



جامعة المستقبل  
قسم تقنيات البصريات

L3

مشاكل العين بالامراض الباطنية و العصبية

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## Intracranial aneurysm and hydrocephaly

### Intracranial Aneurysms (cerebral aneurysm)

#### - What is cerebral aneurysm?

Cerebral (Brain) aneurysm is a bulge or balloon like dilatation/ swelling of the wall of a blood vessel in the brain because of a weakness in the wall of the artery wall, usually at branch points.

(Usually present since birth)

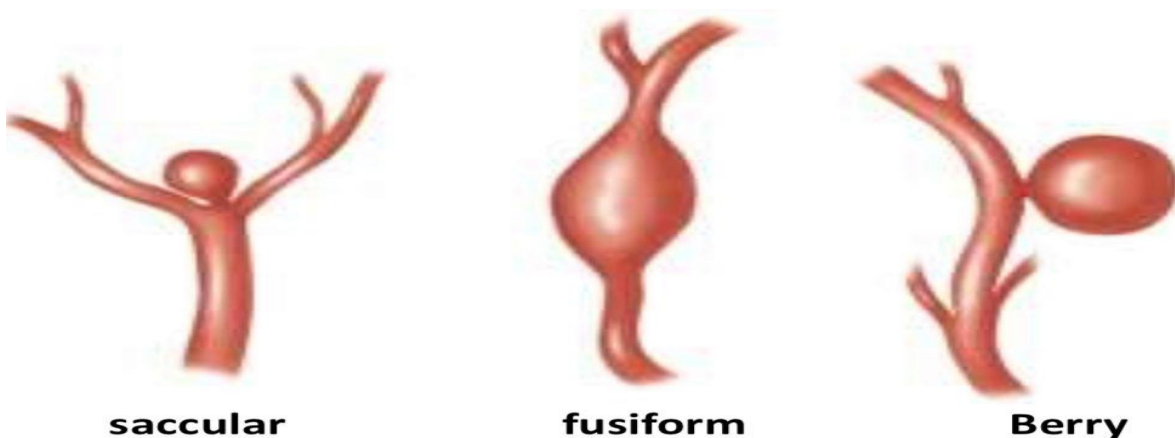
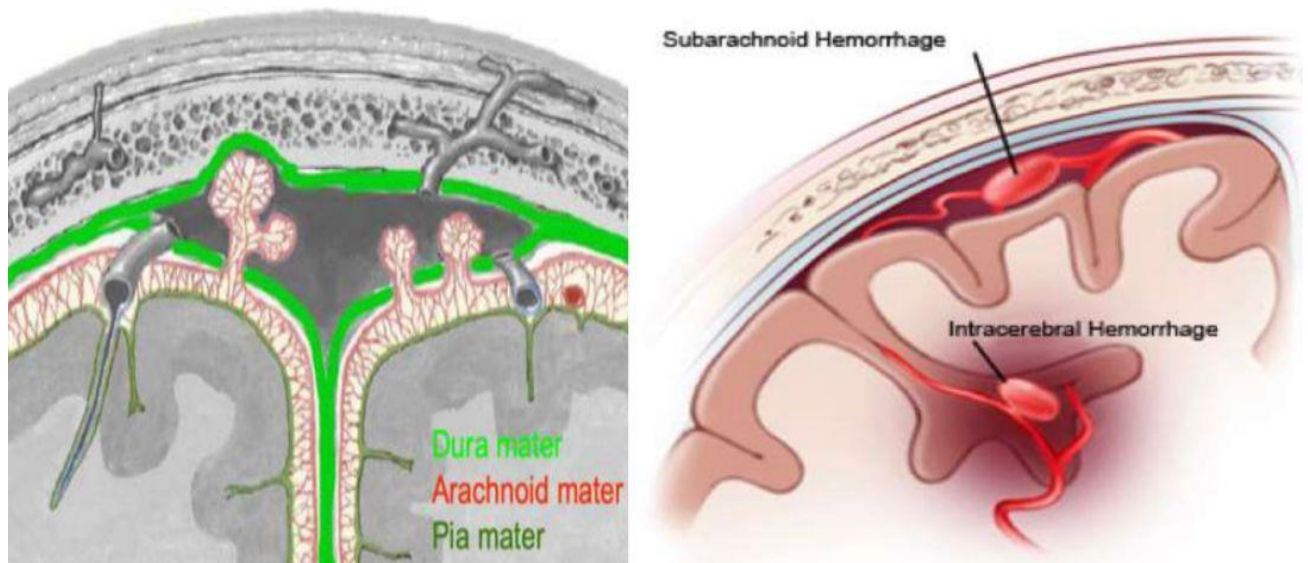


