LITERATURE REVIEW : OVERVIEW OF MEAN PLATELET VOLUME AND COUNT PLATELET IN PATIENTS WITH DIABETES MELLITUS TIPE II

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ABSTRACT

Introduction*: Diabetes Mellitus is a disease characterized by hyperglycaemia associated with a deficiency of insulin secretion. Type II Diabetes Mellitus is characterized by decreased insulin sensitivity. In type II diabetes mellitus, there is an acceleration of thrombopoiesis and an increase in platelet turnover. This study aims to determine the description of MPV (Mean Platelet Volume) and platelet count in patients with type II Diabetes Mellitus.* ***Methodology*** *: The research design used is the Literature Review method . Data collection uses electronic databases, namely Google Scholar, Pubmed and Researchgate, both national and international journals.* ***Research findings*** *: Data collection was carried out through 3 analyzed journals. Where in the three journals analyzed, the results of the platelet count varied, while the MPV increased in patients with type II diabetes mellitus.* ***Conclusions*** *: Based on the results of a literature review that has been carried out by researchers, it can be concluded that there are variations in the description of the platelet count in type II diabetes mellitus, there is a decrease in the platelet count and the result in the platelet count in the normal range (254,550-284,210 cells/mm3). However, the value of MPV increased in patients with type II diabetes mellitus in the range (7.4 – 9.91 fL).*

Keywords: Diabetes Mellitus Type II, MPV (Mean Platelet Volume), Platelet Count

1. INTRODUCTION

Diabetes Mellitus is a disease characterized by the occurrence of hyperglycemia and metabolic disorders, symptoms that people with Diabetes Mellitus complain about are polydipsia, polyuria, polyphagia, weight loss, tingling [2]. Diabetes Mellitus is classified into several types, namely, Type I Diabetes Mellitus, Type II Diabetes Mellitus, Gestational Diabetes, and other specific types of Diabetes [1].

The results of Riskesdas 2018 show that the prevalence of diabetes mellitus in Indonesia based on a doctor's diagnosis at the age of 15 years is 2%. This figure shows an increase compared to the prevalence of diabetes mellitus in the population of 15 years in the 2013 Riskesdas results of 1.5%. The high prevalence of type II diabetes mellitus is caused by risk factors that cannot be changed, one of which is genetic factors and one that can be changed is smoking habits [2].

In patients with type II diabetes mellitus, there is an acceleration of thrombopoiesis and an increase in platelet turnover or what is commonly called platelet

turnover. The twofold increase in platelet turnover occurs due to decreased platelet survival time and increased entry of new platelets into the circulation. When platelet turnover increases, there is an increase in the size of larger and reactive platelets released from the spinal cord megakaryocytes, making them more thrombogenic [3].

The mean platelet volume is the average number of platelets that describes the function and activity of platelets [4] . MPV can be used as an indicator of an increase in platelet reactivity [5] . Based on this background, this study will focus on the overview of mean platelet volume and platelet count in patients with type II Diabetes Mellitus.

2. METHODS

2.1. Journal Search Strategy

This study was conducted using a literature review method that examines the Overview of Mean Platelet Volume and Platelet Count in Patients with Type II Diabetes Mellitus. Collecting data using electronic databases, namely Google Scholar, Pubmed and Researchgate with a search strategy based on the PICOST problem analysis.

Table 1. PICOST Problem Analysis

NO	Metode PICOST	Problem Analysis
1	Population (P)	Patients with Type II Diabetes Mellitus
2	Intervention (I)	No Special Treatment
3	Comparation (C)	There is a comparison
4	Output (O)	MPV and Platelet Count
5	Study (S)	Cross Sectional
6	Time (T)	2017-2018

2.2. Data analysis

Based on a literature search with the theme Overview of Mean Platelet Volume and Platelet Count in Patients with Type II Diabetes Mellitus, data was obtained which was then made in the form of a table consisting of the author, title, name of the journal and the year of publication of the journal.

Table 2. Data Analysis

No	Writer	Title	Journal	Publication Years
1.	Buch A, et al	Platelet volume indices as predictive biomarkers for diabetic complications in type 2 diabetic patients.	Journal of Laboratory Physicians	2017
2.	Bhatta S, et al	Mean Platelet Volume and Platelet Count in Patients with Type 2 Diabetes Melitus and Impaired Fasting Glucose.	Journal Nepal Health Res Counc 2018 Oct-Dec;16(41): 392-5	2018
3.	Umarani, James & Barathi	Study on Mean Platelet Volume and Platelet Count in Diabetes Melitus Type 2.	Pacific Group of e-Journals (PaGe)	2017

3. RESULTS

Based on the literature review search results about the image of the Overview of Mean Platelet Volume and Count Platelet in Patients with Diabetes Mellitus Type II literature obtained three journals internationally were used in this study are listed in Table 3.

