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Therapeutic Plasma Exchange in Critically Ill Pediatric Patients with Leukemia

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Mc Dermott, Sarah E. and Dargan, Chandni, "Therapeutic Plasma Exchange in Critically Ill Pediatric Patients with Leukemia" (2021). *Research Days*. 14.
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Therapeutic Plasma Exchange in Critically Ill

Pediatric Patients with Leukemia

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Background

- Therapeutic plasma exchange (TPE) has well-documented applications in the adult population.
- Limited data exists regarding the use of TPE in critically ill pediatric patients, especially those with oncological diseases.
- Care for these patients poses certain clinical considerations including the safety of continuing chemotherapy, delayed clearance of chemotherapy, and ability to tolerate chemotherapy once recovered.
- We aim to highlight TPE in their management, so that it may be recognized as an earlier treatment modality.

Design/Method

- Records for 7 pediatric patients with leukemia (0-18 years) who received TPE in Children's Mercy ICU from 2015-2020 were retrospectively reviewed.
- Data collected included demographics, TPE specifications (treatment indication, number of treatments, baseline and interval laboratory evaluation, procedure related complications), duration of time in the ICU, and outcome measures. Descriptive and survival analyses were performed.

ASFA Guidelines for Therapeutic Apheresis (2019)

Category I: Accepted as first-line therapy for a disorder

Category II: Accepted as second-line therapy for a disorder

Category III: Optimal role for apheresis therapy is not established

Category IV: Published evidence demonstrates apheresis to be ineffective or harmful

	Alive 30 days post-TPE	Deceased 30 days post-TPE	P-value
Baseline Lab Values (Mean ± SD)			
Creatinine	0.67 ± 0.36	0.57 ± 0.38	0.73
AST	78 ± 34	897 ± 116	0.18
ALT	46 ± 13	411 ± 357	0.08
Total Bilirubin	2.5 ± 1.08	2.7 ± 3.46	0.93
ANC	3100 ± 4700	1547 ± 1379	0.06
CRP	15 ± 8.1	16.8	0.87
Follow up Lab Values			
CRP	2.4 ± 1.2	11.9	0.023*
Lactic Acid	2.1 ± 0.46	14.6 ± 5.5	0.017*

Results

- Our population (mean age 7.43 years, 57.1% female) consisted of 4 patients requiring extracorporeal membrane oxygenation (ECMO) and 6 requiring CRRT.
- Multi-organ failure (MOF) prompted the initiation of TPE in 85.7% of patients, 42.9% of whom were also diagnosed with hemophagocytic lymphohistiocytosis (HLH).
- Mean days in the ICU until apheresis initiation was 12.43 (range 1-68 days), not statistically different between those who did (n=4) and did not (n=3) survive 30 days post-TPE.
- All living patients were able to continue chemotherapy treatment, however 2 required protocol adjustments for residual decreased organ function.

Conclusion

- Our cohort demonstrated MOF and HLH consistently as indications for TPE, currently ASFA category III indications (optimal role of apheresis is not yet established).
- Recognition of this treatment modality earlier in the clinical course for critically ill oncological patients may lead to improved outcomes, and a larger cohort study is needed to evaluate this further.

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