Analysis Comparing Standard Photopheresis (SP) and Modified Photopheresis (MP)

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Definition and Process

- Photopheresis
  - WBCs collected
  - 8-MOP added
  - WBCs exposed to ultraviolet-A light (UVA)
  - Treated WBCs are re-infused

Proposed Mechanism of Action

- Induces apoptosis of treated MNCs
  - Eliminates overactive allogeneic T-lymphocytes
  - Decreases T-cell proliferation
  - Induces proliferation of autologous regulatory T-cells (T_{reg}) in the patient

Purpose of the Study

- Validate clinical practice
- Determine, compare and contrast collection efficiency and cellular contents of 2 methods:
  - Products collected directly using the Therakos UVAR-XTS [Standard Photopheresis (SP)]
  - MNCs collected using the COBE Spectra, then secondarily UV-irradiated using the UVAR-XTS [Modified Photopheresis (MP)]

Methods

	Standard Photopheresis (Therakos UVAR-XTS)	Modified Photopheresis (Spectra + XTS)
No. of Procedures	10	8
Gender	Female (2) Male (1)	Female (3)
Median Age (years)	Female (43) Male (41)	Female (48)
Access	Central Line (1) Peripheral Vein (2)	Central Line (3)
Diagnosis	Lung Transplant Rejection	cGVHD, s/p PBSC Transplantation

Legend: cGVHD, chronic graft-versus-host disease; PBSC, peripheral blood stem cell; s/p, status/post

Results

	Standard Photopheresis	Modified Photopheresis
TBV processed	3 Liters	4-6 Liters
Product vol. (mL)	275 ± 19	170 ± 57*
Total MNC (10^9)	1.21 ± 0.78	2.82 ± 1.13*
Granulocyte (%)	58 ± 21	31 ± 15*
Platelets (10^{10})	5.5 ± 3.0	2.3 ± 2.2*
Total red cells (mL)	7.1 ± 1.7	5.2 ± 0.8*
Irradiation time (min)	34.7 ± 7.6	29.0 ± 3.9

- *** $p < 0.05$**
- 5-mL samples of MNC concentrates had CBCs determined using the Beckman Coulter LH 750 Analyzer with automated differentials

Conclusions

- Modified photopheresis (MP)
  - Collects significantly more MNCs with less granulocytes, platelets and RBC contamination.
  - For patients with post-PBSC cGVHD, MP is an alternative way to achieve *similar* therapy as the Therakos UVAR-XTS with once per week procedures.
- There were no significant differences in the irradiation times of the 2 methods.
- Other clinical outcome variables remain for future studies (e.g., MP was not performed in patients with lung transplant rejection; clinical benefits of irradiating MP-derived MNC contents remain to be established; effects of the number of MNCs treated on T_{reg} cells induced in the patient).