**EM Basic- Hyponatremia**
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**Hyponatremia** - serum sodium less than 135 meq/L
- First decision point- seizing, obtunded, or altered mental status?
  - If yes- go to critical care section
  - If no- then DO NOTHING (well, not quite nothing but don’t try to start correcting the patient’s sodium level in the ED)

**Symptoms** - Can be vague and non-specific
- Weakness, fatigue, headache, confusion, etc.
- May be relatively asymptomatic and hyponatremia discovered during workup for something else

**Usual patient** - older patient with “weakness” who is alert and oriented with a sodium of 130 meq/L
  - This patient accounts for the vast majority of ED patients with hyponatremia

**Management** - alert and oriented patient
- **First step**- water restrict
  - Write a nursing order to make patient NPO
  - Tell patient that they have to be water restricted
- **Second step**- investigate for whether this is acute or chronic
  - Look back in the medical record
  - If patient has 3 sets of labs over past 3 months with same sodium level then not that worried
  - May be possible to discharge that patient if they don’t need admission for something else
  - If this is new for the patient then go to the next step
- **Third step**- investigate for possible cause of hyponatremia
  - Medications are a common cause
  - Hydrochlorothiazide and SSRIs are common causes
    - SSRIs- Prozac (fluoxetine), Zoloft (sertraline)
  - MDMA (street drug “ecstasy”) also a cause
    - Inappropriate secretion of antidiuretic hormone (ADH) leads to increase free water retention and dilution of sodium level

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**Causes of hyponatremia** (continued)

- Volume losses
  - Vomiting and diarrhea
- “Leaky fluid states”
  - Severe liver disease, congestive heart failure (CHF)
- Renal failure
- Endocrine causes
  - Hypothyroidism and adrenal insufficiency
- “Beer potomania”
  - Excessive alcohol consumption- alcohol lacks electrolytes so drinking large amounts without eating solid food can deplete sodium levels
- Cancer
  - Lung cancer is notorious for causing hyponatremia
  - Ask about red flags (unexplained weight loss, night sweats, unexplained bone or muscle pain, new back pain in an elderly patient)

**Fourth Step**- Admit the patient and DO NOTHING

***PEARL***- Correcting the sodium too rapidly can lead to Central Pontine Myelinolysis which can cause permanent neurological damage and death

- Don’t try to correct sodium level in the ED- JUST WATER RESTRICT!
  - Resist the urge to gently hydrate with normal saline- even this can raise the patient’s sodium too fast
  - Inpatient team may want urine electrolytes, osoms, etc.

**Hyponatremia critical care** - patient is seizing, altered or obtunded

- Much different patient
- Hypertonic saline to correct sodium until they stop seizing
- Only need to raise sodium about 3-5 points to do this
- Hypertonic saline
  - 3 mls per kilogram IV with theoretical max of 100 mls
  - Rapid sequential boluses over max 10 minutes or until seizures stop
  - Central access preferred but can give it through a GOOD peripheral IV (AC peripheral, not small hand vein)
Hyponatremia critical care (continued)

-Sodium Bicarbonate
  -A substitute for hypertonic saline in a pinch
  -Equivalent to about 11% hypertonic saline
  -One amp usually is 50 mls but more Na than 3%
  -One amp approx. 210 mls of 3% hypertonic saline
  -Push this slower since more concentrated than 3%

-Benzodiazepenes
  -Give Ativan (lorazepam) or Valium (diazepam) in case hyponatremia is not causing seizures and it is a primary seizure disorder instead

***PEARL- If you have a patient with seizures that isn’t responding to benzos, consider hyponatremia as a cause***

-Patient with low sodium (115) but just a little altered and not seizing
  -Give 3% hypertonic saline- 100 mls over one hour
  -Will raise sodium by 2 points

-How much to correct the sodium safely?
  -Rule of Sixes (borrowed from EmCrit, borrowed from review article)
    -Six points for Severe Symptoms in then Stop
      -Once you correct 6 points in 6 hours, stop until the 24 hour mark to avoid overcorrection
    -Six a day makes Sense for Safety
      -More for chronic hyponatremia- don’t correct more than 6 points over a 24 hour period

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