Hydrocephalus and Homoeopathy

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Definition

Hydrocephalus is a clinical entity in which a disturbance in the circulation of the cerebrospinal fluid (CSF) (Psora) causes the accumulation of intraventricular CSF, resulting in progressive ventricular dilation, characterized by increased intracranial pressure, increased CSF volume and the dilation of the CSF spaces (Sycosis).

Etymology

- Greek hudro- 'water' + kephalē 'head' = hudrokephalon
- Late 17th century- modern Latin- Hydrocephalus
- Hippocrates (466-377BC)- first described hydrocephalus
- Early and medieval physicians- believed that the disease was caused by the extra cerebral accumulation of water

Etiology

Hydrocephalus has a variety of causes including:

- Congenital brain defects (Syphilis)
- Hemorrhage, either into the ventricles or the subarachnoid space (Psora/ Syphilis)
- Infection of the central nervous system like syphilis, herpes, meningitis, encephalitis, or mumps (Psora/ Syphilis/ Sycosis)
- Tumor (Psora/ Syphilis/ Sycosis)

Pathophysiology

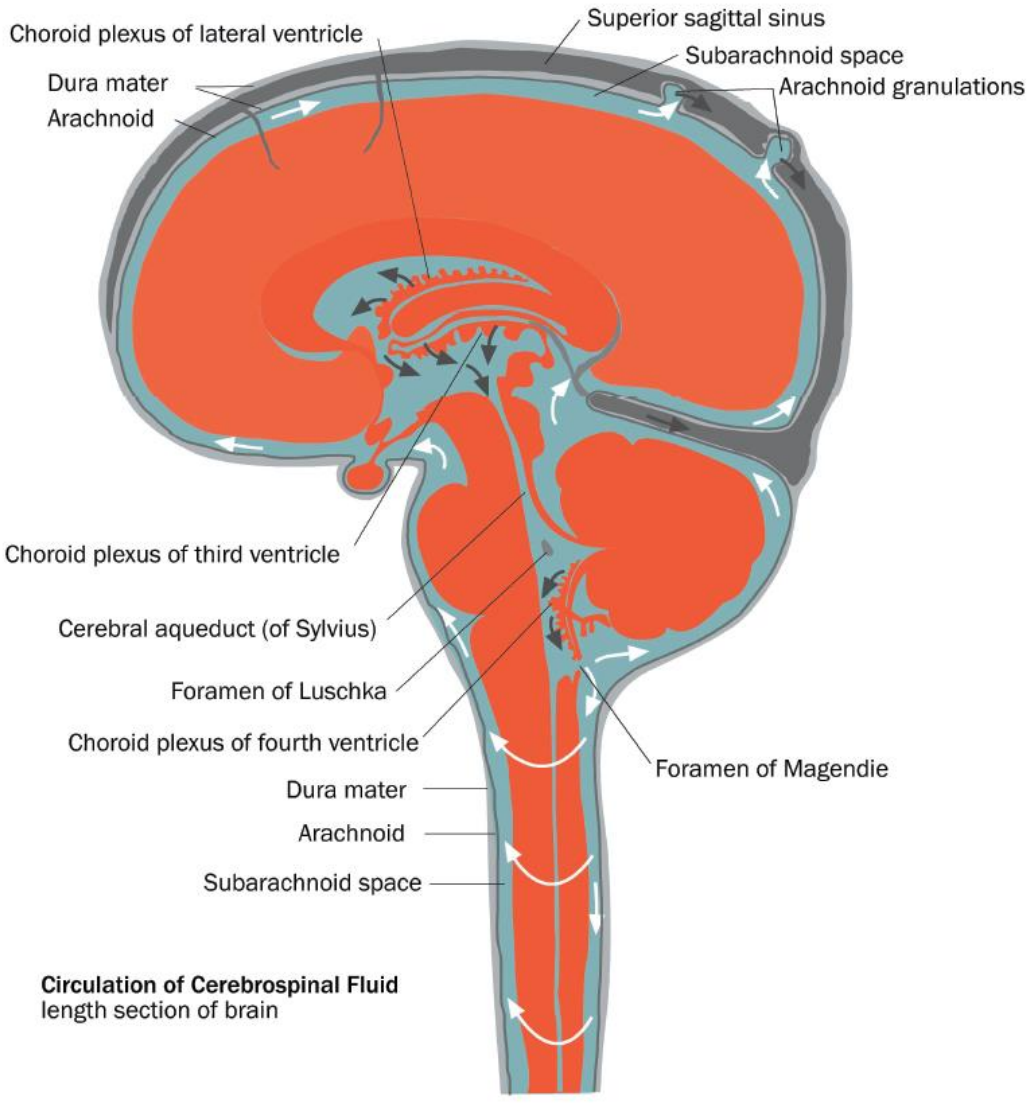
Mechanism of CSF production and its flow runs as below-