Figure (1) the three most common types of aneurysm

- When they rupture in the brain, they cause a very severe disease :



**fig.2 subarachnoid hemorrhage (SAH)**

- The most common location for brain aneurysms is in the circle of Willis.
- Peak incidence is between 40-60 years old.
- Very rare in children.
- women compared with men (3:2)
- Female predominance in adults.
- In rare cases, the brain aneurysm ruptures, releasing blood into the skull and causing a stroke.

### **- Risk factors of Aneurysms**

- The exact mechanisms by which cerebral aneurysms develop, grow and rupture are unknown.

1- Congenital or familial

2- Atherosclerosis ,Hypertension

3- Sickle cell anemia

4- Infections, Trauma

5- Cigarette smoking. Illicit drug use particularly cocaine. Alcohol

.8Arteriovenous malformations, Marfan syndrome ,Polycystic kidney diseases

### **- Symptoms:**

#### **Most brain aneurysms cause no symptoms**

- Numbness or weakness on one side the face
- Alterations in consciousness
- Seizures , Dizziness, Neck pain
- A sudden very severe headache
- Nausea or vomiting, sweating, chills, and cardiac arrhythmias.

#### **Symptoms if Aneurysms has not ruptured yet:**

- Peripheral vision deficits
- Thinking or problems
- Sudden changes in behavior
- Loss of balance and coordination
- Decreased concentration
- Short-term memory difficulty
- Fatigue

## **- Symptoms if Aneurysms has ruptured:**

- Nausea and vomiting
- neck pain
- Blurred vision
- double vision
- Pain above and behind the eye
- Dilated pupils
- Sensitivity to light Loss of sensation

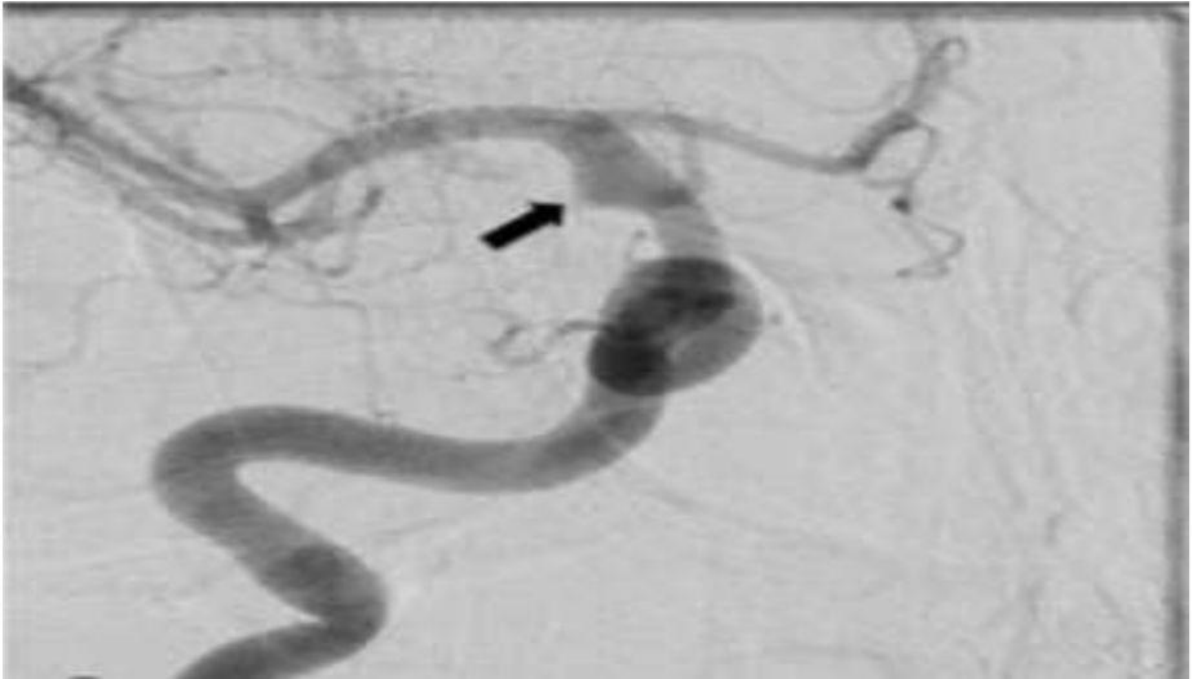
## **Ocular features of brain aneurysms:**

