

# Influence on HLA Alloimmunisation Frequency in Hematology Patients Supported with INTERCEPT Pathogen Inactivated (PI) Platelet Components (PC)



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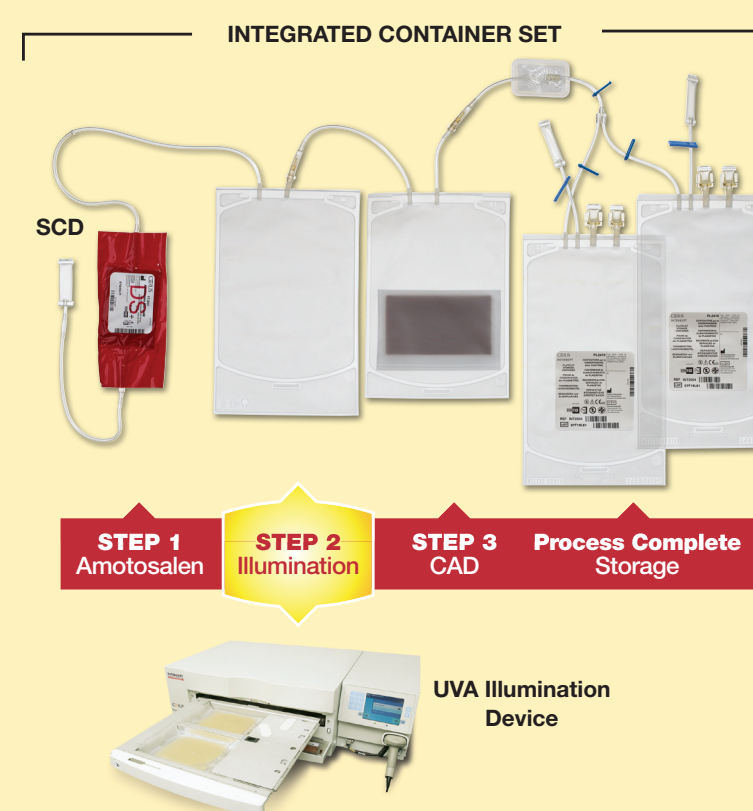
## Background

The Mont-Godinne Blood Transfusion Center (MG-BTC) provides all blood components for the Mont-Godinne University Hospital, a tertiary care facility. In October 2003, INTERCEPT™ was introduced into routine use for pathogen inactivation (PI) treatment of platelet components (PC) to prevent transfusion transmitted infection due to bacteria, viruses, and protozoa (Figure 1). INTERCEPT treatment replaced bacterial detection, CMV serology, and

gamma irradiation for prevention of TA-GVHD. As reported (Transfusion 2009; 49: 1412), comparison of transfusion utilization data for hematology patients for 3 years before (Control) and 3 years after introduction of INTERCEPT (Test) did not impact PC use (Table 1). Alloimmunisation to HLA and HPA can exert an important effect on PC utilization. The BTC database provided an extensive experience with repeated transfusion exposure to examine alloimmunisation.

**Figure 1: The INTERCEPT Blood System for Platelets: Dual Storage System for Double Dose**

Using a sterile connecting device (SCD), the platelet container is sterilely connected to the INTERCEPT kit. Amotosalen (1) is added by gravity flow and the platelet mixture is illuminated with UVA light (2). Residual amotosalen and its photoproducts in the platelet mixture are reduced to low levels using a compound adsorption device (CAD) (3) before the platelets are transferred to the storage containers (4).



**Table 1: PLT Transfusion Support for Hematology Patients Before and After Adoption of Pathogen Inactivation Treatment of PLT Components: No Increase in Utilization**

Parameter	Control*	Test*	p-Value
Number of patients [n]	272	276	
Periods of PLT support [n]	3.7 (4.6)	4.1 (6.9)	0.40
Duration of support [days]	31.6 (42.6)	33.1 (47.9)	0.70
Transfusions/patients [n]	20.8 (27.1)	24.2 (30.5)	0.17
Transfusions/day of support [n]	0.8 (0.4)	0.8 (0.3)	0.13
Total dose/patient [10 <sup>11</sup> ]	87.3 (115.4)	88.1 (111.6)	0.93
Dose per day of support [10 <sup>11</sup> ]	3.2 (1.4)	3.0 (1.3)	0.12

\*Data presented as mean (SD)

## Aims

To conduct a retrospective analysis to compare the frequency of HLA and HPA alloimmunisation before and after introduction of INTERCEPT pathogen inactivation.

## Methods

Routinely, at MG-BTC all hematology patients with repeated transfusion reactions, or suspected clinical refractoriness, undergo both anti HLA and anti HPA screening for alloantibodies. Anti-HLA screening was performed by Quick Screen (class I) and B Screen (class II) (GTI, Waukesha, WI, USA). HPA serologic responses were detected with a validated non-commercial MAIPA assay (MGBTC, Yvoir, Belgium). Data for serologic responses and PC utilization are maintained in a centralized database at the Mont-Godinne BTC. Serologic responses (+) and conversion rates observed in Control and Test periods were compared with a two-tailed Fisher's exact test with a significance level of 5%.

## Results

Among 272 hematology patients receiving PC in the 3 year Control period, 26 (9.5 %) tested positive for anti-HLA antibodies; 10 of 272 patients (3.7 %) had serologic conversion with HLA antibodies. During the 3 year Test period, 6 of 276 (2.1%) tested positive for HLA antibodies, and 3 of 276 (1.1 %) had serologic conversion. During the Test period the proportion of patients with suspected clinical refractoriness decreased from 9.5% to 2.6%. The frequency of serologic conversion to HLA decreased during the Test period, trending toward significance (Table 2). In comparison, there was a significant reduction in the frequency of serologic conversion to HPA (Table 2).

**Conclusions:** Universal leukodepletion of RBC was introduced at Mont-Godinne in 2000, however, all hematology patients received leukodepleted RBC's since 1992. All PC have been leukodepleted since 1992. For this reason, the trend towards a lower alloimmunisation rate probably was not influenced by a pre-existing change in transfusion policy for leukodepletion, and appears directly linked to the introduction of INTERCEPT. In a population of heavily transfused hematology patients at risk for alloimmunisation, followed through multiple periods of transfusion support, the frequency of serologic conversion in response to HLA and HPA decreased; and the frequency of suspected clinical immunologic refractoriness to platelet transfusion decreased with implementation of INTERCEPT pathogen inactivation. These outcomes are consistent with complete inactivation of leukocytes by the INTERCEPT treatment.

**Table 2: Frequency of Serologic Conversion to HLA and HPA Before and After INTERCEPT Implementation**

	PERIOD		p-Value*
	01/10/2000 – 30/09/2003 Control (Conventional) (n=272)	01/11/2003 – 30/10/2006 Test (INTERCEPT) (n=276)	
HLA Sero-conversion	10/272 (3.7%)	3/276 (1.1%)	0.053
HPA Sero-conversion	7/272 (2.6%)	1/276 (0.4%)	0.037

\*Fisher's exact test (two-tailed)

## Conclusions

- Universal adoption of INTERCEPT pathogen inactivation did not increase platelet utilization among hematology patients.
- Serologic conversion to HLA decreased after implementation of INTERCEPT PI trending to statistical significance.
- Serologic conversion to HPA decreased significantly after implementation of INTERCEPT PI.
- The proportion of patients with suspected clinical refractoriness to platelet transfusion decreased after universal implementation of INTERCEPT pathogen inactivation treatment.