

Hyponatremia Treatment Guidelines 11/03

Overview

- Most patients are stable and require no acute Rx
- Most common cause is diuretic use, low NaCl diet, in a CHF pt.
- Severe hyponatremia <110 or symptomatic <120 requires Rx
- Brain injury
 - Edema induced – increased ICP
 - Rx induced (correcting too fast) –demyelination (? etiology)

History

- What are the Sx?
- What was the time course for the Na drop?
- What is the absolute Na value

Categories

- **Pseudohyponatremia**
 - Hyperglycemia – Na drops ~2 per Gluc rise of 100
 - Hyperlipidemia
 - Lab error (drawn above an IV)
- **Hyponatremia with dehydration**
 - Body loss – vomiting, diarrhea, 3rd space
 - Renal loss –diuretics, adrenal insuff, RTA
 - Get a urinary Cl if < 10-20 = dehydration, if > 20 = renal wasting or adrenal – not dehydration
 - Hypo Na + Hyper K + adrenal insuff
 - Treat NSS – 500-1000cc until BP OK then ~200/hr, check Na Q 2hr
- **Hyponatremia with increased total body water**
 - SIADH -ADH is the antidiuretic hormone Inc ADH = incr H₂O= incr Na (usually no edema, ascites, chf)
 - Causes –lung->pneumonia, Ca TB, Abscess, CNS, Drugs-thiazides, oral hypoglycemics, narcs, Cancer meds, others
 - Psychogenic polydipsia
 - Hypothyroidism
 - Diuretics w/ mild CHF
 - Treatment
 - Asymptomatic-> water restriction for increased TBW, NSS for dehydration
 - If severe Sx –ALOC, Sz, hypertonic saline + lasix (salt in, water out)
 - Remember to replace K
 - Use hypertonic saline 3% @ max rate 100cc/hr (1cc/kg/hr) for 2 hours only
 - Only if new AMS, Sz
 - Lasix 20mg – blocks ADH
 - Correct @ rate of 0.5 meq / hr (unless using hypertonic saline), max of 10-12meq/day
 - Recheck lytes Q 2hours
 - DO NOT CORRECT BACK TO NORMAL IN THE ED
- **Hyponatremia with increased total Na and total body water**
 - CRF, CHF, Hepatic Failure
 - Treat underlying problem
 - Avoid NS of Hypertonic saline

Complications

- Central Pontine Myelinosis (CPM)
 - Paralysis, dysarthria, dysphagia, hypotension
 - Cause by rapid correction of Na

Hypernatremia

Overview

- In adults it is due to total body water deficit
- Cellular dehydration cause ALOC
- Fix hypotension

Categories

- Hypernatremia w/ dehydration and low total body Na
 - Heat stroke, diarrhea, osmotic diuresis – glucose, mannitol, enteral feedings
 - Treatment- NS until hemodynamically stable then 1/2NS @100cc/hr
 - Lower Na by 0.5meq/hr once volume is restored
- Hypernatremia w/ low total body water and normal total Na
 - Diabetes insipidus, elderly w/ reset osmostat, hypothalamic dysfunction
 - Treatment- 1/2NS or PO fluids
 - DDAVP for DI
- Hypernatremia w/ normal total body water and increased total NA
 - Salt tablets, NSS infusion, IV NaBicarb, Feeding error, Cushings
 - Treatment –po water, D5W or 1/2NS, Dialysis if CRF

FORMULA*

$$1. \text{ Change in serum Na}^+ = \frac{\text{infusate Na}^+ - \text{serum Na}^+}{\text{total body water} + 1}$$

$$2. \text{ Change in serum Na}^+ = \frac{(\text{infusate Na}^+ + \text{infusate K}^+) - \text{serum Na}^+}{\text{total body water} + 1}$$

CLINICAL USE

Estimate the effect of 1 liter of any infusate on serum Na⁺

Estimate the effect of 1 liter of any infusate containing Na⁺ and K⁺ on serum Na⁺

INFUSATE	INFUSATE Na ⁺	EXTRACELLULAR-FLUID DISTRIBUTION
	mmol per liter	%
5% Dextrose in water	0	40
0.2% Sodium chloride in 5% dextrose in water	34	55
0.45% Sodium chloride in water	77	73
Ringer's lactate	130	97
0.9% Sodium chloride in water	154	100

*The numerator in formula 1 is a simplification of the expression $(\text{infusate Na}^+ - \text{serum Na}^+) \times 1 \text{ liter}$, with the value yielded by the equation in millimoles per liter.⁸ The estimated total body water (in liters) is calculated as a fraction of body weight. The fraction is 0.6 in children; 0.6 and 0.5 in nonelderly men and women, respectively; and 0.5 and 0.45 in elderly men and women, respectively.²⁷ Normally, extracellular and intracellular fluids account for 40 and 60 percent of total body water, respectively.²⁷

3% Na saline =513mmol/l