- Visual disturbances
- loss of vision
- Double vision
- Pain above or around eye
- A drooping eyelid
- Light sensitivity and enlarged pupil.

## **- Diagnosis**

- The history : symptoms
- Computed tomography (CT) scan
- Magnetic resonance (MRI)
- Angiography more precise

•Lumbar puncture: to identify blood in the cerebrospinal fluid (subarachnoid hemorrhage)



**fig.3/angiogram of the aneurysm**



**fig.4/Lumbar puncture**

## - Cerebral aneurysm complications

- A ruptured brain aneurysm can be life threatening and lead to:
- Cerebral vasospasm (reduced blood flow to the brain)
- Hydrocephalus (too much spinal fluid in the brain)
- Coma
- Permanent brain damage
- It bleeding again
- Hyponatremia?

## - Treatment

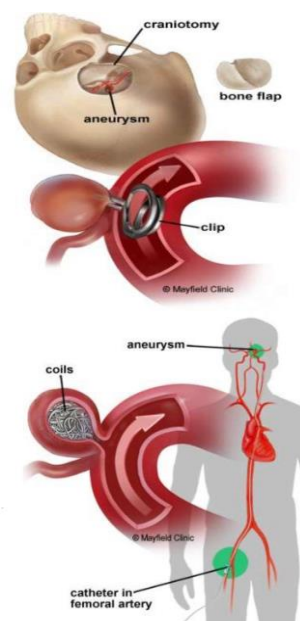
### Treatments depend on:

- Age, and medical history
- Signs and symptoms
- Tolerance of specific medications ,procedures or therapies

**Treatment:** surgical or nonsurgical

**Fig.5 /Clipping is a surgery performed to treat an Aneurysm**

**•Fig.6/Aneurysm coiling**





## Prognosis

- Aneurysms that don't rupture often go unnoticed and have no consequences.
- About half of people with ruptured aneurysms do not survive .
- About 25% of people with a ruptured aneurysm die within the first 24 hours ,and another 25% die from complications within six months.
- A subarachnoid hemorrhage can lead to brain damage, and those who experience this type of brain bleed often need physical, speech to regain lost function and to learn to manage any permanent disabilities

