Question 1

The first thing in evaluating a patient who has a disorder of Sodium and/or Water is?

a. Urine Electrolyte studies
b. Compare Serum Sodium to Urine Sodium
c. Compare Serum Osmolarity to Urine Osmolarity
d. Urinary Anion Gap
e. Evaluate the patient’s fluid status
Question 2

You are seeing a patient with a history of lung cancer with metastasis, his serum Na is 109. He is only on MS Contin and has been eating, however, but feels weak; he appears cachectic with a BP of 130/68 and no evidence of volume depletion. Your next step would be?

a. Renal ultrasound
b. Urine Sodium
c. Urine Osmolarity
d. Serum Osmolarity
e. b, c, and d.
Question 2

The most likely etiology of the patient’s hyponatremia is?

a. Dehydration
b. Sepsis
c. Surreptitious use of diuretics
d. Syndrome of Inappropriate secretion of ADH
e. Diabetes Insipidus
Question 2

The appropriate treatment is?

a. Fluid restriction
b. Tolvaptan-V2 Receptor blocker
c. 3% Saline at 60 ml/hr for 24 hours
c. Hydrochlorothiazide
e. Furosemide
You are seeing a patient with a serum Na of 112, Serum Osmolarity is 260 and Urine Osmolarity is 280, they are not on any medications and BP is 146/84. The most likely diagnosis is?
a. Dehydration
b. Sepsis
c. Surreptitious use of diuretics
d. Syndrome of Inappropriate secretion of ADH
e. Diabetes Insipidus
Barter-Schwartz criteria for SIADH

- Hyponatremia
- Hypoosmolarity (serum)
- Urine Sodium >20
- Urine Osmolarity > Serum Osmolarity (less than maximally dilute)
- Euvolemia
- Normal Cardiac, Renal, Thyroid, Pituitary Axis, Liver

A 54 y.o male has recently had undergone a CABG. Pre-op creatinine was 1.2 mg% and he has a history of Type 2 Diabetes. Intra-operatively, he required 2 hours on bypass pump and post-operatively he has been hypotensive, requiring pressors. 3 days post-op his creatinine is 3.2 mg%. CXR and Renal US are negative, his C.O. is 0.9 and C.I. is 1.6 with a PCWP of 6. He is afebrile but has had little urine output over the past 24 hours, WBC is 9.1 and Hb is 8.9 gm. Your treatment would consist of?

a. Fluid challenge to attempt to raise BP and PCWP
b. Broad spectrum antibiotics for sepsis
c. Transfuse 2 units of packed RBCs
d. Start dialysis
e. High dose loop diuretics to increase urine output
A 66 y.o. female is admitted for mental status changes. She has a history of metastatic breast cancer and has been declining recently. On exam she is very lethargic with a BP of 75/50 and a pulse of 130. Her lab reveals: Na 134, Co2 16, K 5.7, BUN 89, Creatinine 1.9, and Ca 17.2. The most likely explanation of the patient’s presentation is?

a. Production of a PTH-like factors
b. Production of lymphokines
c. Direct bone invasion
d. Production of a Vitamin D like substance
e. Any of the above
Question 5

The first treatment would consist of?

a. I.V. Saline at 30 ml/hr
b. I.V. Saline for several liters then followed by a loop diuretic
c. Corticosteroids
d. Calcitonin
e. Dialysis
Question 6

In a patient with Hypernatremia, regardless of the cause, which of the statements is true?

a. Elevated glucose can increase the Sodium level
b. Elevations in Potassium will almost always occur
c. There is always a free water deficit
d. All of the above
e. None of the above
You are seeing a 52 y.o. male with a history of bipolar disorder for which he has taken Lithium for a number of years. His BP is 128/62 and is not orthostatic. His serum Na is 153 mg% and he drinks a considerable amount of water to compensate for frequent urination. Based on the information, your working diagnosis is?

a. SIADH
b. Dehydration
c. Psychogenic polydipsia
d. Central Diabetes Insipidus
e. Nephrogenic Diabetes Insipidus
Diabetes Insipidus

- Central—due to trauma, edema, ischemia or removal of the Pituitary, or congenital
- Nephrogenic—due to the kidneys loss of response to ADH, drugs, obstruction, ureteral reflux, salt wasting, chronic renal disease, congenital
- Large volumes of dilute urine (10-15 l/day)
- Polydipsia
Diabetes Insipidus

