Treatment of Severe Acute Hypernatremia and Renal Failure by Hemodialysis

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A 21-year-old man was transferred to our hospital due to a drowsy mental state and anuria. He was serving in the armed forces and trained in hot weather. Nausea, vomiting and oliguria had developed 2 days earlier and his mental state became drowsy and disoriented. At admission, he was stuporous and blood pressure was 140/90 mm Hg. Laboratory findings were as follows: sodium 193 mEq/l, potassium 5.9 mEq/l, chloride 148 mEq/l, uric acid 22.7 mg/dl, creatinine 13.5 mg/dl, blood urea nitrogen 203.5 mg/dl, CPK 2,309 U/l, serum myoglobin 2,850 ng/ml. Calculated osmolality was 465.2 mosm/kg. Arterial blood gas analysis showed pH 7.22, pO2 94.1 mm Hg, HC03 9.1 mEq/l. Under the provisional diagnosis of acute renal failure due to rhabdomyolysis, emergency hemodialysis was commenced for 5 suc-
Fig. 1. Correction of hypernatremia and azotemia by hemodialysis. Arrows indicate hemodialysis, there were no neurologic complications and he recovered without neurologic sequelae.

Our case showed severe hypernatremia and anuria which cannot be corrected by conventional measures. Unfortunately, in such a case, the safe rate of correction of acute hypernatremia by hemodialysis is not well established. In general, it has been reported that one should avoid rapid correction of hypematremia using a level of dialysate sodium that is too low, and particularly avoid a low level of dialysate sodium if BUN is > 100mg/dl[2]. In our case it was suggested that hypematremia, considering the clinical course, developed within a short period (maybe within 48 h). Therefore, we decided to lower sodium as soon as possible to prevent neurologic complication by acute hypematremia itself, and we selected hemodialysis as the method for correction of hypematremia and uremia because he was in an anuric and catabolic state (rhabdomyolysis).

With this case, we have demonstrated successful treatment of acute hypematremia by hypotonic hemodialysis. It was suggested that early correction of acute hypematremia before equilibration of osmolality between plasma and brain is important to prevent neurologic complication by hypematremia itself.

References