## Hydrocephalus

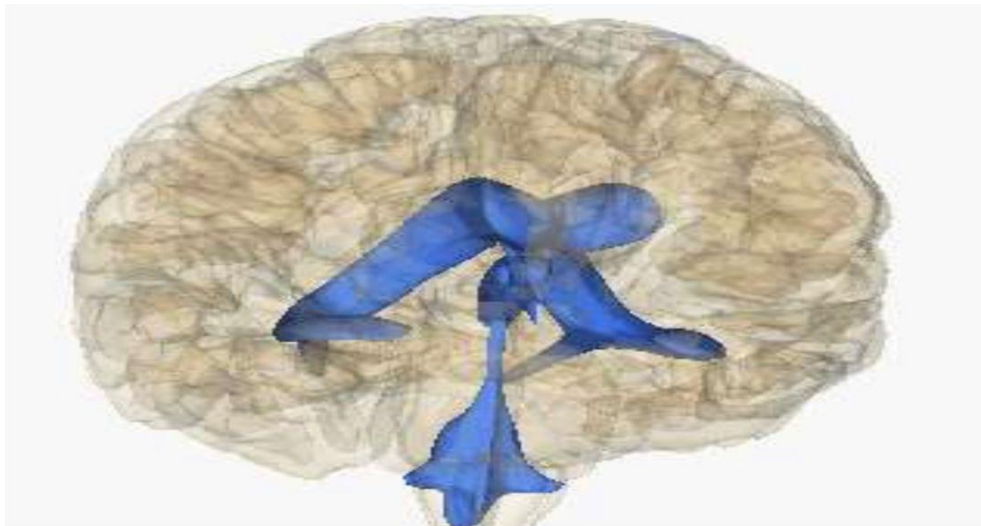
### Definition:

Abnormal collection of cerebrospinal fluid (CSF) resulting in abnormal widening of spaces in the brain.(fig.9)

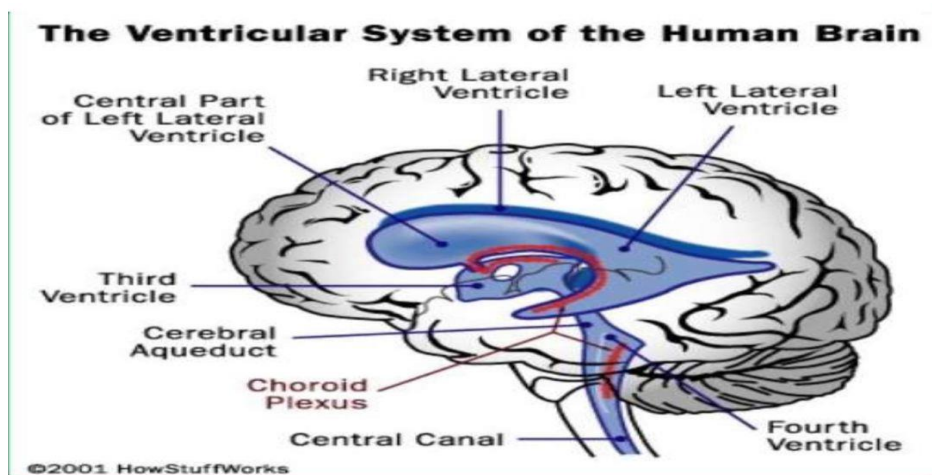
\*Normally, CSF flows through the Ventricles.(fig.7)

\*Secretion by the choroid plexus.(fig.8)

\*Hydrocephalus::Occurs in 3 - 4 cases in every 1000 births.