Production of CSF

- CSF is produced by the epidermal cells in choroid plexus of the lateral, third and fourth ventricles
- Rate of CSF production is approximately 10 ml per hour or 200-250 ml a day in a small child, and in adolescents- about 20 ml an hour or 400-500 ml per day
- The total CSF volume depends on the age of the person and is about 5 ml in a newborn and reaches the adult volume of 80-150 ml at the age of about five years

Flow of CSF

- The CSF flows through the third ventricle and the cerebral aqueduct to the fourth ventricle and through the foramen of Magendie and the lateral foramina of Luschka into the subarachnoid space
- The narrowest passage in the ventricular system is the cerebral aqueduct or the aqueduct of Sylvius
- The CSF flows around the tentorium



Reabsorption of CSF

- CSF is re-absorbed into the venous system through arachnoid villi into the sagittal sinus
- Some of it flows down towards the lumbar subarachnoid space and re-absorbed from the spinal canal as well

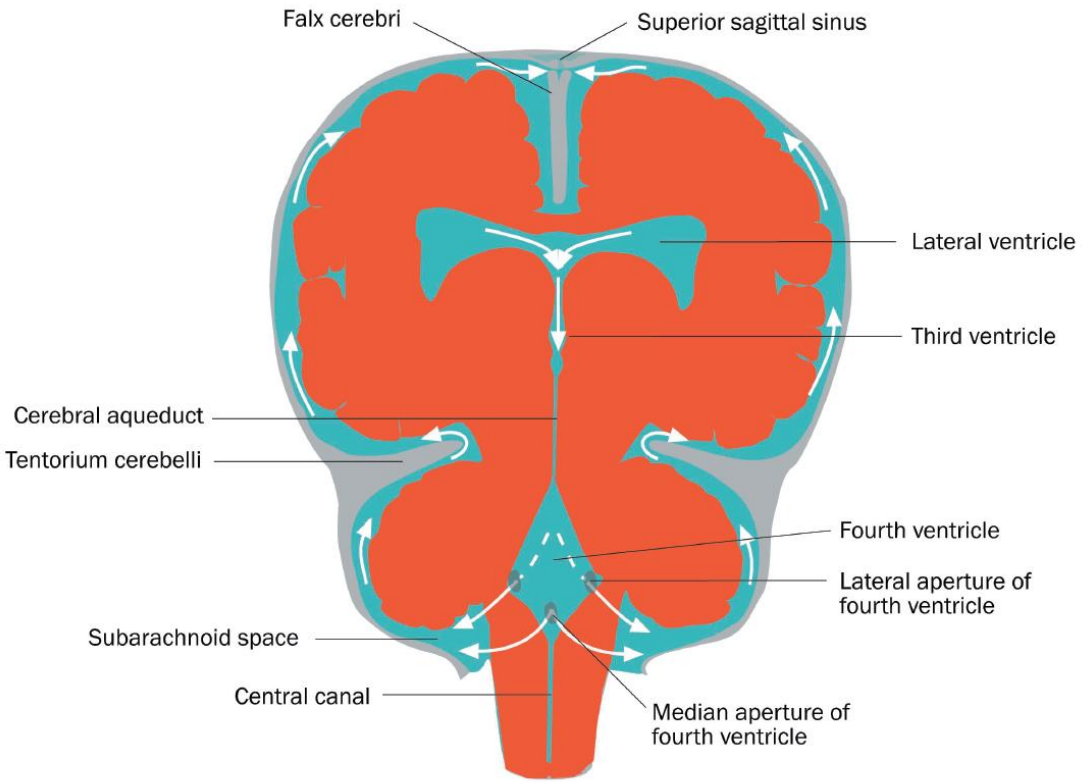
Functions of CSF

- The CSF protects the brain and spinal cord, regulates the intracranial pressure (ICP) within physiological limits and regulates the extracellular environment in the brain

The physiological mechanism underlying hydrocephalus is-

- An obstruction of the CSF circulation
- Reduced re-absorption
- In a few cases, the overproduction of CSF

The ventricular expansion displaces the surface of the brain and compresses the cortical veins, leading to venous congestion and a subsequent increase in ICP. The expansion of the ventricles also affects the surrounding brain structures and the increase in ICP may cause cerebral edema affecting the white matter and eventually also the grey matter.



Circulation of Cerebrospinal Fluid
cross section of brain

Many maturational processes are affected in a negative way. These include-

- The myelination process during which protective sheaths are formed around axons. This is vital for the function of the brain and is negatively affected by the increase in ICP in hydrocephalus.

- The white matter, especially in the periventricular region, is affected by compression and this is more obvious in young children than in older persons.
- There is also a thinning of the corpus callosum and of the cerebral cortex.
- The reduction in the corpus callosum and the internal capsule is of specific importance for cognition.

