



ARF REQUIRING DIALYSIS: Use of Shift CVVHD vs Conventional Dialysis

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INTRODUCTION

- Acute renal failure (ARF) requiring dialysis carries a high morbidity, mortality, it can be treated with either conventional or shift (8h CVVHD) dialysis.

PURPOSE

- Analysis of all patients with ARF requiring dialysis in a tertiary care center using conventional hemodialysis and shift CVVHD.

METHODS

A. Patients: all patients with ARF requiring HD (1999-2008) were included, data obtained from the treatment records from the acute dialysis unit. Electronic medical record and paper records reviewed for demographic, clinical and laboratory data. Dialysis treatment sheets for dialysis parameters and clinical data during dialysis.

B. Dialysis: conventional HD with Volumetric control machines Fresenius 2008H bicarbonate equipped with CRRT chip. All treatments use the relative blood volume monitor (Critline). Shift CVVHD using Nxstage machines with bicarbonate based solutions.

The rationale to use shift CVVHD was to provide dialysis to a increasing number of ICU patients with the same number of Acute HD nurses and due to the non involvement of ICU RN in the delivery of the therapy.

C. Data reported as mean and standard deviation. Analysis of data using SPSS 13.0 software for descriptive, survival analysis using $p < 0.05$ for significance.

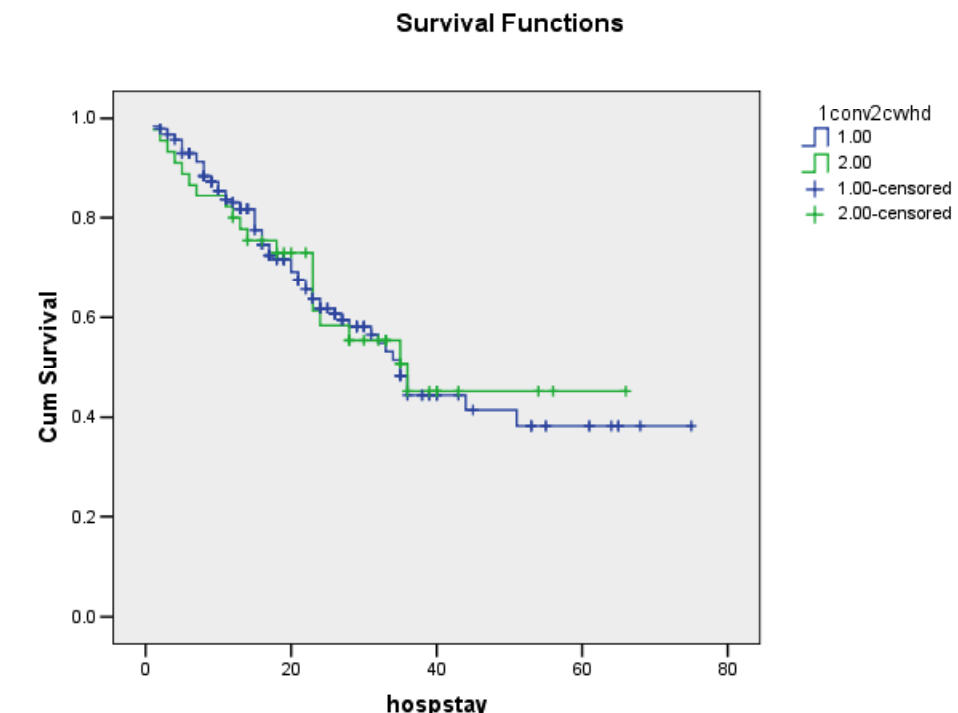
RESULTS

A. Patient characteristics:

280 patients included.
60% males, 70.6% white, 19.5% blacks, 11.5% hispanics.
77% were in the ICU at the time of initiation of dialysis
32% DM.

