Impact of Pathogen Reduction (PR) vs. LVDS Testing on Platelet Availability: A Study Based on Real-World Experience

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Background

Blood shortages continue to raise interest in optimizing blood availability. Two bacterial risk mitigation strategies under the FDA are pathogen reduction (PR) and large volume delayed sampling at 48-hours (LVDS 48hr). These methods differentially impact platelet component (PC) availability for release, shelf-life, time to transfusion, and waste. An independent blood center (BC) that supplies >10,000 PC to more than 30 hospitals annually, assessed PC collection and distribution data to evaluate PC availability when comparing PR (INTERCEPT® Blood System) and LVDS 48hr. PC access also was evaluated at a level II trauma center hospital serviced by the BC. The BC and hospital requested to remain anonymous but reviewed the abstract and agreed with the results and conclusions.

Aims

To evaluate platelet component availability when comparing pathogen reduction (INTERCEPT® Blood System) and large volume delayed sampling 48-hour.

Methods

PC data from October 2021 through February 2022 were exported from the blood establishment computer software (BECS) including DIN, PC type, collection date/time, and shipment date/time. PC age at distribution and usable shelf-life were compared between LVDS 48hr and PR; usable shelf-life was calculated based on maximal shelf-life (7 and 5 days for LVDS 48hr and PR, respectively) and ship date/time. PC wastage at BC was also assessed. The hospital provided one month of data including the date/time of transfusion. Data was cross-referenced with the collection information from the BC; the PC age upon transfusion was determined and compared between LVDS 48hr and PR.

Results

The BC distributed 4,793 components during the study period; 90% were PR PC while the remainder were LVDS 48hr PC (**Table 1**). Analysis of collection and distribution data demonstrated average PR PC release 64 hours (2.7 days) earlier with greater remaining usable shelf-life compared to LVDS 48hr PC. Earlier release translated to significantly fewer wasted PC with PR (**Figure 1**). At the hospital, most of the transfusions occurred between day 3-5 (82%) vs. LVDS 48hr between day 5 and 7 (76%) (**Figure 2**).

Table 1: Blood Center Distribution, Shelf Life, and Wastage

	PC Type		
	PR	**LVDS 48Hr**	**p-value**
Total # Units	4326	467	--
Average Age at Distribution (Hr)	47.7	112.4	<0.0001*
Usable Shelf-Life at Distribution (Hr)	96.3	79.6	<0.0001*
# Units Wasted (%)	341 (7.9)	120 (25.7)	<0.0001**

* T-Test; p<0.05 is statistically significant. **Chi-square test; p<0.05 is statistically significant.

Figure 1: Platelet Average Age at Release and Remaining Shelf-Life at the Blood Center

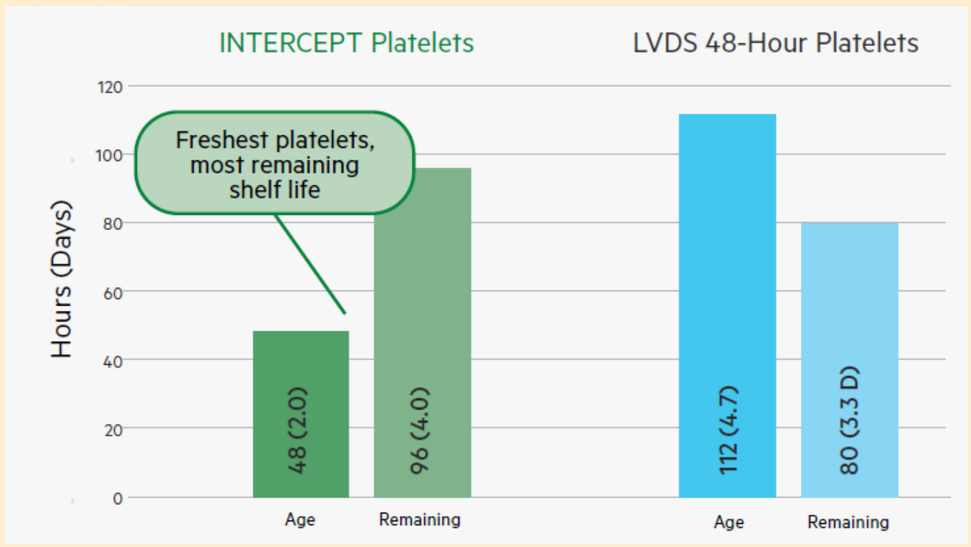
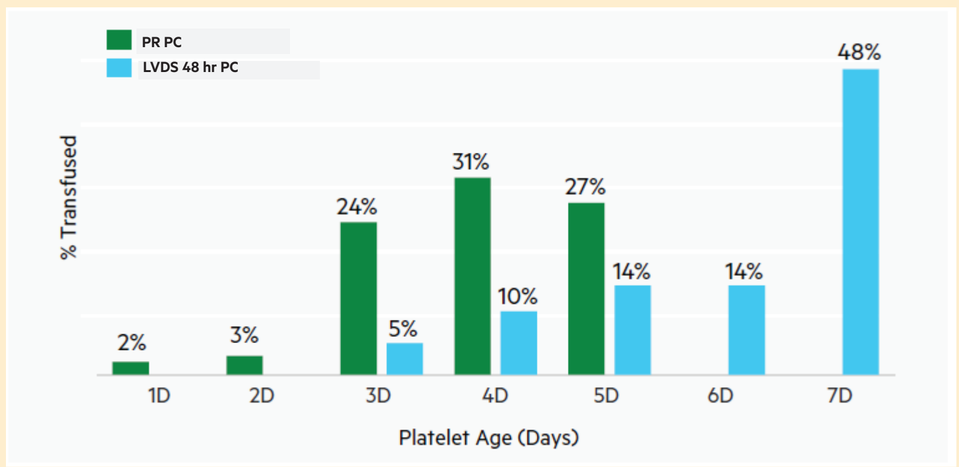


Figure 2: Distribution of Platelet Age at Time of Transfusion



The hospital routinely accepts short-dated platelets thus resulting in skewed distribution/ transfusion toward the end of expiry for both platelet types (i.e. Day 4-5 for PR and Day 7 for LVDS).

Conclusions

In this study, earlier release of PR PC enabled sooner availability of PC and an extended usable shelf-life, particularly if blood center production such as infectious disease testing turn-around time is optimized. Conversely, LVDS 48hr resulted in delayed sampling and a decreased usable shelf-life with increased waste. From a hospital and patient perspective, the comparison of PC age at transfusion demonstrated earlier availability and transfusion of fresher platelets with PR.

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