FRESENIUS KABI
caring for life

Amicus Blue
Therapeutic Apheresis and Cell Collection

Evaluation of a New Closed Extracorporeal Photopheresis System

J Winters, E Burgstaler
Mayo Clinic, Rochester, Minnesota, United States

Background: The Fresenius Phelix is a UVA irradiation device used to photoactivate MNC collected on the Amicus. The system is closed, utilizing a special MNC collection kit and modified instrument software. The preliminary results of a phase I safety trial involving three patients (12 treatments) with chronic graft vs. host disease are presented.

Methods: Reasons for transplantation for the three patients ages 37, 61 and 62 years were: Acute myelogenous leukemia, myelodysplastic syndrome, and myelodysplastic syndrome with PNH. Stem cell source was peripheral blood with a 10/10 match for all. Each developed chronic skin GVHD. Inclusion criteria included WBC and PLT counts ≥ 1000 and $25x10^9$/L, GFR ≥ 30 ml/min/BSA, and AST 10-120 unit/L. Exclusion criteria included active GI bleeding, NYHA cardiac disease greater than grade III, and the presence of light-sensitive diseases. Amicus software 4.51 and Phelix software 1.0 were used. Settings included: 80 ml/min max draw rate, 2000 ml fixed cycle volume, 1.25 citrate infusion rate, and 12:1 ACD-A ratio. Venous access was peripheral or subcutaneous port. Target UVA dose was 1.5 J/CM^2 and 8-methoxypsoralen dose was consistently 3.4 ml.

Evaluation of a New Closed Extracorporeal Photopheresis System (cont.)

Results: The following mean + SD procedure results were obtained: 2,341 ± 14 ml whole blood with ACD-A drawn, 191 ± 3 ml ACD-A used, 691 ± 127 ml saline used, 91 ± 5 minutes procedure time, and 4,881 ± 419 ml total blood volume. Minor alarms (N=4) on the Amicus and no alarms on the Phelix were encountered. All 14-day aerobic and anaerobic cultures were negative and mean endotoxin levels were 0.425 ± 0.1752 EU/ml. Mean pre/post CBC and plasma hemoglobin levels were: 12.5/11.8 W BC, 9.9/9.5 neutrophils, 0.06/0.05 basophils, 0.21/0.15 eosinophils, 1.06/1.03 lymphocytes, 1.23/1.06 monocytes, 314/293 platelets x 10^9/L, 40/37% HCT, 13.3/12.2 g/dl Hgb, and 26.8/23.4 mg/dl plasma hemoglobin.

Plasma hemoglobin delta in the product was 0.00+0.001 grams and the subject was -0.15 ± 0.70 grams. Yields are in the table. Adverse events included one each: Acute respiratory failure, respiratory failure, muscular weakness, musculoskeletal discomfort, and peripheral swelling. Three of four events occurred in one patient two weeks after the study procedure. None of the adverse events were considered related to the procedure or investigational product. The patient who experienced acute respiratory failure was removed from the study because of death due to pneumonia, felt to be unrelated to the procedure.

Conclusions: Results indicate the new closed photopheresis system is capable of collecting sufficient MNC and irradiating the cells producing high lymphocyte apoptosis, with minimal alarms and adverse reactions.

Parameter	N	Mean (SD)	Parameter	N	Collect	Treated
*Inhibition of Proliferation (%)	12	95.37 (2.41)	* Lymphocyte Proliferation (%)	12	34.86 (12.24)	1.43 (0.59)
MNC Collection Efficiency 1 (%)	8	55.33 (8.22)	*Lymphocyte Viability (%)	12	72.07 (12.10)	23.37 (9.56)
WBC Yield (x10^9)	11	2.85 (1.12)	*Lymphocyte Apoptosis (%)	12	36.01 (13.52)	94.72 (4.45)
MNC Yield (x10^9)	8	2.78 (0.88)				
Lymphocyte Yield (x10^9)	8	1.11 (0.55)				
Monocyte Yield (x10^9)	8	1.66 (0.65)				
Granulocyte Yield (x10^9)	8	0.37 (0.21)				
Platelet Yield (x10^{11})	11	0.471 (0.1504)				

*72 Hour Means (SD)

Source: Winters J, Burgstaler E. Evaluation of a new closed extracorporeal photopheresis system. In: Proceedings from the 45th Annual Meeting of the European Society for Blood and Marrow Transplantation; March 24-27, 2019; Frankfurt, Germany.

NOTE: The Amicus ECP System has obtained CE mark approval for the indication of CTCL in the palliative treatment of the skin manifestations of cutaneous T-cell lymphoma (CTCL) that is unresponsive to other forms of treatment. The subject study performed with patients with chronic graft vs. host disease (cGVHD) supports the safety of the Amicus ECP System and is not intended to make any claims about the efficacy of the treatment for cGVHD.

FRESENIUS KABI
caring for life

Fresenius Kabi AG
61346 Bad Homburg
Germany

Phone: +49 61 72 608-0
Fax: +49 6172 608-5786

Fresenius Kabi
www.fresenius-kabi.com

Amicus Blue
www.amicusblue-fresenius-kabi.com