Maintaining the cerebral perfusion pressure

- Recent changes to guidelines recommend a CPP of ~ 60mm/Hg
- Assuming a normal ICP, that means a MAP over 70

**CPP = MAP minus ICP**

**What to increase the MAP with?**
- Whatever crystalloid you were going to use anyway; normal saline is satisfactory
- What you DON’T want is an increase in free water, so avoid dextrose or 4%-and-5th
  - According to the SAFE investigators, albumin increases mortality in head injury.
  - Aim for a Hematocrit of 30
  - Maintain a Hb of 85 to 100
  - Maintain a normal osmolality

**How shall I decrease the ICP?**

**Hyperventilation**
- Reduced CO2 = vasoconstriction and thus decreased cerebral blood flow; thus, ICP will also fall
- But, immediately after a head injury, the cerebral perfusion pressure is already low: hyperventilation will drop it even further.
- This will make the existing hypoxia worse; THUS:
  - HYPOVENTILATION IS NOT RECOMMENDED IN THE INITIAL RESUSCITATION OF HEAD INJURY ...UNLESS THEY ARE CONING IN FRONT OF YOU
- Thus, you wouldnt ever hyperventilate them

**Mannitol**
- 1g/kg
- ONLY in the normovolemic patient – it will drop the blood pressure
- ONLY useful in an osmolality range of 290-330; thereafter, side-effects outweigh the benefits
- It also enters the brain if the blood brain barrier is damaged, actually worsening the oedema
- Massive hypotension will ensue, as it is a potent diuretic.
  - Thus:
    - MANNITOL INFUSION IS NOT RECOMMENDED IN THE INITIAL RESUSCITATION OF HEAD INJURY ...UNLESS THEY ARE CONING IN FRONT OF YOU

**Hypertonic Saline may prove to be better (3% saline)** - at least in one study, its superior to mannitol.
- 20% saline, 20 ml, over 20 minutes (“20 of 20 in 20”)

**Keep the PEEP low: 5 - 10**
- Or else you might compromise cerebral venous return

**Maintain normocapnea**
- 35-40 mmHg PCO2

**Head up, 45 degrees**
- To improve cerebral venous return and reduce aspiration risk

**Keep the head straight and try to avoid jugular CVCs**
- Also to improve cerebral venous return

**Keep them sedated (propofol seems to be the poison of choice)**
- To prevent coughing which will also increase the ICP, and to reduce cerebral metabolic demand
- Paralysis for long periods is not indicated- it is associated with a bad outcome
- Barbiturate coma is still practiced, but there isn’t much evidence for it