Mean hospital stay 21.7d (14)
Mortality was 40.3% no different between the conventional vs shift CVVHD, male vs female, DM vsno DM. sepsis vs non sepsis (fig.1, fig.2)

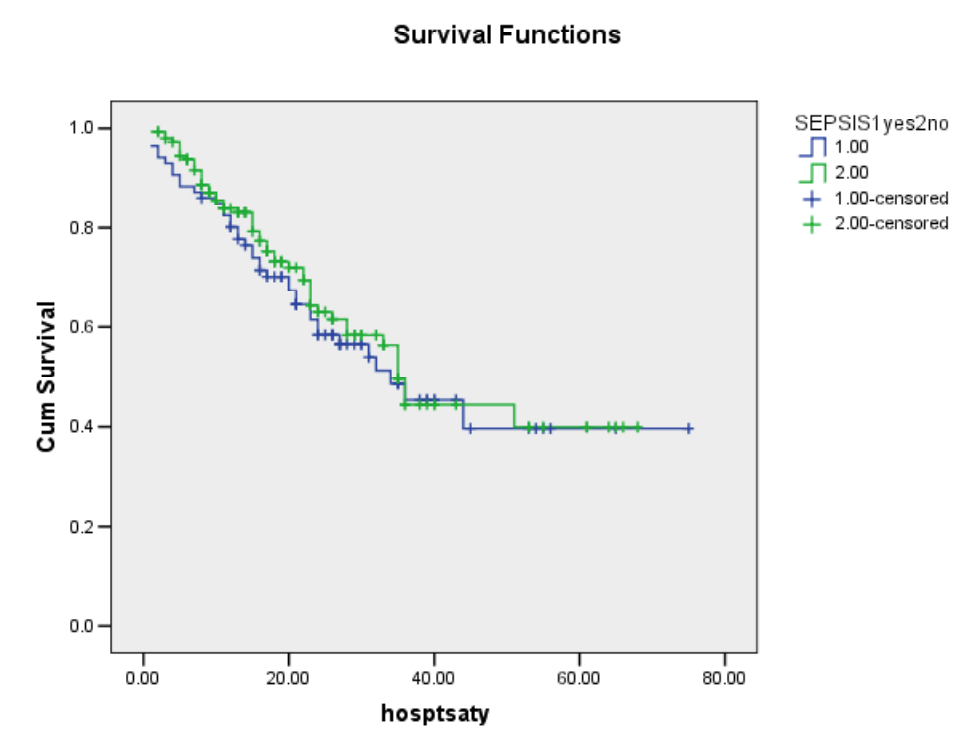
Fig. 1 Survival Conventional vs Shift HD



Log Rank (Mantel-Cox)	Chi-Square	df	Sig.
0.006	0.06	1	.938

Test of equality of survival distributions for the different levels of 1conv2cvhd.

Fig. 2 Survival Sepsis vs no sepsis



RESULTS

B. Survivors vs non survivors (Table 1)

Non survivors had less hospital stay
less number of treatments
lower predialysis MAP
less total UF and UF/hour
more episodes of SBP<100 and hypotensive episodes/hour and lower peak creatinine.

Table 1 Survivors vs non survivors

	1conv2cvhd	N	Mean	Std. Deviation	Std. Error Mean
hospstay	1.00	144	25.10	15.848	1.321
hospstay	2.00	90	16.07	10.933	1.152
numbtreat	1.00	139	6.813	6.1214	.5192
numbtreat	2.00	80	4.000	3.4014	.3803
sbppre*	1.00	139	135.194	28.0904	2.3926
sbppre*	2.00	83	119.482	26.2973	2.8865
dbppre*	1.00	139	68.819	18.1245	1.5373
dbppre*	2.00	83	58.273	15.2657	1.6756
mappre*	1.00	139	90.811	19.7327	1.6737
mappre*	2.00	83	70.410	17.2483	1.8832
mappost	1.00	139	89.115	17.2571	1.4637
mappost	2.00	83	82.329	17.1866	1.8863
uftotal*	1.00	139	3303.9856	2001.52701	169.76731
uftotal*	2.00	83	2591.1566	1829.27084	200.78856
sbpleess100*	1.00	139	1.4092	3.03032	.30752
sbpleess100*	2.00	83	3.6627	5.21320	.57222
ufperhour*	1.00	139	787.2612	482.00823	40.88349
ufperhour*	2.00	83	591.2609	470.26891	51.18172
hypotparh*	1.00	139	3.413	.76437	.06483
hypotparh*	2.00	83	1.0093	1.73216	.19013
hdtime	1.00	139	277.0519	154.88109	13.13084
hdtime	2.00	83	292.4099	121.24701	13.38059
basecreat	1.00	118	1.2458	.52531	.04836
basecreat	2.00	79	1.2165	.53567	.06027
basebun1	1.00	110	26.2972	18.67645	1.78073
basebun1	2.00	76	26.5132	19.24058	2.20705
peakcreat*	1.00	144	6.8989	3.03019	.25252
peakcreat*	2.00	90	5.7733	2.98074	.27267
peakbun	1.00	144	89.1822	43.52706	3.62726
peakbun	2.00	90	95.6222	41.79930	4.49603

