High Dose CVVHD Immediately After Liver-Kidney Transplantation in Primary Hyperoxaluria Type 1

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Close

Introduction

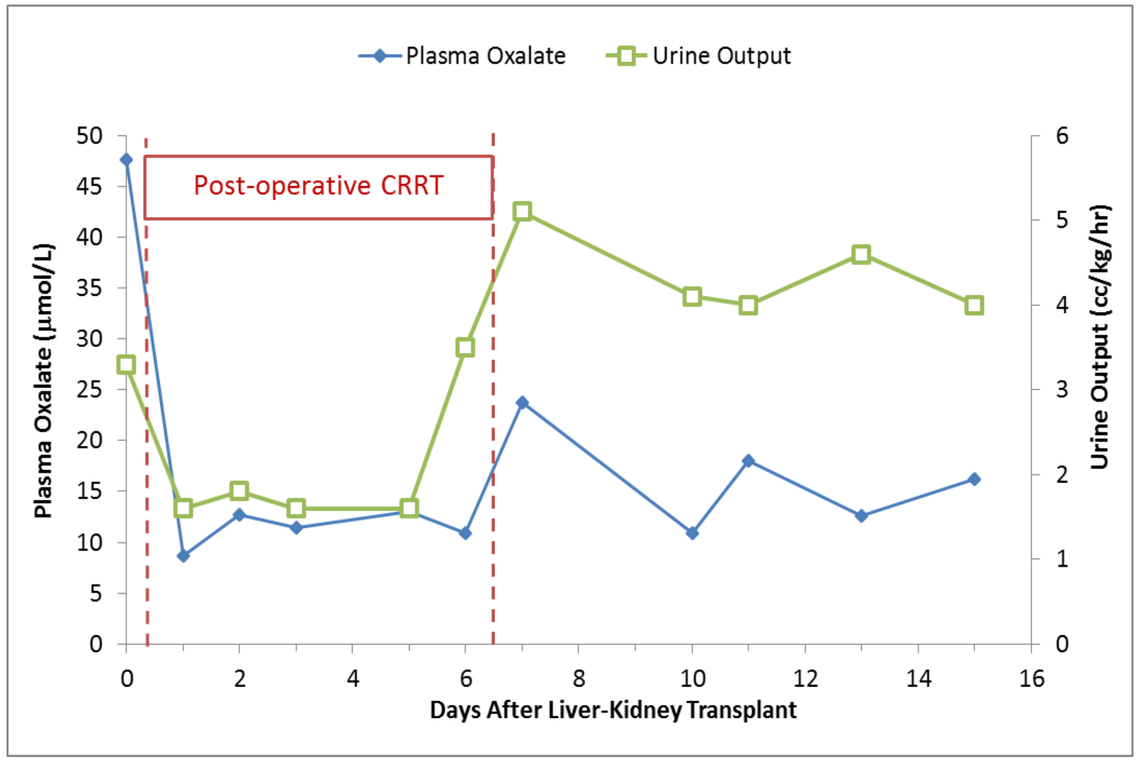
- Patients with primary hyperoxaluria type 1 (PH1) continue to face a high oxalate burden after receiving a liver-kidney transplantation.
- The goal in managing these patients is to keep plasma oxalate (Pox) and urine oxalate levels < 30-50 μmol/L and < 23 mg/L, respectively, as calcium oxalate is insoluble at higher concentrations.[1,2]
- Decrease in urine output (UOP) from delayed graft function (DGF) can result in calcinosis, decrease function, and even graft loss secondary to the inability to excrete the persisting oxalate load.
- We examined the utility of high dose CVVHD to decrease Pox in the setting of DGF.

Case

- 20-month-old female with PH1 who received an en-bloc liver and kidney transplant. Interdialytic Pox ranged 90-120 μmol/L. Intra-operatively there were 60 minutes of warm ischemia with resultant low UOP.
- High-dose CVVHD without ultrafiltration was used post-operatively with the NxStage System One® to maximize Pox clearance until UOP improved on post-operative day 6.
- Anticoagulation was not used due to the high dialysate flow rate and because the patient was in the immediate post-op liver transplant period.

Qb (ml/min)	Qd (ml/hr)	Calculated Small Molecule Clearance (ml/hr/1.73m^2)
90	2000	6784

Results



Post-Op Day	Pox (μmol/L)	Uox (mg/L)	Ucr (mg/dL)	Urine Ox/Cr Ratio[1]	UOP (cc/kg/hr)
0	47.6				3.3
1	8.7				1.6
2	12.7				1.8
3	11.4	35	10	0.35	1.6
5	13.0	93	12	0.80	1.6
6	10.9	54	6	0.90	3.5
7	23.7	77	12	0.64	5.1
9		55	10	0.55	4.6
10	10.9	50	10	0.50	4.1
11	18.0	57	11	0.52	4.0
12		56	10	0.56	4.4
13	12.6				4.6
14		31	11	0.28	4.0

Pox = Plasma oxalate; Uox = Urine oxalate; Ucr = Urine creatinine; UOP = Urine output

1. Normal urine Ox/Cr ratio for children less than 4 y.o. is < 0.15 mg/mg

Summary

- DGF was a concern due to the warm ischemia time and subsequent low UOP.
- To promote oxalate clearance (molecular weight 88.02 Daltons) we used over 3x the standard pediatric small molecule clearance dose, maintaining Pox below the critical saturation point of 30-50 μmol/L.
- Upon discontinuation of CVVHD there was a slight rebound in Pox, however, the level was still below the Pox solubility threshold.

Conclusions

- High dose CVVHD is effective in controlling Pox in the post-transplant period for patients with PH1.
- The use of high dose CVVHD should be strongly considered in patients with PH1 at risk for DGF, as low UOP leads to decreased oxalate clearance and puts the transplant at great risk.

References

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