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A Solution to Continuous Kidney Replacement Therapy in a Background of Hyponatremia with Limited Technical Support: A Case Series

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Case Study : Hyponatremia is not an uncommon medical condition observed in patients presented to hospital, whether as an asymptomatic bystander or a main culprit of the presentation. Management of hyponatremia requires meticulous control of serum sodium level to avoid significant fluctuations of serum osmolarity leading to complications such as osmotic demyelination syndrome. Kidney replacement therapy in a background of hyponatremia complicates the management further and this requires proper manipulation of the treatment regime to ensure a steady serum osmolarity. We report three cases of hypotonic hyponatremia which required kidney replacement therapy due to conventional indications of oliguric acute kidney failure with metabolic acidosis. In order to achieve a steady increment of serum sodium level, we tailored the continuous kidney replacement therapy with 5% dextrose infusion with proportional ultrafiltration. Three cases of sepsis with hypotonic hyponatremia were treated with continuous kidney replacement therapy due to metabolic acidosis and hemodynamic instability. Two of them were hypervolemic due to decompensated heart failure while the other was euvolemic. In view of the difficulty in adjusting the sodium concentration in the dialysate, modifications were made by intravenous continuous infusion of 5% dextrose solution with a rare calculated using the formula [(140 – desired sodium level)/140] x (dialysate volume per hour) with proportional ultrafiltration. Equivalent ultrafiltration to the rate of dextrose infusion was used for the case with euvolemia and increased ultrafiltration was used for those with hypervolemia. We were able to achieve a steady increment of serum sodium by 5 to 6 mmol/L per day and prevented overcorrection of sodium as shown in Table 1. Appropriate modifications of continuous kidney replacement therapy in hypotonic hyponatremia prevent overcorrection of serum sodium level and able to maintain a steady serum osmolarity increment to avoid complications such as osmotic demyelination syndrome.

Table 1 CKRT in Hyponatremia.jpg

Table 1. Serial serum sodium levels and dextrose infusion regime during continuous kidney replacement therapy.

Case	Age (Years) / Sex	Body Weight (kg)	Dialysate dose (L/hour)	Day 1		Day 2		Day 3		Day 4
				Sodium (mmol/L)	Dextrose infusion (ml/hour)	Sodium (mmol/L)	Dextrose infusion (ml/hour)	Sodium (mmol/L)	Dextrose infusion (ml/hour)	Sodium (mmol/L)
1	44/M	70	2.1	110	360	115	285	122	180	126
2	24/F	40	1.2	121	111	126	68	131	25	134
3	68/F	60	1.8	114	257	120	180	124	CVVHD stopped	