C. Conventional vs shift CVVHD: (Table 2)

The patients receiving shift CVVHD had a lower:
MAP predialysis
post dialysis temperature
UF per hour
hypotension/hour
peak creatinine
receive less heparin and had longer dialysis time.

Table 2 Conventional vs CVVHD

	1conv2cvhd	N	Mean	Std. Deviation
mappre*	1.00	178	87.933	20.5920
mappre*	2.00	45	80.941	13.9709
mappost	1.00	178	87.517	18.0327
mappost	2.00	45	82.667	16.0978
ufper	1.00	178	90.0843	16.18908
ufper	2.00	45	89.4222	21.44819
ufperhour	1.00	178	34.3690	10.67776
ufperhour	2.00	45	36.5493	19.15369
temppre*	1.00	178	36.4037	1.16189
temppre*	2.00	45	36.5712	.79547
temppost*	1.00	178	35.3926	1.11288
temppost*	2.00	45	35.3926	1.0933054
uftotal	1.00	178	3050.4896	1998.30904
uftotal	2.00	45	2932.6222	1827.56996
fluidgiven	1.00	178	726.6660	784.48160
fluidgiven	2.00	45	708.2222	325.93424
ufnet	1.00	178	2344.7078	2092.43798
ufnet	2.00	45	2130.8444	1683.23990
heparintotal*	1.00	178	1465.0265	2012.41353
heparintotal*	2.00	45	333.3333	768.70611
sbpleess100	1.00	178	2.9295	6.71109
sbpleess100	2.00	45	3.5596	1.56924
hemore120	1.00	178	1.0787	2.79704
hemore120	2.00	45	1.0787	3.52785
ufperhour	1.00	178	794.7444	500.00906
ufperhour	2.00	45	388.3926	217.66818
hypotparh*	1.00	178	.8817	4.71109
hypotparh*	2.00	45	.2137	.44917
hdtime	1.00	178	211.226	110.13396
hdtime	2.00	45	1.2248	135.98128
basecreat	1.00	163	1.2844	.46074
basecreat	2.00	37	25.7938	16.89803
basebun1	1.00	150	26.5113	19.30871
basebun1	2.00	37	45.7206	2.88916
peakcreat*	1.00	178	5.3666	2.27314
peakcreat*	2.00	45	5.3666	4.29938
peakbun	1.00	150	84.5562	35.64213
peakbun	2.00	45	80.9500	35.64213

DIALYSIS TREATMENTS

1600 treatments in 280 patients average 5.8 treatments (5.4).

