

Increased ICP: Treatment

The best therapy for intracranial hypertension is resolution of the proximate cause of elevated ICP. Regardless of the cause, treatment should be undertaken as expeditiously as possible, and should be based on the principles of resuscitation, reduction of the volume of the intracranial contents, and reassessment.

Specific measures:

Head elevation (30 degrees)

Hyperventilation – PaCO₂ – 26-30 mmHg

Mannitol IV – 1-1.5 g/kg

Maintain euvolemia

Sedation – to decrease metabolic demand (propofol)

BP - Maintain MAP > 60 mmHg. Only treat HBP if CCP > 120 and ICP > 20 mmHg

Avoid fever

Anticonvulsant if seizures present

Hypertonic saline – to increase osmolarity

Furosemide – may be given with mannitol. Avoid dehydration and hypokalemia

Barbiturates – (phenobarbital) - reduce brain metabolism and cerebral blood flow, thus lowering ICP and exerting a neuroprotective effect

Removal of CSF – avoid rapid aspiration – rate of 1-2 mL/minute for 2-3 minutes at intervals

Decompressive craniectomy – opening skull and dura can decrease ICP in up to 70%

Question:

A 46-year-old man who sustained an acute subarachnoid hemorrhage is intubated and mechanically ventilated in the ICU following embolization of an anterior communicating artery aneurysm four days ago. At that time he had a Glasgow coma scale score of 4. Today the patient underwent arteriography with angioplasty for cerebral vasospasm. During the procedure, the ICP rose from 10 mmHg to 25 mmHg over five minutes. His blood pressure is 189/90 mmHg, heart rate is 70 bpm, respiratory rate is 28/min, and CVP is 14 mmHg. Laboratory studies reveal the following:

Serum	
Na	140 mEq/L
K	4 mEq/L
HCO ₃	22 mEq/L
BUN	16 mg/dL
Creatinine	1 mg/dL
Glucose	124 mg/dL
Urine Specific gravity	1.20

A post procedure CT scan has been ordered. While awaiting results of the CT scan, administration of which of the following therapies is MOST appropriate to acutely decrease this patient's ICP?

- a. Dexamethasone
- b. Furosemide
- c. Hypertonic saline
- d. Nimodipine

Answer: C - Hypertonic saline administration acutely lowers lethal intracranial hypertension by direct elevation of serum osmolarity.