Types

Hydrocephalus can be classified into two forms-

Congenital

An obstruction of the cerebral aqueduct (aqueductal stenosis) is the most frequent cause of congenital hydrocephalus. (Syphilis)

Acquired

Acquired hydrocephalus may result from spina bifida, intraventricular hemorrhage, meningitis, head trauma, tumors, and cysts. (Psora/ Syphilis/ Sycosis)

Other way of classification keeps hydrocephalus in two headings-

Elevated pressure hydrocephalus

This type of hydrocephalus leads to an elevation of the CSF pressure within the brain. This increased pressure pushes aside the soft tissues of the brain and squeezes or distorts them, causing damage to these tissues. (Psora/ Sycosis)

In infants whose skull bones have not yet fused, the intracranial pressure is partly relieved by expansion of the skull, so that symptoms may not be as dramatic. This type of elevated-pressure hydrocephalus may occur from infancy to adulthood and may be of two types-

Communicating or non-obstructive hydrocephalus

Whenever, there is a reduction in the absorption rate, caused by damage to the absorptive tissue, the ventricles get turgid and the condition is called communicating or non-obstructive hydrocephalus. (Psora/ Syphilis)

Non-communicating or obstructive hydrocephalus

This is the most common variety. There is a free flow of CSF from the ventricles through the aqueduct and foramina to the spinal compartment. In this case, reduced absorption occurs when one or more passages connecting the ventricles become blocked. This prevents the movement of CSF to its drainage sites in the subarachnoid space just inside the skull. (Psora/ Syphilis)

Thus, obstructive hydrocephalus is developed by the processes restricting the intraventricular CSF flow leading to an increased amount of CSF not being absorbed and resulting in enlarged ventricles.

Dandy says that almost every kind of hydrocephalus could be called obstructive, as it is the CSF absorption that is obstructed in communicating hydrocephalus.

Several mechanisms lead to the obstruction of the CSF flow-

- Primary malformations (Syphilis)
- Hemorrhages (Psora/ Syphilis)
- Post-infectious scarring (Psora/ Syphilis/ Sycosis)

Normal pressure hydrocephalus

It is marked by ventricle enlargement without an apparent increase in CSF pressure and affects mainly the elderly.

