

In & Out on Photopheresis: Does vascular access choice improve procedural efficiency and patient safety?

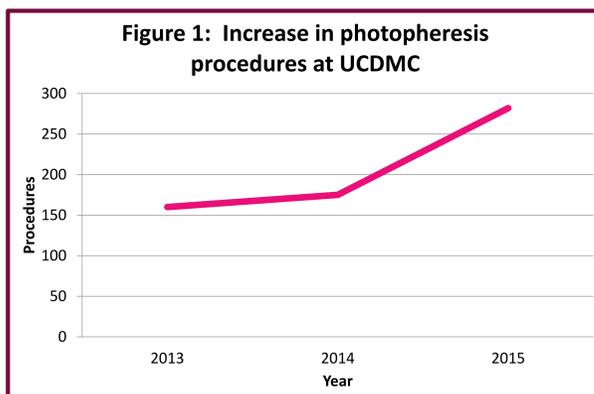
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INTRODUCTION

Extracorporeal photopheresis (ECP) is “a therapeutic procedure in which buffy coat, separated from patient’s blood, is treated extracorporeally with a photoactive compound (e.g., psoralens) and exposed to ultraviolet A light and subsequently reinfused to the patient during the same procedure.” (1) ECP is often used to treat T-cell malignancies and chronic Graft vs. Host disease.

In 2015, the UC-Davis apheresis service performed 282 ECP procedures, 43% and 38% higher than 2013 and 2014 respectively (Fig 1).



As this and other apheresis procedures have increased, outpatient clinic capacity has remained the same. Due to the rapid expansion, opportunities to improve our workflow efficiency are more important.

It was observed that ECP patients occasionally had extended treatment times (ETT) nearing 3 hours due to repeat instrument alarms. ETTs reduce workflow efficiency by decreasing bed and nurse availability. ETTs also cause patient discomfort.

The manufacturer also noted ETTs could lead to high instrument temperatures increasing the risk of hemolysis and recommended return rates ≥ 15 ml/min. However, no formal procedure regarding run time limits was elucidated. (2)

OBJECTIVE

Our goal was to establish previously unpublished safe procedural run time ranges for the various vascular access types compatible with ECP for our patient population.

MATERIALS AND METHODS

We performed a retrospective cohort analysis of 68 procedures performed across 19 patients in 2015. Thirty two (32) procedures were performed using double-lumen vortex ports, 13 procedures were performed using double lumen tunneled apheresis catheters, 10 procedures were performed using single lumen vortex ports, and 13 procedures were performed using peripheral IV placement. No adverse events were reported. Total run time and photoactivation time were recorded. Procedures were stratified by vascular access type. Reference ranges were established by the standard technical method of deriving the mean \pm 1 standard deviation. Means were compared using the two-sample student’s T-test.

*CELLEX Photopheresis System
Manufactured by Therakos
(Raritan NJ).*



RESULTS

The mean procedure run time for each vascular port type is reported in Table 1. There was no statistical significance between double lumen vortex port and double lumen tunneled apheresis catheter, nor between the single lumen vortex port and peripheral IV access (two-tailed P value 0.6835 and 0.7827 respectively). Statistical significance was found when comparing the means of the procedural run times for both double lumen vortex port and double lumen tunneled apheresis catheter with the run times for peripheral IV access and single lumen vortex ports ($P < 0.0001$ in each scenario).



Vascular Port type (N)	Mean procedure time (min)	Proposed reference range (min)
Double lumen vortex (32)	104 \pm 10	92 -114
Tunneled catheter (13)	102 \pm 12	
Single lumen vortex (10)	142 \pm 10	130 -156
Peripheral I.V. (13)	143 \pm 14	

Table 1. Results and Proposed Reference Ranges

ANALYSIS

Pertinent reference ranges for procedural run times by vascular access were set by calculating the mean of the groups \pm 1 SD (standard deviation). The reference ranges proposed for vascular port type are displayed in Table 1.

DISCUSSION

Our findings support that peripheral IV access and single lumen vortex port access leads to significantly longer ETTs and decreases our efficiency. Given this, we recommend double lumen port access or double lumen tunneled apheresis catheter access on all new patients referred for ECP therapy. In addition, our proposed reference ranges will ensure that physicians are immediately consulted when patients fall outside the expected run times to help trouble shoot delays and ensure ongoing patient safety. Our established reference ranges will be incorporated into departmental policies and procedures in the near future after review by the apheresis continuous quality improvement committee, the nursing manager, and the medical director.

CONCLUSIONS

We established previously unpublished safe procedural run time ranges for the various vascular access types compatible with ECP. We also identified previously unreported trends in procedure run times between vascular access devices, an important consideration when recommending vascular access for a new patient.

REFERENCES

- (1) American Society for Apheresis Guidelines (2013)
- (2) Therakos technical bulletin CLX #09

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