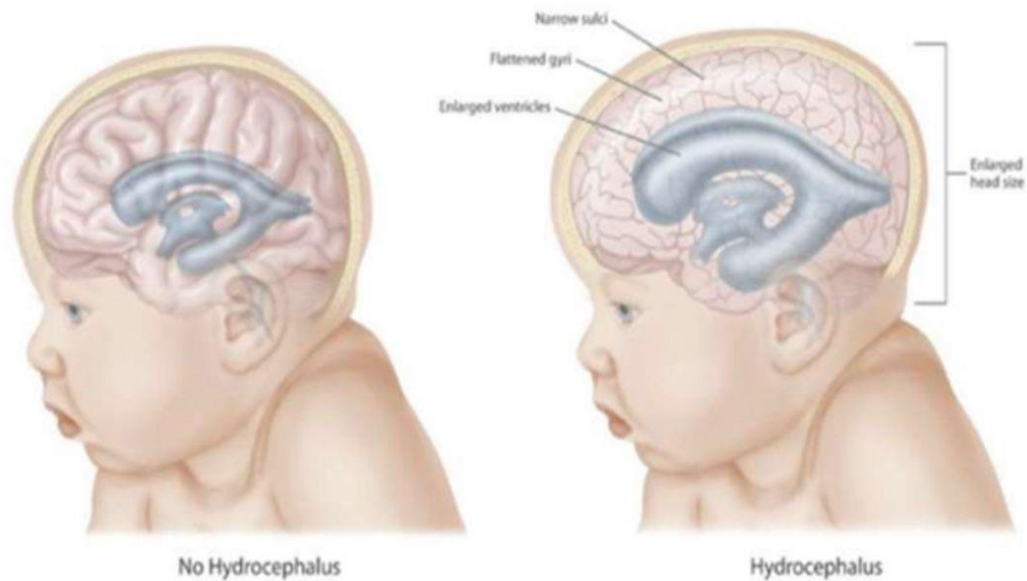


Ventricles.(fig.7)



Choroid plexus.(fig.8)





(fig.9) Hydrocephalus

### Function of CSF:

- Protects and support the brain and spinal cord.
- Carries nutrients.
- Removing the end-products of metabolism .

**Normal volume of CSF is around 150 ml, production: 20 ml/h**

- In Hydrocephalus:
  - Excessive production
  - Decreased absorption
  - Obstruction

## - Types of hydrocephalus

- Communicating hydrocephalus
- Non-Communicating Obstructive or hydrocephalus
- Normal pressure hydrocephalus commonly occurs in the elderly and is characterized by memory loss, dementia, gait disorder , urinary incontinence

## Causes Hydrocephalus

Can be congenital or acquired

- Congenital hydrocephalous: Intrauterine infections ( rubella, cytomegalovirus ,toxoplasmosis), Intracranial & intraventricular bleed, tumors ,congenital malformations
- Acquired hydrocephalous: Tuberculosis, Chronic meningitis ,Intraventricular hemorrhage ,tumors , Intracranial hemorrhage ,Ruptured aneurysm

## - Clinical Features:

Symptoms of hydrocephalus vary with age.

### In infancy

- rapid increase head size.
- high pitched crying, bulging fontanelle

- Delayed closure of the anterior fontanelle, tense and elevated.
- pupillary changes , papilledema ,lethargy, coma, seizures .

### Later signs In infancy:

bossing of forehead, scalp appears shiny with prominent scalp veins , difficulty holding head, eyebrows and eyelids drawn upward, sunset eyes in infants(fig.10), strabismus ,nystagmus, optic atrophy.



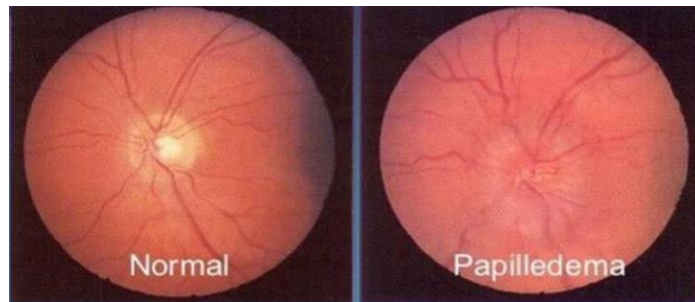
**Sunset eyes (fig.4)**

### Older children

present with signs of IICP(Vomiting ,sleepiness, restlessness, irritability , headache, lethargy, poor coordination ,gait disturbance, urinary incontinence ,personality changes, visual changes ( double vision ) ,downward deviation of the eyes (sunsetting sign).

## - Visual Symptoms of Hydrocephalus:

- Swelling of the optic nerve (papilledema)(fig.11)
- Misalignment of the eyes (strabismus)
- Reduced color vision
- Reduced side vision (visual field loss)
- Abnormal pupil reaction to light.
- Double vision (diplopia)
- Nystagmus



**Papilledema (fig.11)**

## - Investigation

- Ultrasonography(fig.12)
- CT /MRI of the head(fig.13)
- Lumbar puncture



**(fig.13)**

**(fig.12)**

## Treatment:

- Surgical (obstruction such as tumor)
- Intracranial shunts to divert fluid to the subarachnoid space
- Extracranial shunts to divert fluid from ventricular system to an extracranial compartment frequently peritoneum.

