THE USE OF AN ORAL SALT LOAD FOLLOWED BY FUROSEMIDE IN THE TREATMENT OF EUVOLEMIC SIADH-INDUCE HYPONATREMIA

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Introduction

Furosemide can be used in the treatment of SIADH. However, to be effective, renal medulla osmolality as reflected in urinary osmolality (UOsm) must be high. Sodium is the most important contributer to renal medulla osmolality, which increases following the administration of oral salt. We analyze the use of an oral salt load followed by furosemide for the acute/short-term treatment of euvolemic SIADH hyponatremia.

Material and Methods

Retrospective analysis of 9 patients with SIADH-induced hyponatremia and moderate hyponatremic encephalopathy receiving 4-5 g of oral salt, followed 3 hours later by 20 mg furosemide iv or 40 mg furosemide po (salt-plus-furosemide). Serum sodium levels (SNa), serum potassium (SK), urinary sodium (UNa) were measured at baseline, and 12 to 16 hours following salt administration. All SNa were corrected for glycemia. Osmolality was measured by In 6/9 patients, a SNa level was available from 24 hours or less previously. Osmolality was measured by Advanced Instruments Model 3320 osmometer.
Variables were compared using Wilcoxon and Mann-Whitney test. Data analysis used SPSS15 software.

Results

Baseline characteristics:
4/9 (44.4%) were women and 5/9 (65.6%) were men. Average age was 69.3 (SD 20.7).
All patients were clinically euvolemic, with normal ocular pressure and central venous pressure.

Prior to salt-plus-furosemide:
SNa levels were descending in 5/6 (83.3%) patients with a median change of -1.5 [IQR -2.3 - 0.25] mmol/L.
Mean 24 hours or less previously SNa was 121 (SD 4.5) mmol/L.

Initial laboratory tests:
Mean SNa was 119 (SD 4.8) mmol/L, mean was SK 4.4 (SD 0.6) mmol/L, median UNa was 54 [IQR:42.5-86] mmol/L, mean POsm was 249 (SD:7.9) mOsm/kg, mean UOsm 449 was (SD 251.2) mOsm/kg.

Following salt-plus-furosemide:
SNa rose from 3 to 7 mmol/L, with a median increment of 5 [IQR 4-7] mmol/L, reaching a median SNa of 124 [IQR:121-127] mmol/L, mean SK 4.1 (SD:0.4) mmol/L, mean UNa 66.4 (SD 24.6) mmol/L, mean POsm 259 (SD 7.4) mOsm/kg and mean UOsm 370 (SD 151.4) mOsm/kg.

The SNa change post salt-plus-furosemide versus the change prior to salt-plus-furosemide was statistically significant (p=0.027). SK descent was also significant (p=0.017).

All blood pressure levels were below 130/85 mmHg before and after salt administration.

FIGURE 1: Mean SNa evolution following salt-plus-furosemide

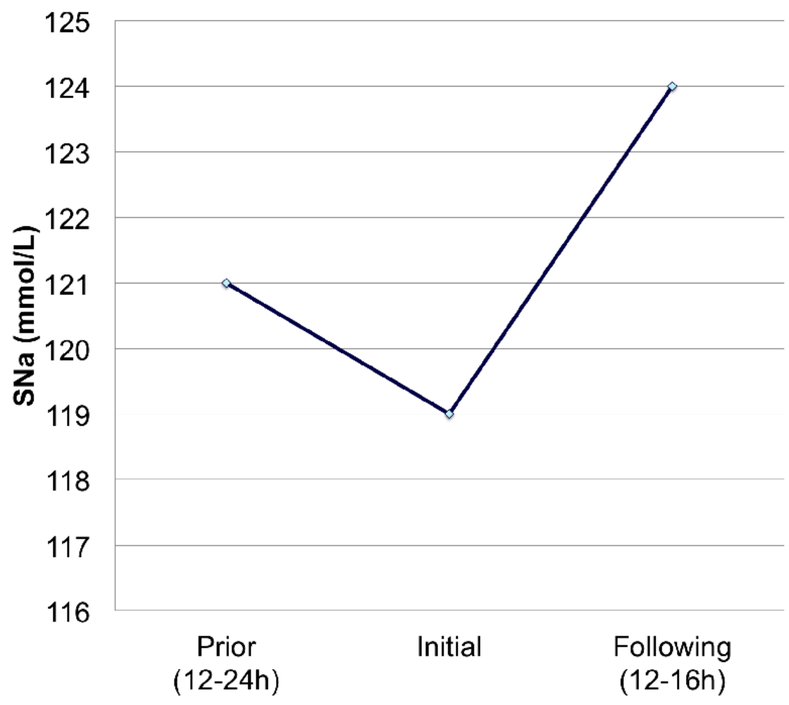

TABLE 1: Baseline characteristics and laboratory tests evolution of patients

	Sex	Age	Prior SNa (mmol/L)	Initial					12-16 hours following salt-plus-furosemide				
				SNa (mmol/L)	SK (mmol/L)	POsm (mOsm/kg)	UNa (mmol/L)	UOsm (mmol/L)	SNa (mmol/L)	SK (mmol/L)	POsm (mOsm/kg)	UNa (mmol/L)	UOsm (mmol/L)
1**	Male	76	**118**	**117**	3.5	253	12	228	**124**	3.5	257	-	-
2	Male	46	**125**	**124**	3.8	258	53	272	**129**	3.6	269	82	441
3	Male	27	**128**	**126**	4.1	254	72	235	**131**	4	263	24	194
4	Male	78	**120**	**122**	5.2	-	54	643	**127**	4.3	264	44	577
5	Female	83	**116**	**114**	4.2	245	121	556	**121**	4.1	253	60	330
6	Female	67	**122**	**120**	5	258	42	931	**127**	4.9	260	86	584
7	Female	71	-	**111**	5	235	69	593	**114**	4.5	243	82	248
8	Female	82	-	**116**	4.2	245	43	175	**123**	4.2	258	87	233
9	Male	94	-	**119**	4.9	247	100	409	**124**	4.2	260	-	349

** Patient with extremely low prior salt intake. He was diagnosed of SIADH 3 weeks later.

Conclusions

The oral administration of 4-5 g of salt followed by furosemide can be useful in the acute/short-term treatment of euvolemic SIADH-hyponatremia. However, this therapy should not be attempted in severe hyponatremia, since a minimum 4 mmol/L SNa rise is not assured

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