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Correction of severe hypernatremia with continuous renal replacement therapy using regional citrate anticoagulation

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PURPOSE

To demonstrate the safe reduction of serum sodium through the use of continuous renal replacement therapy (CRRT) in the setting of severe hypernatremia and neurologic dysfunction.

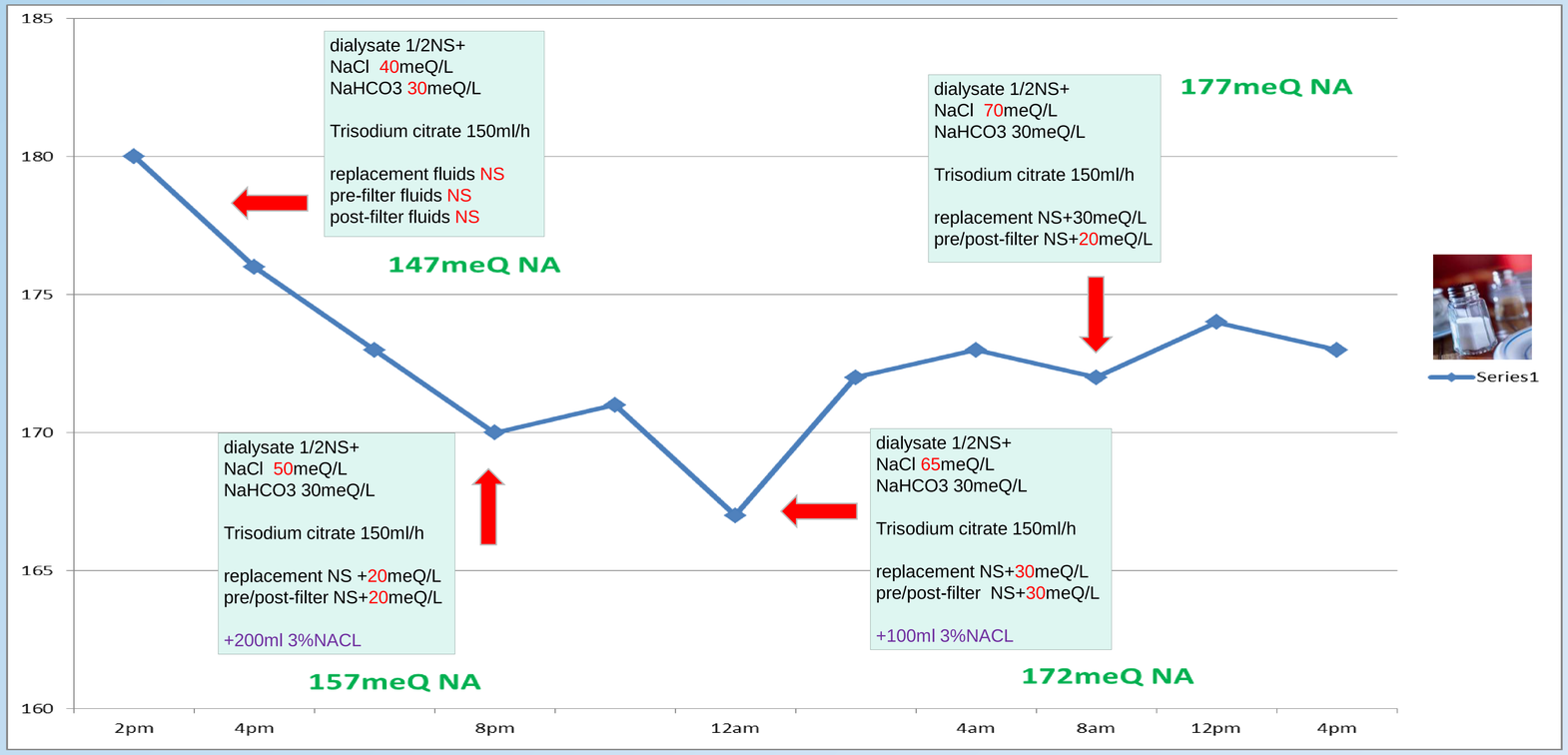
BACKGROUND

- CRRT has been implemented in cases of electrolyte imbalance in patients with severe neurologic deficits.
- The use of pre-mixed dialysate solution has been shown to save pharmacy and machine start up time however at the expense of not being able to customize therapy for individual patient cases.
- We present a management case of severe hypernatremia in a patient with devastating neurologic deficits and the dependence of custom dialysate to safely bring her to eunatremia

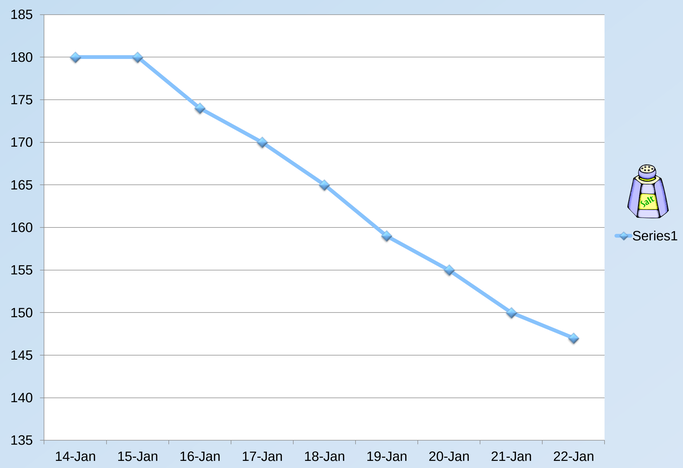
PATIENT PRESENTATION

27F G1P0 with PMH SLE c/b nephritis was admitted at 33weeks gestation c/o chest pain, headache, nausea/vomiting and hypertension. Her neurologic status deteriorated rapidly, developed seizures and had an emergent C-section for eclampsia. Imaging revealed a large left-sided intraparenchymal hemorrhage with mass effect. She returned to the OR for evacuation then transferred to the ICU intubated for continued care. For neurologic protection, mannitol and hypertonic saline were given to goal serum sodium 155-160mmol/L. On admission serum creatinine was 0.9mg/dL and spot UPCR was 22grams. Nephrology was consulted on hospital day5 for hypernatremia of 172mmol/L and acute kidney injury with creatinine up to 2.57mg/dL. Patient proved to be salt avid and unable to naturiese despite sustained urine output of 200-300ml/hr. After failing to manage her sodium with hypotonic fluids and diuretics, CRRT was initiated when serum sodium reached >180mmol/L.

CRRT Fluid Changes in 1st 24hours of therapy



Trend of Serum Na+ on CRRT



DISCUSSION

- Once optimal CRRT fluid composition was achieved and serum sodium stabilized, daily adjustments were made to allow her sodium to decrease by <5mmol/L/day until 147mmol/L. Slow reversal of hypernatremia was imperative to decrease further neurologic injury from fluid shifts. ICP and central perfusion pressure (CPP) were monitored throughout the procedure and remained within target range. Despite correcting the patient's serum sodium, she did not have neurologic recovery and care was withdrawn.
- In this particular case, the initial neurologic insult was ultimately devastating. However, it proved that CRRT with regional citrate anticoagulation can be used to safely correct hypernatremia when custom dialysate and replacement fluids are employed. In addition to serial sodium measurements, concurrent monitoring of ICP and CPP should be considered in neurosurgical patients to help guide therapeutics.