Other classification of hydrocephalus may be as below-

Infantile hydrocephalus

This type of hydrocephalus is not associated with myelomeningocele (MMC) or with malignant tumors and developing during the first year of life. Different malformations such as Dandy-Walker, X-linked hydrocephalus, arachnoidal cysts and aqueductal stenosis belong to this group. (Psora/ Syphilis/ Sycosis)

Post-hemorrhagic hydrocephalus

Arachnoiditis is caused by the blood and hemorrhagic debris in the ventricles that most often obliterates the posterior fossa or the aqueduct of Sylvius. (Psora/ Sycosis)

Post-infectious hydrocephalus

Obstructions in various parts of the CSF pathways by infections and scarring may result in increased intracranial pressure and hydrocephalus. (Psora/ Syphilis/ Sycosis)

Hydrocephalus associated with MMC

Several factors are important for the pathogenesis of this type of hydrocephalus-

- The Arnold-Chiari type II malformation with an abnormal disposition of the brain stem, a deformity of the posterior fossa, where the cerebellar tonsils prolapse through the foramen magnum and the fourth ventricle is displaced. (Syphilis)
- Aqueductal stenosis as a consequence of the Arnold-Chiari II malformation (Syphilis)
- Distal tethering of the spinal cord in the MMC, displacing posterior fossa structures downwards (Psora/ Syphilis/ Sycosis)

Hydrocephalus associated with brain tumors

Hydrocephalus may be associated with malignant tumors in the posterior fossa. (Psora/ Syphilis/ Sycosis)

Signs and Symptoms

Signs and symptoms of elevated-pressure hydrocephalus

- Headache
- Nausea and vomiting, worse in the morning
- Lethargy
- Disturbances in gait
- Diplopia
- Subtle difficulties in learning and memory
- Delayed developmental milestones

Irritability is the most common sign of hydrocephalus in infants. If this is not treated, it may lead to lethargy.

Bulging of the fontanelles, or the soft spots between the skull bones, may also be an early sign. When hydrocephalus occurs in infants, fusion of the skull bones is prevented. This leads to abnormal expansion of the skull.

Signs and symptoms of normal-pressure hydrocephalus

- Dementia
- gait abnormalities
- incontinence of urination or bowel movements

Hydrocephalus is a complex disorder with a significant impact on the brain not only macroscopically but also it affects the physiology, biochemistry and on the ultrastructure of the brain.

The macroscopic changes lead to the distortion of structures, such as the compression of white and grey matter, causing compression of cerebral blood vessels leading to reduction of the cerebral blood perfusion. These changes are important for the severity of the consequences of hydrocephalus. The outcome of hydrocephalus may be-

Cognition

- The intellectual performance is affected even if the hydrocephalus is treated and the overall IQ is in the low-average range or below
- The verbal intelligence is often better preserved than the non-verbal
- There may be problems with visual perception, visuo-construction, visuo-orientation and recognition of faces
- Executive functions such as planning, organization and using strategies may also be impaired

Attention

- Early-onset hydrocephalus is frequently associated with behavioral problems
- Autism disorders are common
- Some children with hydrocephalus had deficits in selective and focused attention
- Children with MMC have been found to be more easily distracted and inattentive than controls

Motor function

- Motor impairments are common
- Musculoskeletal dysfunction is common even in post-surgical cases
- The etiology and gestational age at birth have an important effect on the severity of the motor disability.
- Many children born preterm with hydrocephalus after a perinatal cerebral hemorrhage develop cerebral palsy
- In children with MMC, the motor function is dependent on the spinal lesion and about half these children learn to walk, with or without aid

Epilepsy

- Children with hydrocephalus often have a convulsive disorder
- The etiology of the hydrocephalus and the presence of neuroradiological abnormalities in the brain parenchyma have an important impact on the risk of developing epilepsy
- In some studies, the presence of a shunt appears to increase the risk of developing seizures
- Most of the seizures are of the partial type and involvement of the side contralateral to the shunt placement

Vision

- The dilation of the ventricles and the increase in ICP can cause damage to the occulomotor pathways, the optic nerves and the optic radiation

