Fluids in the ICU

Terms to understand:

**Osmolarity**: # of osmoles of solute/L solution

**Osmolality**: # of osmoles of solutes/kg solvent

Osmolarity of 100mmol NaCl = 200mosm/L

This looks at only osmotically active particles (not ineffective dissolved particles)

At physiologic solution concentrations, the two terms are interchangeable

**Calculated serum osmolality**:

(2xNa+) + (BUN/2.8) +( Glu/18)

* the difference between measured and calculated Sosm is **osmolar gap**. Measured Sosm picks up osmoles such as mannitol and toxic alcohols which are not accounted for in calculated osm.
* Normal Sosm 275-295

This is why it is important to get Sosm in hyponatremia: hypoosmolar hyponatremia reflects true increased free water (such as SIADH, CHF, cirrhosis)

**Tonicity of a solution**: describes what happens to cells when put in that solution. Influenced by cells that can’t cross the membrane

**Hypertonic solution** 🡪 cells shrink as water flow out of cells into solution

**Hypotonic solution** 🡪 cells swell as water flows into cells from solution

**Isotonic solution** 🡪 no movement of water

|  |  |  |  |
| --- | --- | --- | --- |
|  | Na+ | Cl- | Osmolarity |
| 0.9 NS | 154 | 154 | 308 |
| LR | 130 | 109 | 275 |
| Normosol | 140 | 98 | 295 |
| 0.9NS + 150meq HCO3 | 308 |  | 616 |
| 25% albumin |  |  | 312 |
| 3% saline | 513 |  | 1026 |
| 23% saline | 4004 |  | 8008 |
|  |  |  |  |
|  |  |  |  |

Body Fluid compartments;

TBW = 1/3 ECF (1/4 IV and 3/4 interstitial) + 2/3 ICF

**Total body water** = weight x X X = 0.6 men 0.5 women

**Total fluid requirement/day**:

30ml/kg – average ICU patient

40ml/kg—multitrauma, sepsis, burns, fever