OR Keyword: **Thursday – 1 / 27 / 11**

SIADH

Anesthetic Pearls: Diagnosis and Treatment of Syndrome of Inappropriate Antidiuretic Hormone

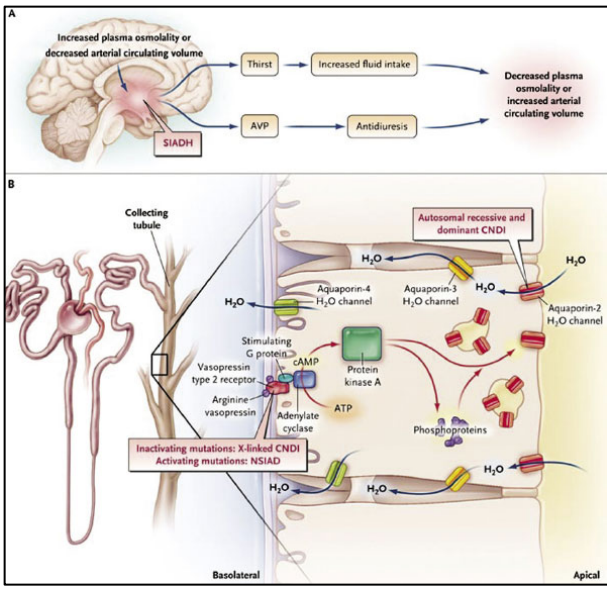
The **Syndrome of Inappropriate Antidiuretic Hormone** secretion (SIADH) is characterized by hyponatremia, serum hypo-osmolality, and normovolemia (no evidence of tissue edema).

Antidiuretic Hormone (ADH) is the primary hormone regulating water excretion in individuals who are healthy. ADH is synthesized in the hypothalamus and works primarily in the collecting ducts in the kidneys to reabsorb water. ADH is typically released under two conditions: (1) an elevation in serum osmolality (1-2% elevation of plasma osmolality > 280 mOsm/kg); (2) a 7-10% volume deficit. Interestingly, hypovolemic stimulation of ADH release over-rides hyperosmolar-related ADH release when the two are in conflict. ADH is also a peri-operative "stress" hormone and is secreted commonly in the peri-operative period. It is a leading cause of intra- and post-operative oliguria (after hypovolemic causes have been ruled out).

Causes of SIADH:

Disorders	**Comments**
Major Surgery	Pain afferents stimulate hypothalamic ADH release (lasts 2-5 days), after mitral commissurotomy (acute decrease in LA pressure causes release of ADH)
Neurologic Conditions	Skull fracture, subdural hematoma, subarachnoid hemorrhage, cerebral thrombosis, encephalitis, meningitis, psychiatric disorders, cerebral salt wasting syndrome
Drugs	NSAID's, chlorpropamide, vincristine, oxytocin, general anesthesia, narcotics, TCA's
Malignant Neoplasms	Acute asthma, atelectasis, empyema, pneumothorax, acute respiratory failure, TB, oat cell lung carcinoma, pancreatic cancer, duodenal cancer, thymoma
Idiopathic	Cancer & vasculitis (continue periodic checks for underlying disorders)

Symptoms (serum Na^+ < 120 mEq/L leading to CNS edema): restlessness, irritability, confusion, coma, seizures



Diagnosis:

1. Plasma osmolality (< 280 mOsm/kg) (inappropriately concentrated urine in the face of hyponatremia)
2. Urine osmolality (> 100-150 mOsm/kg, but usually > 300 mOsm/kg)
3. Urinary sodium concentration (usually > 40 mEq/L)
4. Normal plasma creatinine
5. Normal adrenal and thyroid function
6. Normal acid-base (HCO_3) and potassium balance

Management:

Any component of hypovolemia must be identified and treated with isotonic fluids; however, most patients with pure SIADH will usually be normovolemic. For these individuals, fluid restriction is in order (usually limiting fluid intake to < 1200 ml/day). Fluid restriction works by creating a hypovolemic state in which most fluid is reabsorbed proximally before it reaches the collecting duct, thus ADH has no fluid to work on. In cases of severe or symptomatic hyponatremia (usually Na^+ values less than 120 mEq/liter), regardless of etiology, the sodium should be "slowly" corrected with 3% hypertonic saline until the sodium is greater than 125 mEq/liter. A loop diuretic (Furosemide) can also be given to increase free water clearance. The sodium deficit in hyponatremia is calculated by the following formula:

mEq Na^+ needed = (140 – serum Na^+) x (0.6 x weight [kg])

<u>The serum / blood sodium level should not be increased more than 15 mEq/L per 24 hrs</u>. When serum sodium is greater than 125 mEq/L, hypertonic saline should be stopped and free water restriction begun until the sodium returns to normal. Correction of the serum Na^+ levels too rapidly may result in CNS injury (central pontine myelinolysis).