32% of the treatment done with femoral catheters
Shift CVVHD vs conventional HD: (Table 3, Table 4)
Blood flow was lower (309 vs 376 ml/min)
dialysate K higher (3.2 vs 2.6 mEq/L) (fig.3)
dialysis time was longer (469 vs 243min) (fig.4)
total Ultrafiltration was higher (3.68L vs 3.32L)
more fluid was given (834 vs 499ml)
less heparin used (806 vs 1935U)
less episodes of SBP<100 mmHg
less UF/ hour(472 vs 832ml/h)
hypotension/hour (0.09 vs 0.45) (Fig.5)
MAP pressure before dialysis was lower (84 vs 92 mmHg)
less episodes of SBP<100mmHg (0.7 vs 1.7)
lower venous pressure (196 vs 209).
The mean dose of CVVHD was 65.5(18.9)ml/kg/h. (fig.6)

Table 3 Conventional vs Shift CVVHD

	1conv2cvhd	N	Mean	Std. Deviation	Std. Error Mean
AGE	1.00	174	60.9023	16.41185	1.24418
AGE	2.00	47	60.1702	18.30932	2.67069
WEIGHT	1.00	348	84.9608	23.96314	3.90917
WEIGHT	2.00	47	87.5319	27.54589	4.01798
GB*	1.00	936	376.8903	49.64786	1.62279
GB*	2.00	348	309.3713	40.28357	2.15943
GD*	1.00	932	663.7554	128.34925	4.20422
GD*	2.00	0(a)			
DIALK*	1.00	936	2.6004	.75329	.02462
DIALK*	2.00	348	3.29513	53.171	0.0960
MACHTEMP*	1.00	936	36.0218	83994	.02745
MACHTEMP*	2.00	294	35.8163	89982	.05213
HDTIME*	1.00	936	443.9408*	62.31726	2.03690
HDTIME*	2.00	348	469.3966	67.60094	3.62427
VPRESS*	1.00	936	209.4872	67.09203	2.19297
VPRESS*	2.00	348	196.0345	46.26473	2.48095
SBPPRE*	1.00	936	135.8483	27.37942	8.9492
SBPPRE*	2.00	348	128.2471	21.66491	1.16136
SBPOST	1.00	936	131.5759	23.21457	.78879
SBPOST	2.00	348	132.5374	33.92832	1.81896
DBPPRE*	1.00	936	70.8472	26.48957	8.6584
DBPPRE*	2.00	348	62.2155	14.38107	.77091
DBPPRE*	1.00	936	68.7543	15.21326	.49726
MAPPRE*	1.00	936	92.5142	23.15895	.75697
MAPPRE*	2.00	348	84.2261	14.05529	.75344
MAPPOST	1.00	936	89.6947	16.12997	.52703
MAPPOST	2.00	348	86.9224	16.25562	.87139
HRPRE	1.00	936	90.2596	18.34179	.59952
HRPRE	2.00	348	91.7767	16.87912	.50482
HRPOST	1.00	936	93.3376	18.56076	.60668
HRPOST	2.00	348	90.7132	17.38798	.93209

