Results of Thrombocyte Examination with Addition of Coagulation of EDTA and Na Citrate in DHF Patients in Mitra Keluarga Kemayoran Hospital

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Abstract

Indonesia is one of the countries with the second highest dengue cases in Southeast Asia in 2004- 2010 (WHO, 2012). Examination used in diagnosis of DHF diagnosis is platelet count, which is done at Mitra Kemayoran Hospital, if a clot occurs when checking platelets using EDTA anti- coagulant. The purpose of this study was to determine differences in platelet count results using EDTA and Na Citrat anticoagulants. This research was conducted at Mitra Kemayoran Hospital in April - June 2018. The samples in this study were all patients who performed platelet count examination at Mitra Kemayoran Hospital in April - June 2018. The data in this study were carried out by examining the platelet count using anticoagulants EDTA and Na Citrat. The data in this study were analyzed using Normality Test and t-est Test. The results at this time obtained the p-value of the examination results of 0.222 from these results can be censored if there are no correct results from examining the platelet count using EDTA and Na Citrat anticoagulants.

1. INTRODUCTION

Dengue Hemorrhagic Fever (DHF) is considerably a new disease or a new variant of dengue infection because of its unusual hemorrhages and the shock syndrome so-called dengue shock syndrome (DSS) which has been known for more than a century in Asia are largely age dependent, the disease is mild in children and more severe in adults. Infants and young children with dengue infection have syndrome ranging from undifferentiated fever to mild febrile illness sometimes with the triad of high fever, pain in various parts of the body and rash. The disease is known as non-fatal, death is rather an exceptional. DHF on the contrary, attacks mostly children under age 14 years and caused significant mortality among preschool age children of Southeast Asia and the Western Pacific regions where classical dengue syndrome is a rare incidence among indigenous people (Nimmannitya, 1975).

DHF is a disease that affects many people in the world with a high prevalence of events. World Health Organization (WHO) said Indonesia is the second highest DHF country in Southeast Asia between 2004-2016 (Indonesian Public Health Office, 2012). DHF events in Mitra Keluarga Kemayoran Hospital in 2017 were 419 cases with a decrease in platelet counts of 419 cases.

Examination used in the diagnosis of dengue fever included platelet counts. This is because thrombocytopenia and haemoconcentration are constant findings in DHF. A drop in platelet count to below 100.000 per mm^3 is usually found between the third and eight day of illness, often before or simultaneous with changes in haematocrit

An adequate supply of circulating platelets is essential to maintain vascular integrity and to facilitate thrombus formation at sites of vascular injury. The normal platelet

count in humans ranges from 150×10^9/L to 400×10^9/L. Thrombocytopenia is usually an acquired disorder from the situation where platelet count less than 150×10^9/L, Thrombocytosis, defined as a platelet count exceeding the upper limit of the normal range ($>400 \times 10^9$/L), is associated with an increased risk of thrombosis. (Daly, 2011).

The platelet count measures the number or concentration of platelets in the blood stream. The normal platelet count is between 150 and 450 billion (or 109) per liter of blood. In some cases, the platelets are expressed as the number per cubic millimeter or microliter of blood, with the normal range being between 150.000 and 450.000. For sake of simplicity, the easiest way to express the normal platelet count is 150 to 450 (George & Buchanan, 2012).

Platelet count testing uses several anticoagulants including heparin, and EDTA anticoagulant (Handayani, 2009). Anticoagulants are additives that inhibit the clotting of blood and/or plasma, thereby ensuring that the concentration of the substance to be measured is changed as little as possible before the analytical process (Guder 2001). Anti-coagulation is achieved either by the binding of calcium ions (EDTA, citrate and fluoride) or by the inhibition of thrombin (heparin) (Mohri, et al., 2007).

Based on preliminary research conducted at Mitra Kemayoran Hospital, it is known that platelet examination using EDTA anticoagulants occurs in clumps which cause the results of the examination to be less valid. The most ideal examination of platelet counts uses Sodium Citrate anticoagulants, Na Citrate (Longo, 2010).

Sodium citrate has been used as an anticoagulant to stabilize blood and blood products for over 100 years, presumably by sequestering Ca^{2+} ions in vitro. Anticoagulation of blood without chelation can be achieved by inhibition of the contact pathway by corn trypsin inhibitor (CTI) (Mann et al., 2007).

2. RESEARCH METHODS

The place and time in this study were the Kemayoran Mitra Keluarga Hospital in May - June 2018. The object of this study was patients with Dengue Hemorrhagic Fever (DHF) who performed thrombocyte examinations at Mitra Keluarga Kemayoran Hospital in May - June 2018. The population in this study is all patients suspected of dengue fever that perform thrombocyte examinations at Mitra Kemayoran Hospital who conduct examinations in May - June 2018. Samples in this study were drawn by Total Sampling Technique. The data in this study were collected by examining platelet counts using EDTA anticoagulants and Na citrate. The data in this study were analyzed using the T-test with Minitab.

3. RESULTS AND DISCUSSION

The data in this study were analyzed using the Kolmogorov-Smirnov normality test. The results of the normality test on this research data are presented in the following Table 1.

Tabel 1. Normality Test Result

Mean	-2140
StDev	10180
N	35
KS	0.125
P-Value	>0.150

Based on table 1 it is known that the value of the p value homogeneity test is less than 0.15, this means that the data is normally distributed so that it can be continued using the T-test. The value of the T-test in the study was analyzed using MINITAB with results such as Table 2 below.

Table 2. Paired t for Thrombocyte EDTA – Thrombocyte Citrate

	N	Mean	St. Deviation	SE Mean
Thrombocyte - EDTA	35	62343	28093	4749
Thrombocyte – Citrate	35	60203	25403	4294
Difference	35	2140	10180	1721

Based on table 2 it can be seen if the p value is 0.222, with these results it can be seen if there is no significant difference in the results of the platelet count examination using EDTA anti-coagulant and Na Citrate. The statistical results showed no significant difference, but several study samples had different platelet count values, differences in platelet count values with the use of anti-coagulant EDTA and Na Citrate because the most ideal anti-

coagulant platelet count used was Na Citrate compared to EDTA.

The most ideal examination of platelet counts uses Sodium Citrate anticoagulants, Na Citrate and Heparin (Longo, 2010). EDTA coagulation can reduce platelet activity to aggravate (cluster) with calcium and freeze quickly, but EDTA binds potassium and platelets cannot move to prevent the occurrence of adhesion (Gandasoebrata, 2008).

The essential roles for calcium ion in blood clotting reactions were demonstrated by Arthus between 1890 and 1896. Ca^{2+} required for blood clotting could be neutralized by the addition of Na citrate. The prothrombin time (PT) and the activated partial thromboplastin timemake use of citrate plasma, a source of Ca^{2+} and either tissue thromboplastin or contact activation. Typically blood is collected into 3.2% or 3.8% sodium citrate and plasma is prepared by differential centrifugation. Reactions are initiated by the addition of Ca^{2+} solutions sufficient to overcome the citrate. Citrate anticoagulation has enabled tests of coagulant function and has provided stable sources of both blood and plasma for clinical use, protein isolation and biochemical studies (Mann et al., 2007).

4. CONCLUSIONS AND RECOMMENDATIONS

The conclusion of this study is that there is no significant difference between the use of anti-coagulant EDTA and Na citrate in the examination of platelet counts in DHF patients

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