Proceeding

The Primary Role of Development LPPC in PAS in Blood Transfusion Centre, Faculty of Medicine Khon Kaen University, Thailand

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Background and objective: Platelet additive solutions (PAS) are crystalloid nutrient media used in place of plasma for platelet storage. They replace 60-70% of plasma in platelet components. So the amount of storage plasma can be decreased. Platelet stored in PAS have been demonstrated to have a lower risk for allergic transfusion reactions and appeared to have equivalent clinical efficacy for controlling bleeding, compared to platelets stored in 100% plasma. We try to bring PAS to replace plasma in making leukocyte poor platelet concentrates (LPPC) compared with conventional methods that use plasma, 1 bag of total buffy coat 4 units. This study aimed to prepare LPPC in PAS in our routine work, instead of the traditional LPPC.

Methods: PAS and plasma using a ratio of 65:35 in accordance the standard reference. Then LPPC in PAS were measured the volume, content of platelet concentrates, white blood cell contamination and the titer of anti-A and anti-B compared to traditional methods.

Results: LPPC in PAS had volumes 304 ± 20 ml, content of platelet concentrates 2.8 ± 0.5X10^{11} cells/unit and had 0.1X10^{9} white blood cells contamination. LPPC from traditional methods had volumes 324±16 ml, contents of platelet concentrates 3.9 ± 0.3X10^{11} cells/unit and had 0.1X10^{9} white blood cells contamination. The titer of anti-A and anti-B in LPPC in PAS is less than or equal to 64, all of which are classified as low titer, but LPPC from the traditional way with a titer of anti-A and anti-B over 64 about 20 %.

Conclusion: All of LPPC in PAS are classified as low titer, which led to the patient at any group. Statistical tests showed that there was no difference in volumes and white blood cells contamination from the two methods, but the content of platelet concentrates obtained from traditional methods over to new methods of statistical significance. However, the content of platelet concentrates from LPPC in PAS provides reached the recommended quality of Council of Europe (EU) and National Blood Centre, Thai Red Cross Society (TRC) which contents of platelet concentrates equal or more than 2.4X10^{11} cells/unit. This may be due to a new method that we have developed a process to make it better in the future.

Key Words: LPPC, PAS

Introduction

Platelet additive solutions (PAS) have been used to store platelets since the 1980s.[1,2] PAS storage of pooled buffy coat prepared platelet concentrates(PC) have long been used in Europe.[3] The advantages of using a PAS for platelet storage are many including more plasma to meet patient needs or to fractionate into plasma-based products, reduced red cell hemolysis from ABO incompatible plasma and reduce other adverse effects related to plasma transfusion.[4-6] Reduction in plasma volume with anticipated benefits in reduced allergic reactions, and possibly transfusion-related acute lung injury(TRALI).[7]

PAS compose of citrate, acetate, phosphate, magnesium, potassium and gluconate. Each type of PAS, these components will be different. PAS has been used as a platelet storage medium in apheresis platelets and buffy coat-derived platelets. It is not only used, but used in combination with plasma. The propotion of plasma range from 20 to 50% and PAS 50 to 80%.

The advantages of PAS are improve the efficiency of platelet collections: additional volume for more collection, maximize the capability to collect multiple blood components, facilitate pathogen inactivation, increase storage time to 7 days with bacterial detection test and due to decrease in the titer of ABO agglutinins, platelets in PAS do not require ABO compatibility between donor plasma and recipient cells or use as universal platelet.

Buffy coat pooling, usually 4-6 BCs are connected to a pooling system / SCD connected to each other, together with 1 unit of PAS or plasma (sterile docking for storage). BC bags washing with PAS/plasma and then into the bottom bag. Soft spin centrifugation of BC pool and transfer upper PC into storage bag with manual press or with an automated separation device, leaving BC-RBC layer into pooling bag. PC could be sampled, stored or filtered during transfer or with an automated instrument (eg.TACSI)

The advantages of pooled buffy coat platelet are higher yield of platelet, reduce standard dose from 6 to 4 units per pool, reduce donor exposure, lower residual white blood cell and increase plasma recovery. The objective of this study was to To prepare LPPC in PAS in our routine work, instead of the original LPPC.

Methods

Whole blood (WB; 450 ± 10 ml.) was high-speed at 22°C, 3,960 rpm 10 min centrifuged (Heraeus Cryofuge 6000i, 8500i) before separation by semi-automated system. Buffy coat was separate for 30-35 ml. packed. Platelet concentrate (PC) was prepared by pooling four isogroup buffy-coat (BC) units resuspened with PAS or plasma on the next day. The pooled was low-speed centrifugation at 22 degree C 2,300 rpm for 4 minutes and transferring the supernatant (LPPC) to a 5-days storage bag (PL2410 plastic storage container 1,000 ml.) Both LPPC and LPPC in PAS were sampled and stored in a flat agitator at 20-24 degrees C for up to 5 days after collection. Weights, platelet yields were measured and volumes were calculated based on specific gravity. For counting residual leukocytes were performed by automate; Mythic 22 hematology analyzer. The titer detection used two-fold dilution by standard tube method.

Results

LPPC in PAS had volumes 304±20 ml, content of platelet concentrates 2.8±0.5X10^{11} cells/unit and had 0.1X10^{9} white blood cells contamination. LPPC from traditional methods had volumes 324 ± 16 ml, contents of platelet concentrates 3.9 ± 0.3X10^{11} cells/unit and had 0.1X10^{9} white blood cells contamination (Table 1). The titer of anti-A and anti-B in LPPC in PAS is less than or equal to 64, all of which are classified as low titer, but LPPC from the traditional way with a titer of anti-A and anti-B over 64 about 20 %.

Table 1 CBC results in LPPC in PAS

Types	N	X±2SD (x10^{11})	WBC (x10^{9})	Volume (X±SD)	unit
LPPC in PAS	30	2.8 ± 0.5	0.1	304 ± 20	5 ± 1
LPPC	175	3.9 ± 0.3	0.1	324 ± 16	7.1 ± 0.5

Table 2 Titer of Anti-A and Anti-B in LPPC in PAS

anti	Code no	2	4	8	16	32	64	128	256	Titer
A	4	4	3	3	2	0	0	0	0	16
B	4	4	4	3	3	2	0	0	0	32

Conclusion

All of LPPC in PAS are classified as low titer, which led to the patient at any group. Statistical tests showed that there was no difference in volumes and white blood cells contamination from the two methods ($p>0.05$), but the content of platelet concentrates obtained from traditional methods over to new methods of statistical significance ($p<0.01$). However, the content of platelet concentrates from LPPC in PAS provides reached the recommended quality of Council of Europe (EU) and National Blood Centre, Thai Red Cross Society (TRC) which contents of platelet concentrates equal or more than 2.4X10^{11} cells/unit. This may be due to a new method that we have developed a process to make it better in the future.

Reference

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