- This is the cause why patients of hydrocephalus may have visual impairments
- The posterior visual pathways are close to the lateral ventricles and may be damaged by the dilation of the ventricles
- Optic atrophy can result from the traction or compression of the optic nerve
- Other visual impairments, such as reduced visual acuity, visual field defects and strabismus, visual perceptual problems have been described in several studies

Other associated problems

- Some children develop precocious puberty
- Recurring periods of headache, nausea and somnolence are not uncommon

Special problems in children with MMC

Children with MMC have a complex situation and as a consequence of the spinal lesion, they have a variety of problems apart from the hydrocephalus-

- Neurogenic bladder and bowel dysfunction
- Motor impairment is often prominent and many deteriorate as they grow up
- About half the children manage to walk by themselves, some with aid
- Upper limb function is also frequently affected
- They often develop scoliosis and there is a risk of progressive neurological symptoms due to the tethered cord syndrome

Diagnosis

The primary diagnosis is made by looking at size of head and by case taking thoroughly. The hydrocephalus is easy to diagnose.

Its diagnosis is based on the analysis of the size of the ventricles. The ventricles can also be enlarged due to atrophy of the brain and this condition has to be distinguished from hydrocephalus.

In infants with open sutures, the diagnosis can be made clinically by measuring an increase in head circumference. In older children with closed sutures, there is a compression of the peripheral CSF spaces, which can be confirmed by neuroimaging.

Ultrasonography

This is the screening procedure in small children when the anterior fontanel is still open. It can also be useful for follow-up after treatment to check the ventricular size.

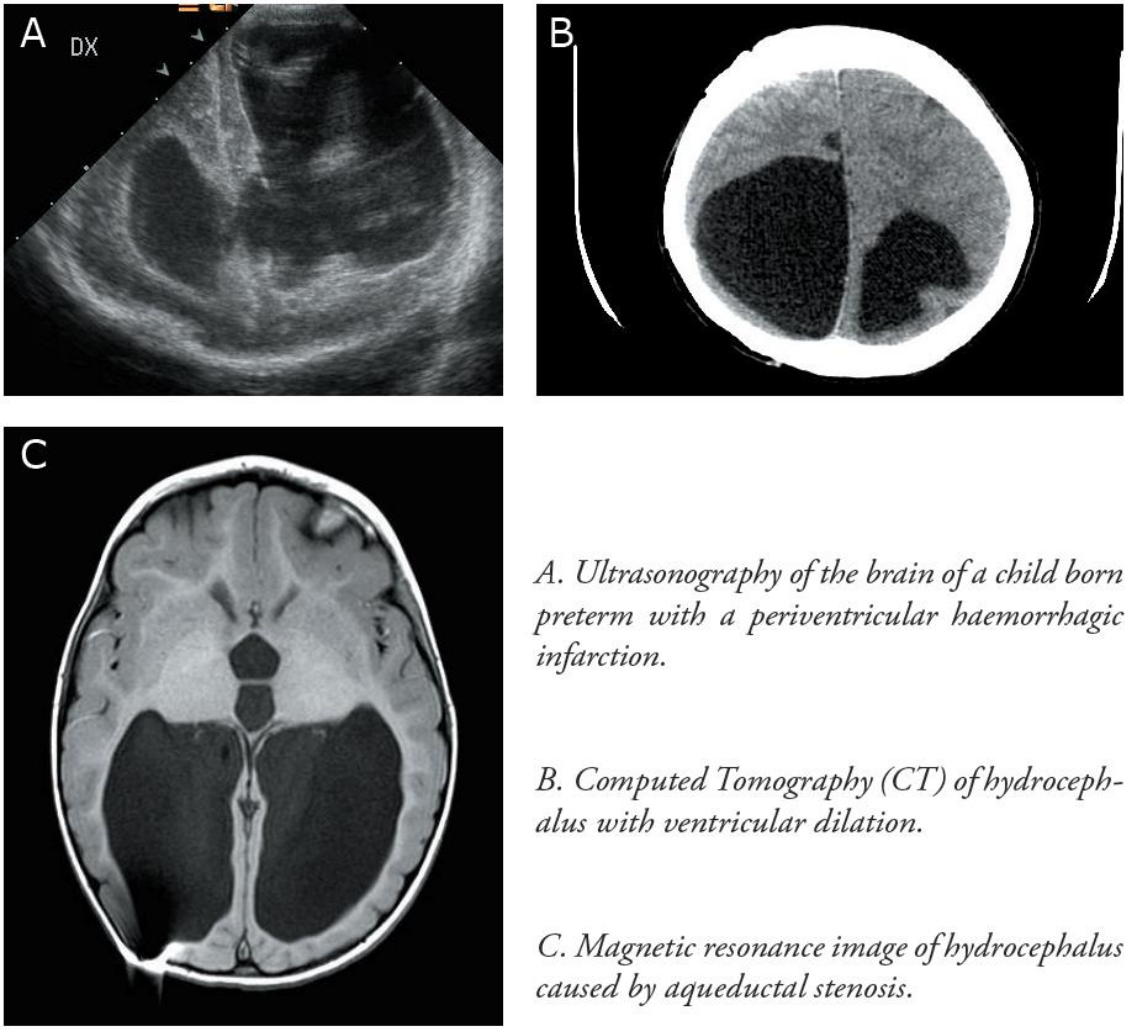
Computed tomography (CT)

