Unique Features of a College On Campus Donor Center: Impact of Exam Stressors and Donor Attributes on Platelet Apheresis Yield

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Background

- Platelet collection through apheresis is cost-effective when multiple platelet products can be derived from a single collection

- Despite high national average split rates, split rates at actual donor centers may vary depending on local donor pool and procedural characteristics

**Recruitment**
Donor pool, donor history, prescreen criteria

**Biomtric/Demo**
BMI, HT, gender, age, demographics

**Separator**
single/double needle
collection rate/BV
PLT recruitment
capability sensitivity
manual/auto adjustx
cost

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Donor pool, donor history, prescreen criteria

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Procedural
VASCULAR, heat pads, cuff pressures
vein selection
mngmt of draw/return alerts

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**MENTAL STRESSORS**
comfort, availability, motivation,

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**Recruitment**
Donor pool, donor history, prescreen criteria

**Biomtric/Demo**
BMI, HT, gender, age, demographics

**Separator**
single/double needle collection rate/BV
PLT recruitment capability sensitivity manual/auto adjustx cost

**Procedural**
VASCULAR, heat pads, cuff pressures vein selection mngmt of draw/return alerts

**PLT Activate**
comfort, availability, motivation, MENTAL STRESSORS

**Catecholamine**

**Recruitment**
Donor pool, donor history, prescreen criteria

**Biomtric/Demo**
BMI, HT, gender, age, demographics

**Separator**
single/double needle collection rate/BV
*PLT recruitment*
capability sensitivity manual/auto adjustx
cost

**Procedural**

- **VASCULAR**, heat pads, cuff pressures
- vein selection
- mngmt of draw/return alerts

**PLT Activate**

- MENTAL STRESSORS

**Catecholamine**

**STRESS REDUCTION**

**Separator**
single/double needle collection rate/BV


Objectives

- Impact of exams on platelet yield at a college on-campus collection facility

- Identify donor and procedural related predictors of collecting split platelet products using Trima Accel
Methods

- Retrospective review of collections over 7 years at an On-Campus and an Off-campus facility.

- Rate of inadequate- or low- yield products collected during exam days vs non-exam days.

- Exam Days: includes 2 wks before final exam.

- Multiple Databases.
PLT Collection Criteria

- WT > 110 lb

- Platelet Count > 150k/uL and < 550k/uL
  - History: Greater of Avrg 2-3 PLT CT and/or Latest PLT CT
  - No History: Default 250k/uL
PLT Processing

Product Split by PLT ct:

- Inadequate  <2.5 x 10^{11}
- Low yield  2.5-2.9 x 10^{11}
- Single  3.0-6.2 x 10^{11}
- Double  6.3-9.2 x 10^{11}
- Triple  9.3 x 10^{11}
Results

- **37,725 collections (Aug 2007 to Oct 2014)**
  - 34,121 (90%) from off-campus site
  - 3,604 (9.6%) from on-campus site (starting 2011)

- **Demographics**
  - **Age:** 29 [16-84]; on-campus 10 yr younger
  - **Undergrad:** 25% (on-campus 52% vs off-campus 17%; P<0.05)
  - **Male:** 68%   **TBV:** 5063 mL [2972-9262]
  - **HCT:** 43 [38-55]   **PLT:** 236k [150-600k]/uL
Ethnicity

On-campus

- Caucasian: 29%
- Hispanic/Latino: 28%
- Asian: 25%
- Filipino: 5%
- Other: 4%
- African American: 3%
- Middle Eastern: 1%
- Native American: 1%
- Pacific Islander: 0%

Off-campus

- Caucasian: 45%
- Hispanic/Latino: 20%
- Asian: 16%
- Filipino: 2%
- Other: 5%
- African American: 4%
- Middle Eastern: 1%
- Indian: 1%
- Native American: 0%
- Pacific Islander: 0%
Baseline Characteristics

- **Duration:** 74 min (IQR: 61-92; Range 31-145)
- **No. Access Pressure Low:** 6 (IQR 0-19) (1+ in 73%)
- **No. Return Pressure High:** 0 (1+ in 2.6%)
- **Exam and non-exam periods are similar with regards to all donor characteristics and above procedure parameters**
- **Split rate:** 30%
- **% inadequate- or low-yield product:** 3.9%
Rate of Inadequate or Low Yield Exam vs Non-Exam

