Comparing Tidal Peritoneal Dialysis to Continuous Venovenous Hemodiafiltration in Critically-ill Patients With Acute Kidney Injury: A Single Center Experience

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OBJECTIVE

Acute kidney injury (AKI) is an abrupt and usually reversible decline in the glomerular filtration rate (GFR). The term acute kidney injury (AKI) rather than acute renal failure (ARF) is increasingly used by the nephrology community to refer to the acute loss of kidney function. No modality of renal replacement therapy in the critically ill patient with AKI, including intermittent hemodialysis, peritoneal dialysis, and the many forms of CRRT, has been clearly shown to have a survival benefit. The choice of dialytic technique is dependent upon a variety of factors including availability, the expertise of the clinician, hemodynamic stability, and the degree to which solutes and/or fluid must be removed. Patients with AKI requiring renal replacement have mortality rates in excess of 50%; a prognosis that has remained stable over several decades despite multiple advances in the practice of critical care medicine.

METHODS

Patients with acute kidney injury and multi-organ involvement were randomly allotted to CVVHDF, (Group A) TPD, (group B). Cause and severity of renal failure were assessed at the time of initiating dialysis. Forty patients were randomized and analyzed. Principal outcome measure was hospital mortality, and secondary end points were recovery of renal function, metabolic and fluid control, and improvement of hemodynamic instability.

RESULTS

The cause of AKI was sepsis in 28.6% and 26.3%, acute tubular necrosis in 28.6% and 26.3%, post-operative in 19.0% and 10.5%, contrast induced in 14.3% and 21.1%, disseminated intravascular coagulopathy in 4.8% and 15.8%, and cardiorenal syndrome in 4.8% and 0.0% in group A and group B respectively. There was no statistically significant difference in the median (IQR) systolic and diastolic blood pressure, and the median (IQR) time to start renal replacement therapy from consultation was almost equal in both groups [9 h (7.5-10.5) vs. 9 h (8.0-9.5)] respectively. Clearance, as reflected by BUN and serum creatinine was significantly better in the TPD than CVVHDF group ($p < 0.05$). Correction of metabolic acidosis and hyperkalemia was significantly better with TPD ($p < 0.05$). Net ultrafiltration was significantly better in the first 4 days [median (IQR) 1240 (1125-1260) vs. 940 (750-1100), $p < 0.05$] in patients treated with CVVHDF as compared to those treated with TPD. Recovery of renal function and survival were significantly better in patients treated with TPD ($p < 0.01$).

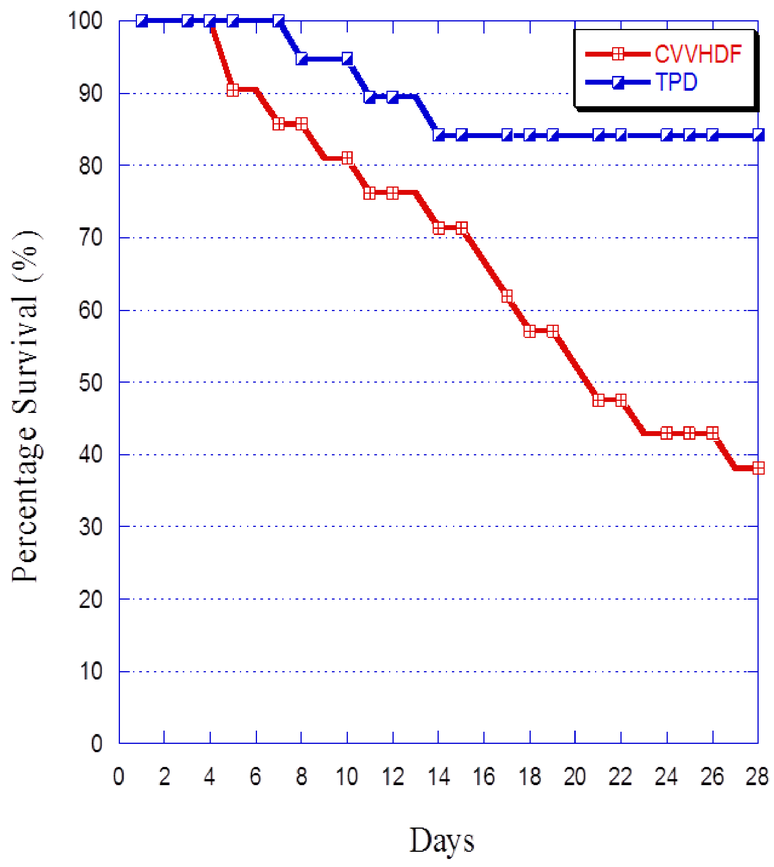


Figure 2: Survival of patients treated with CVVHDF vs. TPD after 4 weeks of treatment. CVVHDF: continuous Veno-venous Hemodiafiltration, TPD: tidal peritoneal dialysis

Outcome	Group A n = 21	Group B n = 19	p value
Infectious complications related to dialysis, n (%)	9 (42.9)	2 (10.5)	< 0.01
Time to prepare dialysis access and initiate dialysis, (minutes), median (IQR)	35 (32-45)	38 (30-42)	> 0.05
Recovery of kidney function, n (%)	6 (28.6)	13 (68.4)	< 0.01
Resolution of AKI (days), median (IQR)	2 (9-15)	8 (6-10)	< 0.01
ICU stay (days), median (IQR)	9 (12-21)	10 (7-12)	< 0.01
Need of chronic dialysis, no (%)	2 (9.5)	3 (15.8)	> 0.05
Mortality, no (%)	13 (61.9)	3 (15.8)	< 0.01

Table 3: Outcome of renal replacement therapy in the two groups

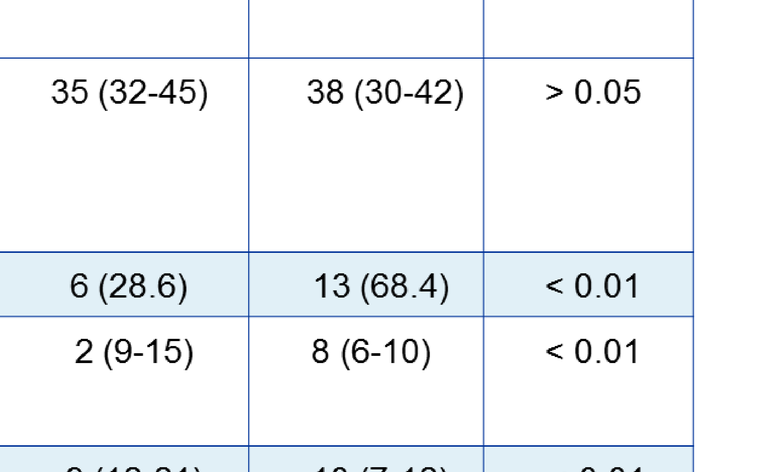
CONCLUSION

TPD seems to be more effective than CVVHDF in terms of clearance of uremic toxins. It also appears to be a safer method of CRRT with better outcome as reflected by recovery of renal functions and patients' survival.

KEYWORDS

AKI, Tidal peritoneal dialysis, CVVHDF, AKI, Urea clearance, Ultrafiltration

FIGURE



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