CT is excellent for analyzing the sizes of the ventricles and, when the ventricles are enlarged, to distinguish hydrocephalus from atrophy.

After shunting, a CT scan is often sufficient as a follow-up investigation.

Magnetic resonance imaging (MRI)

This is the best way and to some extent, it can also visualize the CSF flow to investigate the patency of the aqueduct or after ETV.



A. Ultrasonography of the brain of a child born preterm with a periventricular haemorrhagic infarction.

B. Computed Tomography (CT) of hydrocephalus with ventricular dilation.

C. Magnetic resonance image of hydrocephalus caused by aqueductal stenosis.

Treatment

CSF Shunt

The insertion of a CSF shunt is a common procedure. The equipment that is used is a proximal catheter, which usually has several openings. The catheter is placed in the ventricle that is going to be drained. Shunts often fail because the catheter is occluded by some tissue.

Ventriculostomy

The principle is to perform a stoma in the bottom of the third ventricle and from there lead the CSF to the subarachnoid spaces where it can be re-absorbed.

Homoeopathic remedies for Hydrocephalus

Since hydrocephalus affects the higher centers of an individual, the entire organism is affected. The only way of treatment becomes the holistic one. If studied carefully and logically, the similimum remedy can be found and the case may be cured easily. Of course, the causa ocassionalis or maintaining cause is to be removed first.

The following Homoeopathic remedies are wonderful in curing hydrocephalus, but if used as per laws of Homoeopathy-

abrot. acon. agar. am-c. APIS apoc. Arg-n. Arn. ars-i. Ars. Art-v. atro-s. aur-ar. aur-s. Aur. Bac. bar-c. bell. Bism. Bry. cadm-s. calc-i. Calc-p. calc-sil. CALC. CAMPH. canth. Carb-ac. caust. Chin. chinin-s. Cina

Clem. coloc. Con. crot-h. cupr-act. cupr. cypr. cyt-l. Dig. ferr-i. Ferr. galv. gels. Grat. hed. Hell. Hyos. ign. indg. Iod. iodof. Ip. kali-br. Kali-i. kali-p. lach. LYC. mag-m. Merc. Nat-m. nux-v. oeno. Op. ph-ac. Phos. plat. podo. Puls. rhus-t. samb. sep. SIL. sol-ni. spig. squil. Stram. Sulph. thuj. toxo-g. tub. verat-v. Verat. viol-t. zinc-br. Zinc-m. Zinc.

Short repertory of Hydrocephalus

FACE - COLDNESS - hydrocephalus, in agar. arg-n. CAMPH. hell. Lyc. Verat.