Table 3. Analysis of Literature Review Results

No.	Writer, Publisher, Publication Years	Title	Methods,Sampels, and Research Instrument	Results
1.	Buch A, et al. (Journal of Laboratory Physicians). (2017).	Platelet volume indices as predictive biomarkers for diabetic complications in type 2 diabetic patients.	Cross sectional. (500 people (300 people patients with diabetes, 200 the non- diabetic)	The number of platelets decreased significantly in people with Diabetes Mellitus. While the MPV values for diabetics (9.91 fL) and non-diabetic patients (8.84 fL)
2.	Bhatta S, etal. (J NepalHealth Res Counc 2018 Oct-Dec;16(41): 392-5).(2018)	Mean Platelet Volume and Platelet Count in Patients with Type 2 Diabetes Melitus and Impaired Fasting Glucose.	Cross sectional. (300 people (100 people non- diabetic, 100 people with fasting glucose disorders , 10 0 people patients with diabetes))	The results of the platelet count in type II diabetes mellitus were 254,550 cells/mm3 and in non-diabetics, the platelet count was 255,060 cells/mm3. Meanwhile, MPV in diabetes mellitus patients increased with MPV value (7.4 ± 0.77 fL) and in non-diabetics the MPV value (6.06 ± 0.41 fL)
3.	Umarani, James& Barathi. (Pacific Group of e-Journals (PaGe)) .(2017)	Study on Mean Platelet Volume and Platelet Count in Diabetes Melitus Type 2.	prospective. (150 people (100 people patients with diabetes, 50 people controls)).	The results of the platelet count in patients with type II diabetes mellitus were 284,210 cells/mm3 and the platelet count in non-diabetic patients was 298,180 cells/mm3. Meanwhile (MPV) increased in patients with type II diabetes mellitus with a value of (9.64 fL) and in non-diabetic patients with a value of 8.66.

4. DISCUSSION

Based on the three journals were obtained and analysed there are similarities in the first journal, second and third in the examination of the hematologic parameters in patients with diabetes mellitus type II. Mean Platelet Volume increases are significant in patients with diabetes mellitus type II. The increase in MPV is due to platelet dysfunction and platelet size in type II diabetics, where MPV is an indicator of the average size of platelets and platelet activity. So that this platelet dysfunction causes an increase in the value of MPV.

In addition, there are differences in the number of platelets in the first journal with the second and third journals, where in the first journal there is a decreased platelet count in patients with type II diabetes mellitus compared to controls. According to [3] Count of platelets are low or thrombocytopenia can be caused due to a decrease in production by the bone marrow due the reduction of selective megakaryocytes were associated with the use of drug, can also be caused due to the increase in turnover of platelets caused platelet activity related to the type II diabetes mellitus. The results of the platelet count in

patients with type II diabetes mellitus with the use of drugs are in the range of 264.017 cells/mm3.

Judging from the results of the platelet count, the results of the platelet count were within the normal range. Because the number of normal platelets in the blood is 140.000-450.000 cells/mm3 [6] .

In the journal the second and the third obtained the results of the number of platelets is not there a difference that is significant in patients with diabetic and non-diabetic, because in patients with type II diabetes mellitus disruption of the function of platelets. Where platelets are still produced, but there is an increase in platelet turnover. Therefore platelets produced is (immature, more substle, more active and thrombogenic). The number of platelets depends on several variables, namely: platelet survival, platelet production rate, and platelet turnover rate .

Of the three journals in the review found varied results, the first journal found decreased platelet count while in the second journal and third journal obtained the number of platelet in the normal range (254.550-284.210 cells/mm3) . However, in the third journals it was found that MPV increased in patients with type II diabetes mellitus.

The limitations in this literature review contained in the research [8] showed platelet count decreased, but not described related result the number of platelets decreases it.

5. CONCLUSIONS

Based on the results of a literature review that has been carried out by researchers, it can be concluded that there are variations in the description of the platelet count in type II diabetes mellitus, there are decreased platelet count results and the platelet count results are in the normal range (254,550-284,210 cells/ mm 3) . However, the value of Mean Platelet Volume increased in patients with type II diabetes mellitus in the range (7.4-9.91 fL).

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