NEUROICU Guideline:  
Osmotherapy for Treatment of Intracranial Hypertension

20% Mannitol

Goal: To treat severe intracranial hypertension (ICP≥20mmHg) in severely brain-injured patients

Patient Eligibility:
1. Patient must be in the NeuroICU and administration of therapy must be per protocol.
2. Patient must have severe intracranial hypertension (ICP≥20mmHg)

Contraindications:
1. ICP < 20 mmHg
2. Significant intravascular volume depletion exists:
   a. Based on a clinical assessment by the NeuroCritical Care Service which synthesizes exam findings, laboratory results, and other pertinent clinical data
   b. For example: CVP<6; net negative fluid balance; elevated BUN/creatinine ratio
3. Serum Na⁺ ≥160mmol/L
4. Serum osmolar gap>20

Relative Contraindication: Renal insufficiency/ failure

Monitoring:
All patient receiving HTS for the treatment of intracranial hypertension must have the following parameters monitored and documented:
1. Central venous pressure via a central venous catheter OR pulmonary artery occlusion pressure via a pulmonary artery catheter (except in cases of emergent administration)
2. Intracranial pressure monitoring
3. All other monitoring and documentation per NeuroICU protocol

Protocol:
1. MD will order: XX gm mannitol q 6hrs prn ICP ≥ 20mmHg. Hold for osm>320mmol AND osm gap>20. Hold for serum Na⁺ ≥160mmol/L.
   a. Mannitol dose should be 0.5-1.25gm/kg
   b. Maximum dose: 150 gms.
2. Administer first dose of mannitol as ordered.
   • Rate of administration should not exceed 0.1gm/kg/min (administer over 15 minutes)
3. If mannitol fails to lower ICP below 20mmHg within 20 minutes of administration or if severe intracranial hypertension (ICP>20mmHg) recurs within 6 hours of administration- consider use of 5%NaCl. (*See NeuroICU Osmotherapy Guidelines for Treatment of Intracranial Hypertension: Hypertonic Saline- 5%NaCl/Na acetate)
4. If ICP responds to mannitol in a sustained fashion, then five hours post administration, check serum Na⁺, BUN, glucose, and serum osm- calculate the osm gap.
5. If ICP again exceeds 20mmHg, then:
   a. If serum osm<320mmol, then administer next dose of mannitol
   b. If serum osm>320mmol:
      i. Calculate osm gap
      ii. OSM GAP = Measured OSM – Calculated OSM
         1). Measured OSM= OSM value obtained from lab
         2). Calculated OSM= 2(Na⁺) + BUN/3 + glucose/18
      iii. If osm gap<20mmol- administer next dose of mannitol
      iv. If osm gap>20mmol- hold mannitol and notify MD. Consider use of 5%HTS.
6. Replace urinary losses on a cc per cc basis for the first 2 hrs following each administration.
7. If hypotension or a drop in CPP below 70mmHg occurs, notify MD and consider HTS
8. For each occurrence of severe intracranial hypertension, review and repeat protocol.