Jurnal Analis Medika Biosains (JAMBS)
Vol.9, No.1, Maret 2022, pp. 09 - 14
ISSN: 2656-2456 (Online)
ISSN: 2356-4075 (Print)

Perbedaan Jumlah Trombosit pada Produk Trombosit Konsentrat (TC) yang berasal dari Kantong Darah 350 Ml Dan 450 Ml Di UTD PMI Kota Surabaya

Yustisia Amalia[1], Wiwid Samsulhadi[2], Darmawati[3]
[123] Program Studi D-III Teknologi Bank Darah Fakultas Ilmu Kesehatan Universitas Dr.Soetomo Surabaya

Article Info

Artcle history :
Received, Aug 19th 2021
Revised, Feb 23th 2022
Accepted, Feb 25th 2022

***Keyword** :*
Trombosite Concentrat (TC), Platelet Count

ABSTRACT

One of the blood products produced by UTD is platelets. To ensure the quality and quantity of platelets, it can be assessed from the number of platelets, storage temperature, oscillation, permeability of blood bags, and pH as well as the presence or absence of bacterial contamination. Platelets are obtained from Whole Blood (WB) which is accommodated into a sterile blood bag system with an integrated transfer bag, the content of suspended platelets in plasma, quality control of platelet components can be carried out by checking the platelet count of the TC product that has been produced. The purpose of this study was to determine the difference in the number of platelets per unit in the TC product between the volume of blood bags of 350 ml and 450 ml. The study used an observational analytic method with a cross-sectional approach. The data obtained were analyzed directly, this research was carried out from August to October 2019 at the Laboratory of the Indonesian Red Cross Blood Transfusion Unit, Surabaya City. The sample used for this research is the result of the inspection data of TC product samples, totaling 44 samples of TC products. The results of the study prove that the number of platelets in a collectible TC product can be influenced by the volume of whole blood bags as the starting material for the manufacture of a TC product.

ABSTRAK

Salah satu produk darah yang di hasilkan oleh UTD adalah trombosit, Untuk menjamin kualitas dan kuantitas trombosit dapat dinilai dari jumlah trombosit, suhu simpan, goyangan, permeabilitas kantong darah, dan pH serta ada tidaknya kontaminasi bakteri. Trombosit didapat dari *Whole Blood*(WB) yang ditampung ke dalam sistem kantong darah steril dengan kantong transfer yang terintegrasi, kandungan trombosit tersuspensi didalam plasma, pengawasan mutu komponen trombosit dapat dilakukan dengan pemeriksaan jumlah trombosit terhadap produk TC yang telah dihasilkan.Tujuan penelitian ini adalah untuk mengetahui perbedaan jumlah trombosit per unit pada produk TC antara volume kantong darah 350 ml dan 450 ml. Penelitian menggunakan metode analitik observasional dengan penedekatan *cross-sectional*. Data yang didapatkan dianalisa secara langsung, penelitian ini dilaksanakan pada bulan Februari sampai October 2019 di Laboratorium Unit Transfusi Darah Palang Merah Indonesia Kota Surabaya. Sampel yang digunakan untuk penelitian ini merupakan hasil data pemeriksaan sampel produk TC yang berjumlah 44 sampel produk TC.Dari hasil penelitian membuktikan bahwa Jumlah trombosit dalam suatu produk TC yang dapat dikoleksi, dapat dipengaruhi oleh volume kantong darah *whole blood* sebagai bahan awal dari pembuatan suatu produk TC.

Kata Kunci : Produk Trombosit, Jumlah Trombosit

BACKGROUND

The blood taken directly from the donor is called Whole Blood (WB), mixed with anticoagulants that are already available in blood bag packaging with a volume of 350 ml and 450 ml with the aim of clotting the donor's blood so that it can be stored and given to the patient. From this bag the blood can be separated into concentrated Red Blood Cells or known as Packed Red Cells (PRC), Platelet Rich Plasma (PRP), Cryoprecipitate and Thrombocyte Concentrate (TC)), Fresh Frozen Plasma (FFP), so that from one the bag can be used for more than one patient appropriately.

One of the blood products produced by UTD is platelets. To ensure the quality and quantity of platelets, it can be assessed from the number of platelets, storage temperature, oscillation, permeability of blood bags, and pH as well as the presence or absence of bacterial contamination. According to the Regulation of the Minister of Health number 91 of 2015 concerning blood service standards, Platelets are obtained from Whole Blood (WB) which is accommodated into a sterile blood bag system with an integrated transfer bag, the content of suspended platelets in plasma, quality control of platelet components for parameters examined related The final platelet count per unit is not stated, it is obtained from a whole body volume of 350 ml or 450 ml with a platelet count specification of 60 x 109.

Platelets are blood cells used by the body in the clotting process when injured, especially if the wound is unable to be closed by vasoconstriction of blood vessels. megakaryocytes) through stimulation of a humoral stimulator called thrombopoietin, whose levels will increase in cases of thrombocytopenia.

Concentrated platelets are blood components containing platelet cells with a volume of about 50 ml, an ambient temperature between 20^{o}C – 24^{o}C and a shelf life of five days with shaking. Concentrated platelets are useful for increasing the number of platelets in adult patients after transfusion, an average of 5000- 10000/µL.