- Diagnosis with water deprivation test
- Hypernatremia
- Hyperosmolarity
- Dilute urine
- Treatment: ADH replacement
Question 7

To make the diagnosis, the next test would be?

a. Measure a Serum ADH level
b. Measure Urine ADH level
c. Saline suppression test
d. Water restriction test
e. None of the above
Question 7

The result was what you expected. Your treatment now would be?

a. Thiazide diuretic
b. Amiloride
c. Daily NSAID use
d. Low Sodium and low protein diet
e. All of the above
Question 8

You are seeing a 32 y.o. female with hypertension. Her medications include: Dyazide, Metoprolol, and Lisinopril; despite her compliance her BP is 168/78. Her lab is remarkable for a Na of 148 mg% and a K of 2.8 mg%. Your next diagnostic test would be?

a. Plasma Renin Activity
b. Serum Glucose
c. Serum ADH level
d. Plasma Catecholamines
e. CT of the Adrenal glands
Question 8

In the above mentioned patient, you would expect to find edema.

a. True
b. False
Hyperaldosteronism/Conn’s Syndrome

- Excess production of Aldosterone by an adrenal adenoma or multiple microadenomas
- Refractory hypertension
- Refractory hypokalemia
- Mild hypernatremia
- Mild metabolic acidosis
- Aldosterone escape-no edema
You are seeing a 40 y.o. patient with HIV, he has recently been found to have military T.B. He appears ill and has a BP of 88/62 and a pulse of 120. His exam is remarkable for diffuse tanning. Lab reveals a Na 147 mg%, K 6.2, CO2 15 with an anion gap of 10, BUN is 32 and Creatinine is 1.5. WBC is 4.2 with 12% Eosinophils. The lab was obtained after several liters of Saline and normalization of BP. What is the most likely explanation for the patient’s condition?

a. Type IV RTA
b. Acute Renal Failure
c. Sepsis
d. Addison’s Disease
e. Lab error
Question 10

You are seeing a 56 y.o. Type 2 Diabetic, his lab is: Glucose 260, Na 138, K 5.7, CO2 17, BUN 29, Creatinine is 1.7 he is chronically non compliant with all of his meds and diet. What is the explanation of his lab?

a. Occult alcohol abuse
b. Dehydration
c. Addison’s Disease
d. Type IV RTA
c. Uncontrolled Diabetes
Question 11

You are seeing a patient for CHF. He has been aggressively treated with diuretic and despite equally aggressive potassium replacement, his K remains low. What is your next step?

a. Double the dose and frequency of potassium replacement
b. Stop all diuretics
c. Add an ACE-I
d. Switch to a potassium sparing diuretic
e. Measure Serum Magnesium
Question 12

You are consulted by the Trauma Service; a 22 y.o. male was admitted for evacuation of a subdural hematoma following an accident. Despite aggressive post-op fluids, the patient had had significant polyuria, his Na is 154 with an Osmolarity of 320. The cause of the patient’s Sodium abnormality is?

a. Over secretion of ADH
b. Over responsiveness of ADH receptors on the kidney
c. Dehydration
d. Under secretion of ADH
e. Under responsiveness of ADH receptors in the kidney
Question 13

In the previous patient, the best treatment would be?

a. Fluid restriction
b. Demeclocycline
c. Thiazide
d. Amiloride
e. Desmopressin (DDAVP)
Question 14

You have a patient who is on torsemide, chlorthaladone, and potassium bicarbonate/citrate. Her potassium usually runs a bit low, 3.4 mg/dl and her magnesium is normal. She had been vomiting, but is still able to take her medications. On exam her BP is 90/60 dry mucous membranes and poor skin turgor.

Today her lab reveals: Na 136, K 2.9, Cl 96, CO₂ 33. Mg is low at 1.0.
Question 14 continued

Optimal fluid replacement would include:

1. Saline, potassium bicarbonate and magnesium
2. Potassium chloride and magnesium
3. Potassium bicarbonate, and magnesium
4. Potassium chloride, saline and magnesium
5. Saline and magnesium
Hypokalemia-Treatment

- Potassium Chloride is the preferred replacement
- KCl will raise the potassium level quicker than other forms
- Metabolic alkalosis frequently is seen with hypokalemia, unless Chloride is replaced, bicarbonate will continue to be produced
- Potassium bicarbonate (K-lyte) will further aggravate the alkalosis and hypokalemia

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