GENERALS - CONVULSIONS - hydrocephalus; with Arg-n. Art-v. bell. Calc. hell. Kali-i. Merc. Nat-m. Stram. Sulph. Zinc.

GENERALS - HISTORY; personal - hydrocephalic children; of delivering calc-p.

HEAD – HYDROCEPHALOID phos. Zinc.

HEAD - HYDROCEPHALUS - accompanied by - blindnessapoc.

HEAD - HYDROCEPHALUS - accompanied by - Neck; emaciated calc-p.

HEAD - HYDROCEPHALUS - accompanied by - weakness; general sil.

HEAD - HYDROCEPHALUS - acute - measles; after merc.

HEAD - HYDROCEPHALUS – acute apoc. cupr. cyt-l. hell. merc. op.

HEAD - HYDROCEPHALUS - beginning stage toxo-g.

HEAD - HYDROCEPHALUS - cholera; after - children; in zinc.

HEAD - HYDROCEPHALUS – chronic art-v. calc-i. calc-p. hed. kali-i. op. zinc.

HEAD - HYDROCEPHALUS - diarrhea agg.; after - children; in zinc.

HEAD - HYDROCEPHALUS - diarrhea agg.; after - long, exhausting diarrhea cypr.

HEAD - HYDROCEPHALUS – edematous hell.

HEAD - HYDROCEPHALUS - lies with head low apis merc. sulph. zinc.

HEAD - HYDROCEPHALUS - meningitis; after apis sol-ni. sulph. tub.

HEAD - HYDROCEPHALUS - perspiration; with merc.

HEAD - HYDROCEPHALUS - scarlatina; after apis merc.

HEAD – HYDROCEPHALUS abrot. acon. am-c. APIS apoc. arg-n. Arn. ars-i. Ars. art-v. atro-s. aur-ar. aur-s. Aur. Bac. bar-c. bell. Bism. Bry. cadm-s. calc-i. Calc-p. calc-sil. CALC. canth. carb-ac. caust. Chin. chinin-s. cina coloc. Con. crot-h. cupr-act. cupr. cypr. cyt-l. Dig. ferr-i. Ferr. galv. gels. grat. Hell. Hyos. ign. indg. Iod. iodof. Ip. kali-br. Kali-i. kali-p. lach. LYC. mag-m. Merc. Nat-m. nux-v. oeno. Op. ph-ac. Phos. plat. podo. Puls. rhus-t. samb. sep. SIL. sol-ni. spig. squil. Stram. Sulph. thuj. toxo-g. tub. verat-v. verat. viol-t. zinc-br. Zinc-m. zinc.

MIND - EXCITEMENT - hydrocephalus, in Apis Carb-ac.

MIND - FEAR - hydrocephalus, in Zinc.

MIND - SHRIEKING - hydrocephalus, in APIS Cina Dig. kali-i. Lyc. merc. Zinc.

MIND - STUPOR - hydrocephalus, in APIS Apoc. Clem. Hell. Hyos. Lyc. Nat-m.

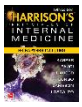
MIND - UNCONSCIOUSNESS - hydrocephalus, in APIS apoc. art-v. Clem. Grat. Hell. Hyos. Lyc. Nat-m.

RECTUM - DIARRHEA - hydrocephalus acutus, during Apis bell. Calc. Carb-ac. Hell. Zinc.

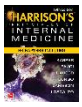
URINE - MILKY - hydrocephalus; in - little but frequent discharges of milky urine; with very - unconsciousness and delirium; with APIS

URINE - MILKY - hydrocephalus; in Apis

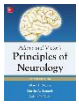
Bibliography



Atlas of Clinical Manifestations of Metabolic Diseases > INTRODUCTION Harrison's Principles of Internal Medicine..., at which time he had developmental delay, hepatomegaly, and skeletal involvement. At the time of the picture, the patient had short stature, an enlarged tongue, persistent nasal discharge, stiff joints, and hydrocephalus. Verbal language skills consisted of four or five words. The patient had a severe...