Fig. 3. Dialysate K HD vs Shift CVVHD

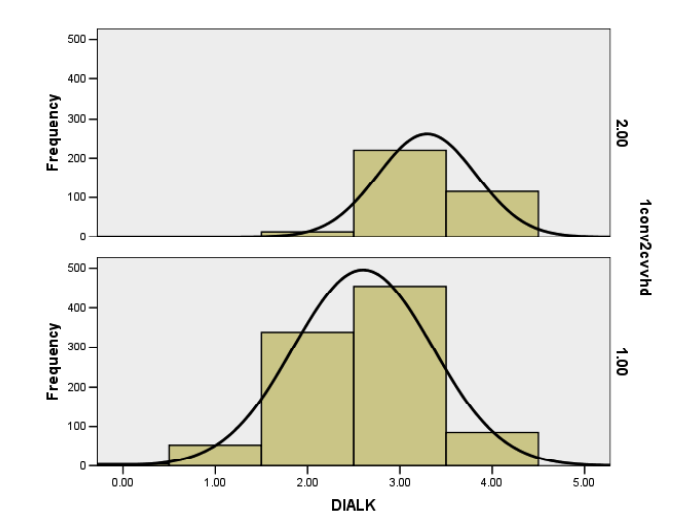


Table 4 Conventional Vs Shift CVVHD

	1conv2cvhd	N	Mean	Std. Deviation	Std. Error Mean
TEMPPRE	1.00	937	36.7066	1.93686	.06327
TEMPPRE	2.00	348	36.8704	.90343	.04843
TEMPPOST*	1.00	937	36.5880	1.91627	.06260
TEMPPOST*	2.00	348	36.2487	1.00071	.05364
ET*	1.00	937	-2.8698	15.40258	.50318
ET*	2.00	348	-12.5842	19.44997	1.04263
STARTHCT	1.00	882	29.8383	4.00758	.13494
STARTHCT	2.00	3	26.2000	3.16070	1.82483
POSTHCT	1.00	863	35.2622	4.55722	.15513
POSTHCT	2.00	3	30.1667	1.60728	.92796
BVCHANGE	1.00	730	-13.0529	6.30154	.23323
BVCHANGE	2.00	3			
UF*	1.00	936	3326.5502	7.90277	4.56266
UF*	2.00	348	3688.0632	1660.66245	88.48480
FLUIDGIVEN*	1.00	936	499.7179	497.29273	16.25779
FLUIDGIVEN*	2.00	348	834.2627	238.79174	12.80058
UFTOTAL	1.00	936	2859.6293	2271.99618	74.26252
UFTOTAL	2.00	348	2847.6580	1636.27421	87.71350
HEPARINTOTAL	1.00	947	1935.5333	2079.93708	67.58897
HEPARINTOTAL	2.00	348	806.6092	1293.15967	69.32063
SBPLEESS100*	1.00	936	1.7991	3.79618	.12408
SBPLEESS100*	2.00	348	.7241	1.67497	.08979
UFPERHour*	1.00	936	632.1853	453.38386	14.81932
UFPERHour*	2.00	348	472.3232	203.19776	10.89254
HYPOTHour*	1.00	936	.4505	.96034	.03168
HYPOTHour*	2.00	348	.0966	.22489	.01206
hospstay	1.00	188	20.8298	14.93812	1.08947
hospstay	2.00	47	25.0851	14.18179	2.06893
volcvvhd	1.00	0(a)			
volcvvhd	2.00	348	39016.6095	5764.29127	308.99845
dosecvvhd	1.00	0(a)			
dosecvvhd	2.00	348	65.5997	18.90906	1.01366