On-Campus

P<0.05
OR 1.8 *

4.8%
2.7%

Exam Non-Exam
Rate of Inadequate or Low Yield

Exam vs Non-Exam

On-Campus

- Exam: 4.8%
- Non-Exam: 2.7%

P < 0.05
OR 1.8 *

Off-Campus

- Exam: 3.6%
- Non-Exam: 4.1%

P = 0.11
NS
Rate of Inadequate or Low Yield Exam vs Non-Exam

2011-2014 Only

On-Campus

Exam: 4.8%
Non-Exam: 2.7%
P < 0.05
OR 1.8 *

Off-Campus

Exam: 3.2%
Non-Exam: 3.5%
P = 0.46
NS

2011-2014 Only
## Independent Predictors of Inadequate- or Low-Yield Product

*(On-Campus Site Only)*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Adjusted OR [95% CI]</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Exam</td>
<td>1.96 [1.21, 3.18]</td>
<td>0.007</td>
</tr>
<tr>
<td>Being female</td>
<td>1.25 [0.72, 2.19]</td>
<td>0.433</td>
</tr>
<tr>
<td>Decrease height (per inch)</td>
<td>1.14 [1.04, 1.25]</td>
<td>0.004</td>
</tr>
<tr>
<td>Decrease weight (per lb)</td>
<td>1.03 [1.02, 1.04]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Decrease Pre-Plt (per 10^3)</td>
<td>1.01 [1.01, 1.02]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Decrease Duration (min)</td>
<td>1.06 [1.04, 1.08]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Each Slow Draw Alert</td>
<td>1.01 [1.01, 1.02]</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
On-Campus vs Off-Campus

Split Product*

* P<0.05
On-Campus vs Off-Campus

Split Product*

On-Campus: 38%
Off-Campus: 29%

Male Donor*

On-Campus: 72%
Off-Campus: 67%

* P<0.05
On-Campus vs Off-Campus

Split Product* - On-Campus: 38%, Off-Campus: 29%

Male Donor* - On-Campus: 72%, Off-Campus: 67%

HT >70 in* - On-Campus: 48%, Off-Campus: 43%

* P<0.05
On-Campus vs Off-Campus

Split Product*:
- On-Campus: 38%
- Off-Campus: 29%

Male Donor*:
- On-Campus: 72%
- Off-Campus: 67%

HT >70 in*:
- On-Campus: 48%
- Off-Campus: 43%

HT >75 min*:
- On-Campus: 52%
- Off-Campus: 49%

* P<0.05
Independent Predictors of Split Products

**Donor Factors**

- **Platelet** (OR 20)
- **Male** (OR 5)
- **WT** (OR 1.3)
- **HT** (OR 2)
- **+50k**

(Adjusted Odds Ratios by Multivariate Analysis)
Independent Predictors of Split Products

**Donor Factors**
- Platelet (OR 20)
- Male (OR 5)
- HT (OR 2)
- WT (OR 1.3)

**Procedure Factors**
- Duration (OR 4)
- 10 less no. alerts (OR 1.17)

(Adjusted Odds Ratios by Multivariate Analysis)
Inadequate or low yield platelet collections appear to be associated with final exams at an on-campus apheresis site.

Interventions targeting donor independent factors such as procedure duration and number of access draw alerts may improve Trima Accel split rates.
References


Questions & Comments
UCLA TRIMA SETTINGS

- Trima Accel software v 6.0.6 (TerumoBCT)
- YSF: Gayley – 0.95; Ackerman: 0.91
  - max procedure time 135 min
  - return pressure max high limit 310 ml/min (default) and draw pressure low limit –250mmHg (default).
- The inlet/AC ratio 11. AC infusion rate 4 (default)
- Min donor post-hematocrit 32% (default) and post plt ct 100,000/uL (default).
- Maximum draw flow - fast (142 mL/min)
- draw management 4, return management 3 (default)
- Check out the manual for the settings at chapter 8.
Trima Settings

- Trima Accel software v5.0 (Gambro BCT)®
- YSF 0.95, max procedure time 120 min, max high limit 310 ml/min and draw low limit −250.
- The inlet/AC ratio 11. AC infusion rate 4
- Min donor post-hematocriet 32% and plt ct 100.
- Maximum draw flow (120 ml/min) and draw and return management 6 and 4, respectively.
- Procedure endpoints specified as collection time (target 70 min) and yield (target >550 × 10⁹)
Briefly, the duration of donations was individually tailored to obtain the highest possible number of units containing at least $2 \times 10^{11}$ PLTs within a maximal apheresis duration of 100 min. At the beginning of the donation the setting was based on the PLT count and hematocrit (HCT) level of the previous donation. 15–20 min later it was adjusted regarding the current pre-collection analyses. For procedures using A we adjusted to a standard anticoagulant (AC) ratio of 10, a citrate infusion rate of 1.25 mg/kg/min and a maximal cycle volume of 200 ml. The settings for the T procedures included an AC ratio of 12, an AC infusion rate level of 5, a maximal draw flow of ‘high’, a draw flow of 6 and a return flow of 3.
Results

- Split rate overall (1.3), by donor site
- Reason for discontinuation???, by site?
- Are poor yields “explained” by premature stopping e.g. short duration – is this related to donor request or vein access issues?
- No difference in produce procedure duration