

Increased Intracranial Pressure

Recognise deterioration early and protect cerebral perfusion

Intracranial pressure (ICP) is pressure within the skull. Brain tissue, blood and cerebrospinal fluid (CSF) share a largely fixed space. When compensatory displacement is exhausted, extra volume can raise pressure rapidly, reduce brain perfusion and cause herniation.

Causes and pathophysiology

Traumatic injury, intracranial haemorrhage, cerebral oedema, tumour, hydrocephalus, infection or impaired venous drainage may increase intracranial volume. Rising pressure can compress brain structures and blood vessels. The clinical course depends on the cause and speed of change. [1,2]

Finding	What it means for nursing assessment
Change in consciousness	New restlessness, confusion, reduced attention, drowsiness or difficulty arousing the patient may be early deterioration. Compare with baseline; do not attribute changes automatically to sleep or medication.
Headache / vomiting	Headache, nausea and vomiting may occur. Vomiting need not be projectile; neither symptom is specific to increased ICP.
Pupils and motor changes	New unequal or poorly reactive pupils, focal weakness, seizures or abnormal posturing require urgent assessment. A new fixed dilated pupil with declining consciousness suggests possible herniation.
Cushing response	Raised systolic BP/widening pulse pressure, bradycardia and irregular breathing are late, ominous findings. Do not wait for the full triad.
Papilloedema	May occur with sustained raised pressure; its absence does not exclude acute intracranial hypertension.
Infants	Bulging fontanelle when calm, increasing head circumference, irritability, poor feeding or altered responsiveness need assessment. Adult thresholds and examination expectations do not simply transfer to infants.

Pressure and perfusion: avoid mixing up the numbers

Typical supine adult ICP is approximately **5-15 mmHg**. Cerebral perfusion pressure: **CPP = MAP – ICP**. Example: MAP 85 – ICP 25 = CPP 60 mmHg. Hypotension and increased ICP can both reduce brain perfusion.

In severe adult traumatic brain injury, guidance recommends treating ICP above 22 mmHg and generally targeting CPP 60-70 mmHg. These are specialist TBI targets, not universal diagnostic cut-offs for every neurological condition. [3]

Immediate Nursing Priorities

A new neurological change requires reassessment and prompt escalation

Priority	Action and rationale
Escalate and stabilise	Call the appropriate emergency/neurosurgical team for acute decline. Assess airway, breathing and circulation; prevent hypoxaemia and hypotension. Prepare for advanced airway support if the patient cannot protect the airway.
Position appropriately	Usually elevate the head of the bed about 30° and keep head/neck neutral to support venous drainage, if haemodynamics and spinal precautions permit. Avoid marked neck rotation, constriction and excessive hip flexion.
Trend the neurological examination	Record GCS components, pupil size/reactivity, limb movement/strength and vital signs at the prescribed frequency. Note sedation, paralysis, language and baseline deficits that affect interpretation.
Reduce avoidable pressure surges	Provide prescribed analgesia/sedation; address fever, agitation, pain and seizures. Avoid straining; use prescribed bowel care. Space stimulating care according to tolerance rather than creating repeated prolonged stimulation.
Airway care	Suction only when indicated, with appropriate oxygenation and brief technique according to protocol. Do not withhold necessary airway clearance. Watch for ICP/oxygenation changes during care.
Fluids and monitoring	Maintain prescribed isotonic fluid therapy and perfusion goals. Monitor fluid balance, sodium, glucose and renal function. Avoid unprescribed hypotonic/free-water administration or indiscriminate fluid restriction.
Investigations	Prepare for urgent CT and indicated laboratory testing after stabilisation. Lumbar puncture may be unsafe with suspected mass effect/herniation risk; escalate concerns before proceeding.

Possible herniation: act now

Rapid decline in consciousness, a new fixed pupil, posturing or abnormal breathing warrants emergency response. Do not delay escalation while waiting for imaging, a complete Cushing triad or an ICP monitor reading.

Hyperventilation is not routine prevention. Lowering carbon dioxide constricts cerebral vessels and can reduce cerebral blood flow. Brief controlled hyperventilation may be used by the critical-care team as a rescue bridge in an acute crisis; prolonged/prophylactic use can harm. [1-3]

Treatment & Monitoring Safety

Treat the cause while preventing secondary brain injury

Intervention	Nursing responsibilities
Hyperosmolar therapy	Hypertonic saline or mannitol may be prescribed. Monitor neurological response, BP, sodium/osmolality, renal function and fluid balance as ordered. Mannitol can cause diuresis and hypovolaemia; follow infusion and monitoring protocols.
CSF drainage / surgery	An external ventricular drain (EVD), haematoma evacuation, tumour treatment or decompression may be required. Management depends on the cause and response.
EVD safety	Maintain the prescribed reference level and drainage height; re-level after position changes. Follow ordered clamping/transport procedures. Keep the system closed; never change the height, flush or manipulate it independently.
Assess EVD changes	Report unexpected cessation or marked increase in drainage, new bloody/cloudy CSF, leakage, fever or neurological decline. Avoid assuming that no drainage always means obstruction; clinical context and settings matter.
Corticosteroids	May be appropriate for selected causes such as tumour-associated vasogenic oedema. They are not a universal treatment for raised ICP and are not recommended to improve outcome or reduce ICP in severe TBI.
Ongoing protection	Continue aspiration precautions, skin/eye care, nutrition and prescribed thrombosis prevention. Coordinate turning and rehabilitation with physiological stability. Explain the plan to family and support decision-making.

Evaluate the response

Look for stable/improving consciousness and pupils, adequate oxygenation and perfusion, controlled seizures and temperature, and ICP/CPP trends within the prescribed goals. A single normal measurement does not replace serial clinical assessment.

RENR recall

Consciousness change can precede the classic late signs.
Head elevation supports drainage, but perfusion and spinal safety still matter.
A normal-looking pupil examination does not exclude raised ICP.

References | Select a title to open the source.

- [1] Neurocritical Care Society: ENLS neurological emergency protocols
- [2] Neurocritical Care Society: Acute treatment of cerebral oedema
- [3] Brain Trauma Foundation: Severe TBI guidelines, fourth edition