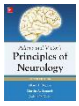


Cestode Infections > Clinical Manifestations Harrison's Principles of Internal Medicine... FIGURE 260-1 Neurocysticercosis is caused by Taenia solium. Neurologic infection can be classified on the basis of the location and viability of the parasites. When the parasites are in the ventricles, they often cause obstructive hydrocephalus. Left: Magnetic resonance imaging...

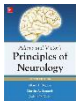


Chapter 17. Coma and Related Disorders of Consciousness > Acute Hydrocephalus Adams & Victor's Principles of Neurology, 10e... The syndrome of acute hydrocephalus, most often from subarachnoid hemorrhage or from obstruction of the ventricular system by a tumor in the posterior fossa, induces a state of abulia (slowed responsivity), followed by stupor, and then coma with bilateral Babinski signs. The pupils are small...

Chapter 232. Normal Pressure Hydrocephalus The Color Atlas of Family Medicine, 2e

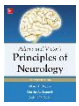


Chapter 30. Disturbances of Cerebrospinal Fluid, Including Hydrocephalus, Pseudotumor Cerebri, and Low-Pressure Syndromes > Neuropathologic Effects of Hydrocephalus Adams & Victor's Principles of Neurology, 10e... Ventricular expansion tends to be maximal in the frontal horns, explaining the hydrocephalic impairment of frontal lobe functions and of basal ganglionic–frontal motor and gait activity in most forms of hydrocephalus. The central white matter yields to pressure, while the cortical gray matter...



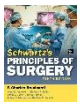
Chapter 34. Cerebrovascular Diseases > Hydrocephalus Adams & Victor's Principles of neurology, 10e... If a large amount of blood ruptures into the ventricular system or floods the basal subarachnoid space, it may find its way into the ventricles through the foramina of Luschka and

Magendie. The patient then becomes confused or unconscious as a result of acute hydrocephalus . The clinical signs...



Chapter 35. Craniocerebral Trauma > Posttraumatic Hydrocephalus Adams & Victor's principles of Neurology, 10e... This is an uncommon complication, but one that is frequently imputed to severe head injury. It conforms to the category of normal pressure hydrocephalus, as discussed in Chap. 30 . Intermittent headaches, vomiting, confusion, and drowsiness are the initial manifestations. Later on, mental...

Encyclopedia Homoeopathica



Neurosurgery > Hydrocephalus Schwartz's Principles of Surgery, 10e... (contrast to Fig. 42-2). The patient had normal-pressure hydrocephalus and had improved ambulation after placement of a ventriculoperitoneal shunt. B . Higher cut from same scan showing ventricular catheter in place in the frontal horn of the right lateral ventricle. Figure 42-33...

Pathology of the Nervous System > Hydrocephalus Pathology: A Modern Case Study... TABLE 21-2 Common causes of hydrocephalus. Aqueductal stenosis —may result from a congenitally malformed cerebral aqueduct or from an acquired stenosis Dandy–Walker malformation —a hindbrain malformation defined by the triad of (1) hypoplasia of the cerebellar...


Radar 10

Stroke Rehabilitation > D. Hydrocephalus CURRENT Diagnosis & Treatment: Physical Medicine & Rehabilitation ... Hydrocephalus is an excessive accumulation of cerebrospinal fluid within the ventricles or subarachnoid space, or both, and often complicates subarachnoid hemorrhage (SAH), intracerebral hemorrhage (ICH), and intraventricular hemorrhage (IVH). IVH, in particular, can lead to arachnoiditis from...

Traumatic Brain Injury > Elevated Intracranial Pressure & Hydrocephalus CURRENT Diagnosis Treatment: Physical Medicine & Rehabilitation... edema, craniectomy to increase the cranial volume, and drainage of the excess CSF. In the postacute setting, hydrocephalus is common, but the interpretation of the finding of ventricular dilation on head CT can be difficult. With more severe TBIs, hydrocephalus ex vacuo may occur; this is an increase...