the absorption decreases. Iron is easier to absorb in ferrous form. Its transport through intestinal mucosal cells occurs by active transport. The ferrous ion that has been absorbed will be converted into ferric ions in mucosal cells. Furthermore ferric ions will enter the plasma with transferrin as an intermediary, or be converted into ferritin and stored in intestinal mucosal cells. When Fe is given IV, it is quickly bound by apoferritin (the protein that forms ferritin) and stored mainly in the liver, whereas after oral administration it is mainly stored in the spleen and bone marrow and its absorption is influenced by the acidic stomach. (Wardhini, 1998; Mason, 2006).

According to research by Wahyuni Saddang, a student of Hasanudin University Faculty of Medicine, "The Effect of Parenteral and Oral Iron Administration on Erythrophysiis Response in Post Saline Patients with Iron Deficiency Anemia" states that the increase in reticulocytes after parenteral iron therapy is higher than oral iron therapy. Wherein parenteral iron administration, the reticulocyte value began to increase on the third day as well as on the seventh day, it increased significantly, whereas in oral iron the reticulocyte value increased on the third day but not significant, a significant increase was seen on the seventh day.

The time for this oral iron administration must be long enough, namely to restore the body's iron reserves otherwise anemia often recurs. The success of this oral iron therapy causes rapid reticulocytosis within about one week and significant hemoglobin improvement within 2-4 weeks, whereby there will be complete improvement in anemia within 1-3 months. this does not mean that therapy is stopped but therapy should be continued for up to 6 months to replenish the body's iron reserves. Several things that cause the failure to respond to oral bei preparations include ongoing bleeding, patient non-compliance in taking insufficient (irregular) doses of medication, malabsorption, misdiagnosis or multifactorial anemia. (Bakta, 2007; Haffbrand, 2005).

In addition, the side effects of parenteral iron are more dangerous. Given the many side

effects, parenteral administration should really be considered. Infusion should be given with care. Hypersensitivity test should be performed first, and the patient should be observed during the infusion so that the possibility of anaphylaxis can be anticipated. (Bakta, 2007; Haffbrand, 2005).

CONCLUSION

From the research that has been conducted on the number of reticulocytes in patients with Iron Deficiency Anemia before and after treatment with preparation F, the following conclusions are drawn: The reticulocyte count before treatment is normal or decreased, The number of reticulocytes after treatment with Fe preparations increased. There is a significant difference between the number of reticulocytes in patients with iron deficiency anemia before and after treatment with iron preparations.

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