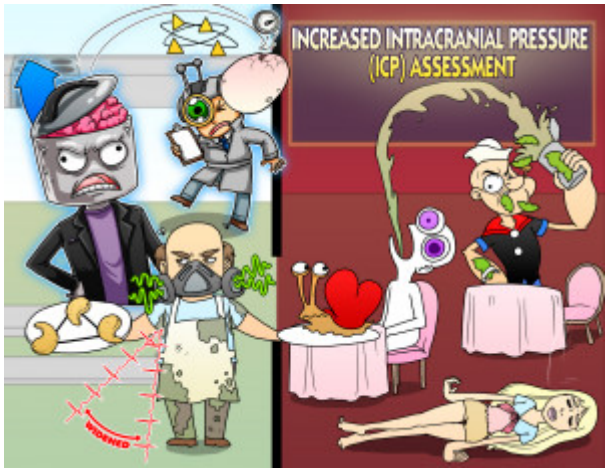
Increased Intracranial Pressure (ICP) Assessment

Intracranial pressure (ICP) is a measure of the hydrostatic pressure in the brain. Three elements contribute to ICP: brain tissue, blood, and cerebrospinal fluid (CSF). While these elements usually remain in balance, factors such as an increased body temperature or increased arterial or venous pressures can cause the ICP to fluctuate. The Monro-Kellie doctrine states, that if one component of ICP (brain tissue, blood, CSF) increases, one of the other components will decrease to maintain a constant pressure. When this balance is disrupted or when compensatory mechanisms fail, increased ICP can result. Signs and symptoms of increased ICP include change in level of consciousness, headache, irregular respirations, widening pulse pressure, bradycardia, projectile vomiting, abnormal pupils, and decerebrate or decorticate posturing.



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Change in LOC
Delta Halo
A patient’s level of consciousness (LOC) is the best way to determine their neurological status. A change in LOC indicates inadequate or impaired cerebral blood flow, meaning that the brain is being deprived of oxygen. Lack of oxygen can initially cause confusion and may eventually lead to a state of unconsciousness.

Headache
Head-egg-lump
Increased pressure in the brain may cause compression of structures such as cranial nerves and arteries. Pressure on these structures can cause a headache. Patients may report a continuous headache that is more severe in the morning.

Cushings Triad
Cashews Triangle-triad
Changes in vital signs that indicate brainstem compression in patients with increased ICP are irregular respirations, widening pulse pressure, and bradycardia. These three changes are known as Cushing’s Triad and should be treated as a medical emergency.

Irregular Respirations
Irregular Respirator
When the brainstem is compressed due to increased ICP, regulation of breathing is disrupted. This causes irregular, and often slowed, breathing.

Widening Pulse Pressure
Widened Pulses
Pulse pressure is a measure of the difference between the systolic and diastolic blood pressures. In patients with increased ICP, systolic hypertension occurs, causing a greater, or widening pulse pressure.

Bradycardia
Snail-heart
Brainstem dysfunction related to increased pressure in the brain will cause a slowing of the heart rate with a full and bounding pulse.

Projectile Vomiting
Projectile Vomit
Vomiting that occurs without the forewarning of nausea can be a sign of increased intracranial pressure. Because vomiting can also be seen with gastrointestinal disturbances, further assessment should be conducted before determining the patient has an increased ICP.

Abnormal Pupils
Abnormal Purple-pupils
Increased pressure on the oculomotor nerve can cause dilation of the pupil(s). Remember, dilation of the pupil occurs ipsilateral, or on the same side, as the compression of the nerve.

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Papilledema

Popeye-edamame

Swelling of the optic disc in the eye can occur bilaterally in patients with persistent, increased ICP.

Posturing

Model Posturing

Changes in motor function can occur with increasing pressure in the brain. Decerebrate posture is indicative of midbrain and brainstem dysfunction and is characterized by extension and adduction of the arms, and hyperextension of the legs. Patients will also demonstrate hyperpronation of the arms, and plantar flexion of the feet in this posture. When increased intracranial pressure affects the cerebral cortex, patients will internally rotate and adduct the arms, with flexion of the elbows and wrists. This is called decorticate posturing.

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