Platelet rich plasma-platelet concentrate (prp-pc) analysis

Quality assessment of platelet concentrates prepared at Dr. Pinnameneni Institute of Medical Sciences and Research Foundation

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Background

Platelet rich plasma-platelet concentrate (PRP-PC) were prepared and their quality variables were evaluated.

Material and methods

In this study platelet products were prepared using platelet rich plasma method. After preparation the products were transferred to platelet incubator and agitated. Their quality was assessed after 24 hours of preparation using the following parameters: volume of the platelet concentrate, platelet count, RBC contamination, morphology and pH.

Results

Volume 90% of the RDP was weighing between 50 to 70 ml, 4% below 50 and 6% above 70 ml. The count correlated well in both the methods and 85% of RDP had a count of above 5. 5 x 1010, 15% had below 5 x 1010. Ph: 56% of the RDP had of 6. 3 to 6. 5, 33% had 6. 6 to 7. 0 and 6% at 6. 2 and 5% above 7. 0. Appearance: 86% was light straw colored, 3% light pint, 6% pink and 5% red.

Conclusion

During the storage of platelet concentrates there is progressive loss in capacity of survival and function of platelets. In order to maximize the

preservation of platelet viability it is best to allow PRP to repose at room temperature for 1-2 hours and then transfuse as soon as possible. To maximize the therapeutic values of platelet concentrates quality control is essential and helps to identify trouble shooting in procedures. In conclusion more than 95% of the RDPs prepared meet the standard.

Keywords: Platelet rich plasma-platelet concentrate, quality parameters, platelet count

Introduction

Transfusion medicine has over the years evolved to assume a complex medical discipline that aided or modified patient care. Blood donation culture has not been fully imbibed in our society and homologous blood is usually in short supply in the blood banks with its attendant consequences in patient management [1] .

Platelet transfusion therapy has played an important role in the management of patients [2, 3]. Today, platelet concentrates are prepared from whole blood either by differential centrifugation buffy coat-derived platelet concentrates (BC) or by platelet rich plasma- platelet concentrates (PRP-PC) and plateletpheresis [(4, 5).]

There are several methods for quality control of platelet components including cell counting, pH, volume and morphology.[6. 7. 8].

The aim of this study was to evaluate the quality of platelets during the storage of platelet concentrates derived from PRP-PCs and whether patients got adequate therapeutically useful amount of platelets.

Materials and Methods

The present study was conducted at blood bank, PSIMS & RF, Andhra Pradesh, India. The study was carried out on 100 patients. Platelet products were prepared from whole blood using platelet rich plasma method. After preparation these were stored in platelet incubator and agitated. Their quality was assessed after 24 hours of preparation using the following parameters: volume of the platelet concentrate, platelet count, RBC contamination, morphology and pH. For the study, samples were taken from the segment of tubing in the platelet concentrate bag to maintain sterility inside the bag.

Volume

The volume of the platelet concentrates were measured by deducting the volume of the empty bag from the volume of the platelets concentrate bag in ml. The measurements were recorded.

p ^{H}

p ^{H} of the platelet concentrate units were checked by the use of semi-quantitative dipsticks (Bayers multistix strips)

Total Platelet Count

Platelet count was done by 2 methods

Automated method by using fully automated analyzer Sysmex KX-21 to assess the quality o the platelets. Counting was based on impedance technology.

Manual method using counting chamber.

RBC contamination

Platelet concentrate unit was checked by visual inspection or various colours.

Morphology

Morphology was analyzed by staining smear by leishman stain.

Results

1. Volume

95% of PRP-PC was weighing between 55 to 75 ml and 5% below 55.

p H

76% of the PRP-PC had of 6. 3 to 6. 5, 20% had 6. 6 to 7. 0 and 4% below 6. 3.

Total Platelet Count

The count correlated well in both the methods and 90% of PRP-PC had a count of above 5. 0 x 10^{10} and 10% below 5 x 10^{10} .

4. RBC contamination

92% was light straw colored, 4% light pint and 4% pink.

Morphology

94% of the platelets were discoid, 4% spherical and 1% fragmented.

Discussion

The potential of transfused platelets to circulate and function is dependent on ex-vivo and in-vivo factors. The percentage of platelets that maintain discoid form is a primary and simple indicator for the quality of the stored platelet concentrates. PCs been gently prepared and then immediately transfused without a storage interval have high retrieval, good survival and conserved function.

Quality assessment of platelet concentrates is an important step to evaluateex-vivofunctional viability of platelet concentrates and post transfusion recovery and survival in donee. Various variables are used for routinequality assessment of platelet concentrates such as volume, platelet count, morphology, RBC contamination and pH.

Conclusion

During storage, platelet concentrates gradually lose the capacity to survive and function. In order to preserve platelet viability, PRP should be allowed to rest at room temperature, for 1-2 hours and transfused as soon as possible thereafter. There is a need to improve the quality of the platelet concentrates being prepared to get maximum therapeutic values. Doing quality control is essential and it is not only valuable in itself but also helps in identify trouble shooting of the procedures. In conclusion more than 95% of the PRP-PC prepared met the standards.

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