Abstract Type : Poster exhibition
Abstract Submission No.: A-0020
Abstract Topic : Fluid, Electrolyte and Acid-base Disorder

Risk Factors and Total Sodium Dose Associated with Hyponatremia Overcorrection : A Retrospective Cohort Study

Jiyun Im, Chan Young Jung, Soon Bae Kim, Jai Won Chang
Department of Internal Medicine-Nephrology, Asan Medical Center, Korea, Republic of

Objectives : Hyponatremia overcorrection may lead to serious irreversible neurologic impairment. Although studies have sought to identify risk factors and optimal treatment regimens for hyponatremia, findings have been inconsistent, and current treatment guidelines provide recommendations that do not take into account patient-related factors. This study aimed to identify risk factors of hyponatremia overcorrection and assess the relationship between administered sodium dose and subsequent changes in serum sodium levels.
Methods : This retrospective cohort study involved 212 patients with hyponatremia admitted to the emergency department of a tertiary medical center. The primary study outcome was hyponatremia overcorrection, defined as >12 mEq/L increase of serum sodium at 12 hours after baseline. The secondary study outcome was hyponatremia overcorrection defined as >8 mEq/L increase of serum sodium at 12 hours after baseline.
Results : Overcorrection of more than 8 mEq/L and 12 mEq/L at 12 hours occurred in 39 (18.4%) and 16 (7.5%) patients, respectively. Low urine osmolality (<150 mOsm/kg) and total sodium dose of >4.6 mEq/kg over 12 hours were significant risk factors of hyponatremia overcorrection on multivariable Logistic regression analysis (Table 1). Serum sodium changes were significantly higher in the group with >4.6 mEq/kg/12hr compared to that of the >3.4 mEq/kg/12hr group (9.4 ± 5.3 mEq/L vs. 5.1 ± 4.0 mEq/L, P = 0.001) (Figure 1).
Conclusions : Low urine osmolality and total sodium dose above 4.6 mEq/kg/12hr were significant risk factors for overcorrection in patients with hyponatremia. Calculating the total sodium dose may be useful in preventing hyponatremia overcorrection.

Table1.JPG

	Correction rate > 12 mEq/L/12 hr				Correction rate > 8 mEq/L/12 hr			
	Univariate analysis		Multivariate analysis		Univariate analysis		Multivariate analysis	
	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
Sex	1.04 (0.38-2.89)	0.937			1.63 (0.81-3.30)	0.173		
Age	0.99 (0.96-1.03)	0.722			0.99 (0.97-1.02)	0.530		
Body weight	0.97 (0.93-1.02)	0.180			0.97 (0.94-1.00)	0.083		
Underlying condition								
Liver cirrhosis	0.40 (0.05-3.15)	0.384			0.47 (0.14-1.64)	0.238		
Heart failure	0.87 (0.11-7.05)	0.894			0.67 (0.14-3.08)	0.602		
Adrenal insufficiency	0.75 (0.09-6.05)	0.787			1.68 (0.65-5.97)	0.396		
Thiazide use	1.61 (0.34-7.70)	0.553			0.53 (0.10-2.41)	0.411		
Severe symptom	1.80 (0.62-5.21)	0.278			1.80 (0.86-3.79)	0.120		
Laboratory parameters								
Initial serum sodium	0.89 (0.81-0.98)	0.020	0.94 (0.84-1.06)	0.338	0.94 (0.88-1.01)	0.097		
Serum potassium	1.27 (0.80-2.04)	0.315			0.93 (0.65-1.32)	0.681		
Serum creatinine	0.91 (0.58-1.44)	0.691			0.85 (0.60-1.21)	0.374		
Low urinary sodium [a]	1.88 (0.62-5.67)	0.265			1.18 (0.55-2.54)	0.674		
Urine Osmolality	1.00 (0.99-1.00)	0.033	1.00 (0.99-1.00)	0.033	1.00 (0.99-1.00)	0.001	1.00 (0.99-1.00)	0.001
Hypoosmolar urine [b]	10.49 (1.58-69.41)	0.015	10.49 (1.58-69.41)	0.015	19.74 (2.13-182.69)	0.009	19.00 (2.06-175.68)	0.009
Total sodium dose								
> 3.4 mEq/kg/12hr	1.93 (0.58-6.46)	0.288			2.13 (0.92-4.94)	0.079		
> 4.6 mEq/kg/12hr	6.00 (1.39-25.96)	0.017	2.33 (0.34-16.09)	0.390	7.64 (2.04-28.62)	0.003	5.44 (1.31-22.73)	0.020

Covariates: age, sex, body weight, initial sodium, potassium, creatinine, urine osmolality
[a] Urine sodium < 20 mmol/L
[b] Urine osmolality < 150 mOsm/kg

Table1.JPG