Ten Year Experience with Ultrafiltration for the Management of Acute Decompensated Heart Failure

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BACKGROUND

Randomized control trials (RCT) of ultrafiltration (UF) have demonstrated conflicting results regarding its efficacy and safety. We reviewed 10 years of real world data regarding UF during hospitalization for ADHF.

METHODS

We performed a retrospective, single center analysis of 335 consecutive patients treated with adjustable rate UF using the CHF Solutions Aquadex Flex Flo System from 7/28/2009 to 6/30/2019. UF for all patients was managed solely by the HF service with patients on a HF Unit in a large community teaching hospital .

RESULTS

Start of ultrafiltration therapy

- **mean creatinine (Cr) was 1.78 mg/dl**
- **mean BUN 49 mg/dl**
- **GFR 39 m/min/1.73m2.**
- **The mean hospital day of UF initiation 5.63 days**
- **Average starting UF rate was 151 cc/hr**
- **58% of patients required UF rate adjustments during therapy.**
- **Inotropes were used in 27% of patients.**

Comparison of UF Retrospective Analysis with Previous Trials
Baseline Characteristics

	Age	Mean Cr (mg/dl)	Mean BUN (mg/dl)	SBP (mm/Hg)	Heart Failure Hospitalization Pre Aqua 1 yr	LVEF
Abington-Jefferson Health	73.3	1.78	49.09	120	2.14	51.8% > 40% 48.2 % ≤ 40%
AVOID	67	1.5	32.6	124	1.4	Mean 36%
CARRESS	69	Median 1.9	Median 48.7	N/A	0.75*	Median 30%
DOSE	66	1.5	38	120	0.74*	27 % ≥ 50%
UNLOAD	62	1.5	32	126	1.6	71% ≥ 40%

RESULTS (Continued)

Comparison of Abington Jefferson UF Retrospective Analysis with Previous Trials

Compared to previous RCTs investigating UF, our cohort was older, with worse renal function, and more antecedent HF hospitalizations in the year preceding therapy. Patient characteristics were as follows: mean age 73, 57% male, 48% LVEF <40%, mean baseline systolic blood pressure 120 mm/Hg, Patients had an average of 2.14 HF hospitalizations in the preceding 12 months.

Post ultrafiltration therapy

- **Mean fluid removal with UF was 14.58 liters.**
- **Mean weight loss upon cessation of UF was 15.63 lbs. (range 0.2-57 lbs.) and was sustained at 1-2 week follow-up.**
- **Mean Cr change upon stopping UF, at discharge and at follow-up (mean 30 days) was +0.11 mg/dl, +0.07 mg/dl and +0.11 mg/dl, respectively.**
- **Major bleeding defined as requiring discontinuation of anticoagulation occurred in 3.6% of patients.**

Outcomes

	Mean Cr Change (mg/dl)			Cr Change by % Increased > 0.3 mg/dl		Weight Loss (lbs)		Volume Removal - Liters
	Pre AQ -> Post	Pre AQ -> D/C	PreAQ -> F/U	Pre AQ -> Post	PreAQ -> D/C	Pre AQ -> Post AQ	D/C -> F/U	Pre AQ -> Post
Abington-Jefferson Health	0.11	0.07	0.11	25.45%	21.21%	15.63	0.6	14.58
AVOID	0.09	0.12	0.37	N/A	N/A	23.54	N/A	18.76
CARRESS	0.23	N/A	N/A	N/A	N/A	12.54	N/A	7.4
DOSE	N/A	N/A	N/A	37%***	N/A	8.1	N/A	4.2
UNLOAD	N/A	N/A	N/A	14.40%	22.60%	11	N/A	4.6

* HF hosp/yr prior to UF reported as % of n
** Reported as combined death, HF readmission and ER visit for HF
*** DOSE Trial using Loop diuretics, not UF

RESULTS (Continued)

Outcomes

	ReHospitalization HF %			
	30d	**60d**	**90d**	**1yr**
Abington-Jefferson Health	12.41	N/A	14.86	27.27
AVOID	9.5	N/A	25.7	N/A
CARRESS	N/A	26	N/A	N/A
DOSE	N/A	42**	N/A	N/A
UNLOAD	N/A	N/A	18	N/A

HF re-hospitalizations at 30 days, 90 days and 1 year were 12.4%, 14.9% and 27.3% respectively. On average patients had 1.74 fewer hospitalizations for HF in the year following UF when compared to 12 months preceding UF.

CONCLUSIONS

Compared with previous trials with UF (UNLOAD, CARRESS, and AVOID), our real world experience demonstrates that UF compares favorably for HF re-hospitalizations, renal function response, and weight /volume loss. Our cohort was sicker than those studied in clinical trials.
Importantly, our real world experience allowed for the adjustment of UF rate during therapy, and we believe this to be a major contributor to our favorable outcomes. In clinical practice, UF can be a safe and effective strategy for decongestion.

REFERENCES

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