Fig. 4 Dialysis Time HD vs Shift HD

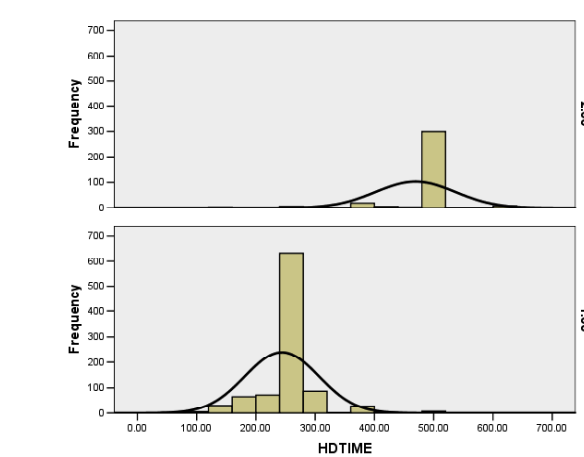


Fig. 5 Hypotension HD vs Shift HD

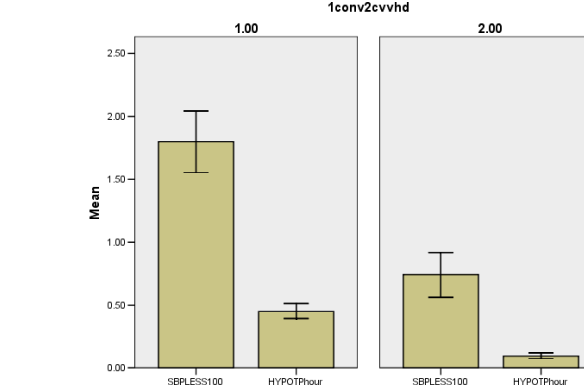
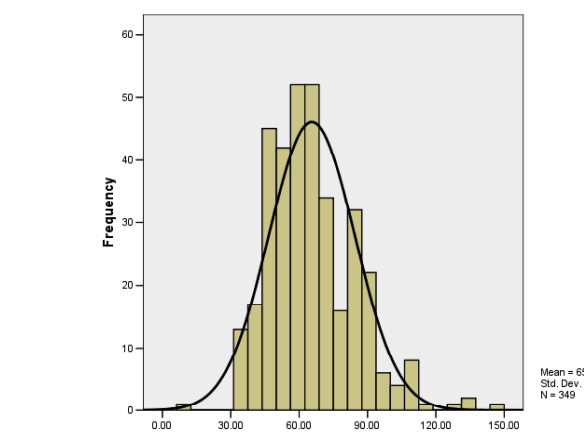


Fig. 6 Dose CVVHD



LABORATORY DATA: (FIGS. 8 -12)

- No significant difference between the predialysis values of BUN, creatinine, potassium, Phosphorous and C02 were noted between the 2 groups despite the difference in the interdialytic time between the 2 groups. (fig.7)

Fig. 7: Interdialytic time

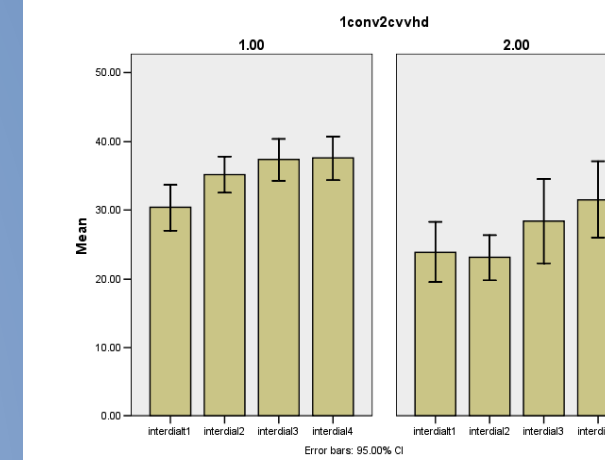


Fig.8: Pre BUN

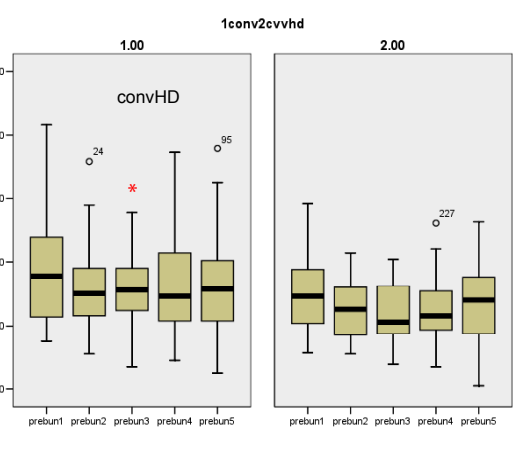


Fig.9: Pre K

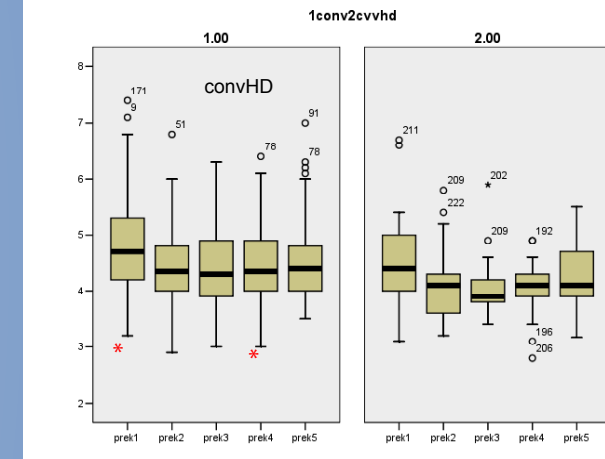


Fig.10: Pre Creatinine

