

Answers: self assessment questions for Na/Water

1. B: note that C is incorrect, since high total body sodium can occur with hypo, hypo, or normo-natremia
2. E—blocking aldosterone will raise serum K even more
3. B—Urea is reabsorbed avidly along with Na in the proximal tubule in volume depleted states. Effective circulating volume is low, while intravascular and extracellular volumes are high.
4. D: the patient has hypervolemic hyponatremia and does not need more salt. You need to treat the CHF.
5. C: limits free water excretion, esp in setting of malnutrition or reduced GFR. Furosemide has no such effect unless patient becomes profoundly volume depleted.
6. B: that pretty much defines the serum sodium concentration
7. E: low in CHF (low effective circ volume stimulates sympathetics) and normal in SIADH (salt balance is intact)
8. A: his low urine osmolality in the face of hypernatremia suggests DI (central or nephrogenic). Scenario A describes water loss via sweat, and the Uosm would be high.
9. A: first stabilize his hemodynamic problems, ie hypotension. Normal saline does this best, given its volume of distribution in the extracellular space.
10. C

Free water deficit: $TBW1 \times Na = TBW2 \times Na$
 $TBW\ 1 = 60\ kg \times 0.6 = 36\ liters$
 $36 \times 163 = TBW2 \times 140$
 $TBW\ 2 = 42\ liters$
 $free\ water\ deficit = 42 - 36 = 6\ liters$

In 24 hours, he will also lose another 7 liters of urine (mostly free water in DI), so he will need about 13 liters of free water total to get him back to a serum Na of 140. Total correction over 6 hours is inappropriate, since this would correct too fast and cause cerebral edema—2 meq/L per hour is maximal safe rate, and some advocate 1 meq/L per hour to be safe.

11. E: nephrogenic DI
12. B: similar to glucose, mannitol is osmotically active, so it would raise Sosm and then lower serum Na by pulling water out of cells. like glucose, it then is excreted in the urine, raising U osm (i.e. its action as an osmotic diuretic)
13. D: note low urine osmolality in face of hyponatremia
14. A: SIADH