

Hydrocephalus

Hydrocephalus occurs when the amount of cerebrospinal fluid (CSF) production in the brain exceeds the rate of CSF absorption. An increase in CSF leads to dilation of the ventricles of the brain, causing the brain to push against the cranial bones, resulting in enlargement of the head. In patients with hydrocephalus, increased head circumference is typically evident when the child is an infant. Patients with hydrocephalus may show signs and symptoms of increased intracranial pressure, such as a change in level of consciousness, vomiting, unequal pupil sizes, and seizure activity. Other assessment findings among infants with hydrocephalus include irritability, increased head circumference, frontal bone protrusion (frontal bossing), downward deviation of the eyes (setting-sun sign), a high-pitched cry, bridging or arching of the back, and bulging fontanelles. Interventions include elevating the head of the bed and surgical placement of a shunt. Patients with hydrocephalus should be placed on seizure precautions.



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Cause

Increased CSF in Ventricles of Brain

[Up-arrow Brain Spine Fluid in Vent of Brain](#)

Hydrocephalus occurs when the amount of CSF production in the brain exceeds the rate of CSF absorption. This imbalance can cause enlargement of the head and neurological changes.

Assessment

Signs of Increased ICP

[Signs of Up-arrow Pressure-cooker Cranium](#)

Patients with hydrocephalus may show signs and symptoms of increased intracranial pressure, such as a change in level of consciousness, vomiting, and unequal pupil sizes. These patients may also exhibit seizure activity. For more information on what to look for in patients with increased ICP, refer to the Picmonic card titled 'Increased ICP Assessment'.

Infant Assessment

High Pitched Cry

[High Pitched Whistle Crying](#)

In infants, a high-pitched cry often indicates increased intracranial pressure.

Irritability

[Irritated](#)

Infants with hydrocephalus may exhibit increased irritability and other changes in level of consciousness. Lower extremity spasticity may be present.

Opisthotonus

[Severe hyperextension of Pistol-body](#)

Opisthotonus, or a state of hyperextension, is characterized by bridging or arching of the back. This can occur in infants with hydrocephalus.

Increased Head Circumference

Up-arrow Head Circumference

An increase in CSF leads to dilation of the ventricles of the brain, causing the brain to push against the cranial bones, resulting in enlargement of the head. In patients with hydrocephalus, increased head circumference (occipitofrontal circumference [OFC]) is typically evident when the child is an infant.

Bulging Fontanel

Bulging Fountain

In infants with hydrocephalus, an increased amount of CSF in the brain can cause tense and bulging fontanels on an infant's head.

Setting Sun Sign

Sun Setting eyelids

When hydrocephalus is severe, infants may exhibit the setting-sun sign in which the eyes are deviated downward with the sclera visible above the iris. Frontal bossing, or protrusion of the frontal bone, may also occur.

Interventions

Seizure Precautions

Caesar with Precaution-sign

Patients with hydrocephalus should be placed on seizure precautions due to increased intracranial pressure.

Elevate HOB

Elevated Head of Bed

The head of the bed should remain elevated in patients with hydrocephalus in an attempt to prevent increased intracranial pressure.

CSF Shunt

Brain Spine Fluid Shunt

Surgical placement of a shunt is typically indicated to correct hydrocephalus. This procedure allows CSF to be removed from the ventricles of the brain and drained into a different region of the body, usually the peritoneum.