

NSGP 210 Case Studies in Pathophysiology – Concept map notes

System: <u>Fluid + Electrolytes</u> Condition: <u>Hypo/Hypernatremia</u> Na: <u>135-145 mg/L</u>			
<b>Basic Concept</b> <ul style="list-style-type: none"> <li>• <math>Na^+</math> major solute + main determinant of osmolarity</li> <li>• + ion (cation)</li> <li>• found mostly in ECF</li> <li>• Assist in fluid balance + osmotic pressures</li> <li>• Controls distribution of water.</li> </ul> <p style="text-align: right;">• Requires <math>Na^+/K^+</math> pump to maintain <math>Na^+</math> extracellular + <math>K^+</math> intracellular</p>			
<b>Pathophysiology</b> <ul style="list-style-type: none"> <li>• <math>Na^+/K^+</math> pump mechanism. <math>Na^+</math> influx during depolarization of action potential</li> <li>• Imbalance major effect on neurotransmission + muscular contraction</li> <li>• Alterations in fluid balance adversely effects <math>Na^+</math> values.</li> <li>• Must be evaluation on hydration status</li> </ul>			
<b>Risk Factors</b> <ul style="list-style-type: none"> <li>• post op <sup>Hypot</sup></li> <li>• Diuretics</li> <li>• elderly</li> </ul>	<b>Hyper</b> <ul style="list-style-type: none"> <li>• breastfed infants</li> <li>• elderly</li> </ul>		
<b>Etiology</b> <u>Hypo Natremia (&lt;135)</u> <ul style="list-style-type: none"> <li>• dehydration</li> <li>• SIADH</li> <li>• fluid overload</li> </ul>	<b>Hypernatremia (&gt;145)</b> <ul style="list-style-type: none"> <li>• water loss</li> <li>with kidney dysfunction – inability of renal tubule to react to ADH, GFR ↓ – <math>Na^+</math> <math>H_2O</math> reabsorb slowed</li> </ul>		
<b>Pathophysiology (include different types here)</b> <p><u>Hypotonic hypotremia = loss <math>Na^+</math> due to kidneys. Adrenal insuff., osmotic diuresis, diuretics</u></p> <p><u>Hypotremia - <math>H_2O</math> excretion is impaired + sodium diluted with water</u> diarrhea, vomiting, excessive sweating</p>	<p>↑ osmotic load – ↑ water from ICF to ECF.</p> <p>Brain cells compensate by moving <math>H_2O</math> from Cerebrospinal fluid.</p>		
<b>clinical presentation (S&amp;S)</b> <ul style="list-style-type: none"> <li>* Neurological deficits</li> <li>* Confusion</li> <li>* Behavior <math>\Delta</math>'s</li> </ul> <p><u>Hypotol. hyperN. → thirst, dry mouth, orthostats hypotension, N/A, azotemia oliguria</u></p>	<table border="0"> <tr> <td style="vertical-align: top;"> <p><u>one with fluid overload</u></p> <ul style="list-style-type: none"> <li>• weight gain</li> <li>HTN</li> <li>mental changes</li> <li>pulm edema</li> </ul> </td> <td style="vertical-align: top;"> <p><u>without fluid overload</u></p> <ul style="list-style-type: none"> <li>• dehydrated</li> <li>• irritability</li> <li>• tachypnea</li> <li>• flushed skin</li> <li>• dry mucous membranes - oliguria</li> </ul> </td> </tr> </table>	<p><u>one with fluid overload</u></p> <ul style="list-style-type: none"> <li>• weight gain</li> <li>HTN</li> <li>mental changes</li> <li>pulm edema</li> </ul>	<p><u>without fluid overload</u></p> <ul style="list-style-type: none"> <li>• dehydrated</li> <li>• irritability</li> <li>• tachypnea</li> <li>• flushed skin</li> <li>• dry mucous membranes - oliguria</li> </ul>
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<b>Diagnostic Test/Procedures</b> <u>Basic Metabolic Panel</u> • GFR	<b>Treatment</b> <ul style="list-style-type: none"> <li>• dehydration = slow replacement of <math>Na^+</math> with fluids</li> <li>watch for edema specifically pulm edema</li> <li>• SIADH - restriction of water + look for source of ADH.</li> <li>• Diuretics</li> </ul>		
<b>Complications</b> <p><u>Severe hypotremia (less than 125)</u></p> <ul style="list-style-type: none"> <li>• high mortality.</li> </ul> <p><u>Post op + elderly have highest incidents</u></p>	<ul style="list-style-type: none"> <li>• to genetic infusion of solutions – cause cerebral edema ⇒ seizures, coma + death.</li> <li>mortality ↑ among elders.</li> </ul>		