METHODE

The type of research used by the researcher is observational analytic research, with a cross sectional approach, namely research that analyzes data obtained directly and carried out within a certain period of time. In this study, researchers looked at the relationship between complete blood bag volume (WB) and the number of platelets in TC products at UTD PMI Surabaya City. The sample in the study was some of the TC products produced at UTD PMI Surabaya City in August - October 2019 as many as 44 bags.

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RESULT

Table 1 –Cross tabulation between the number of platelets from 350 ml and 450 ml blood bags at UTD PMI Surabaya City

No	Platelet count / Blood bag	350 ml		450 ml	
		Amount	(%)	Amount	(%)
1	Pass spesification	13	90	21	100
2	Did not pass spesification	9	10	1	0
	Total	22	100	22	100
	Crosstabulation Chi-Square Test = 0,004				

Based on Table 1, the number of platelets that met the specifications were mostly from 450 ml blood bags as many as 21 samples (95.4%), and a small portion was in the 350 ml bag type, namely 13 samples (10%). Of the 44 samples examined which were declared to meet the specifications, 34 samples (77.2%), and those who did not meet the specifications or did not pass as many as 10 samples (22.7%).

Based on the results of the chi-square test, it is known that the significant value is 0.004. The value of sig.< 0.05, then based on decision making, it can be concluded that H^0 is rejected, meaning that there is a difference between the number of platelets and the volume of blood bags in the platelet component product. Likewise, when viewed from the calculated Chi-Square value (8.282) Chi-Square Table 3.841. The value of X2 Chi-Square Table, then H0 is rejected and Ha is accepted, which means there is a difference in the number of platelets to the volume of blood bags in TC products.

DISCUSSION

Concentrated platelets are blood components containing platelet cells with a volume of about 50 ml, an ambient temperature between 20ºC – 24ºC and a shelf life of five days with shaking. Concentrated platelets are useful for increasing the number of platelets in adult patients after transfusion, an average of 5000- 10000/µL. Platelets are cells that are needed in the process of primary hemostasis and circulate in the body in the amount of 150,000-450,000/mm. Platelet transfusions are given when the number of platelets in a person's body ranges from 20,000–50,000/mm. Platelet products are used to treat a bleeding process, decrease the number of platelets and function abnormalities. Platelet transfusions are often given as

supportive or prophylactic therapy in patients with thrombocytopenia, and are administered according to the ABO blood group.

Centrifugation is a critical step used to separate cellular blood components from plasma, if platelets are not to be made, they must be clean. If platelets are to be made, centrifugation must separate the red blood cells from the platelet rich plasma or from the buffy coat and plasma. Platelets should be separated during the second centrifugation stage. The centrifuge parameters used must be validated before the blood components are processed. After centrifugation, the blood bag must be carefully placed in the plasma extractor or in an automatic separation system so that the layers of blood components can be transferred into the stacked satellite bag.

The manufacture of TC component products is done manually, namely by collecting complete blood from the donor, then the blood bag is rotated using a Refrigerated Centrifuge at a certain speed and time so as to produce TC products in the amount of 40-70 ml per bag. Donor complete blood collection is not accompanied by an initial hematological examination before making a donation, donor selection is carried out the same as other complete blood collections.

Thrombocyte Concentrate or this concentrated platelet contains platelets, some leukocytes and red blood cells and plasma. One bag of concentrated platelets derived from 450 ml of whole blood from a donor contains approximately 5.5 x 1010 platelets with a volume of about 50 ml. In one bag of concentrated platelets derived from 450 ml of whole blood is estimated to increase the number of platelets by 9000-11,000/ul/m2 of body surface area; in adults weighing 70 kg is estimated to increase 5000-10,000/ul.

The number of platelets in TC products produced from 350 ml blood bags contained 13 samples (59.1%) that met the specifications or passed and 9 samples (40.9%) did not meet the 2015 PMK specifications (>60x109). For the type of bag with a volume of 450 ml that met the specifications or passed as many as 21 samples (95.4%), and TC products produced from this 450 ml blood bag, there was only 1 sample (4.5%) that did not meet the specifications or did not pass.

From the results of the study, there was a difference between the number of platelets in the TC product and the volume of blood bags obtained by performing the chi-square crosstab test. Based on the results of the chi_square test, the significant value is 0.004. The value of sig < 0.05, then based on decision making it can be concluded that H0 is rejected. it means that there is a difference between the number of platelets per unit on the TC product to the volume of blood bags of 350 ml and 450 ml.

The difference in the number of platelets in these two types of bags indicates that the volume of the initial blood bag can be used as a consideration for quality because it has a good impact on the quality of platelets in an UTD and provides benefits to patients who will use the product. The volume of platelet product is around 40-70 ml in both 350 ml and 450 ml bags, for the product volume of these two types of bags is the same but the content of the platelet count is different.

Quality control of platelet concentrate products must be carried out every month, at least 4 units are taken, data or results of examination of the platelet count must show at least 75% of the product contains the required platelet count 60x109 for the platelet component of whole blood.

CONCLUSION

The number of platelets per unit in a blood bag volume of 350 ml of the total samples studied (22 samples) tends to be low, there are 9 samples (40.9%) that do not meet the 2015 PMK specifications (>60x109). The number of platelets per unit in a blood bag volume of 450 ml of the total samples studied (22 samples) only 1 sample (4.5%) did not meet the 2015 PMK specifications (>60x109). The results of the study prove that there is a relationship between the number of platelets and the volume of the blood bag. The volume of whole blood as the starting material for the manufacture of TC products is one of the factors that can affect the number of platelets that can be collected.

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