

Brain Injuries

Presented

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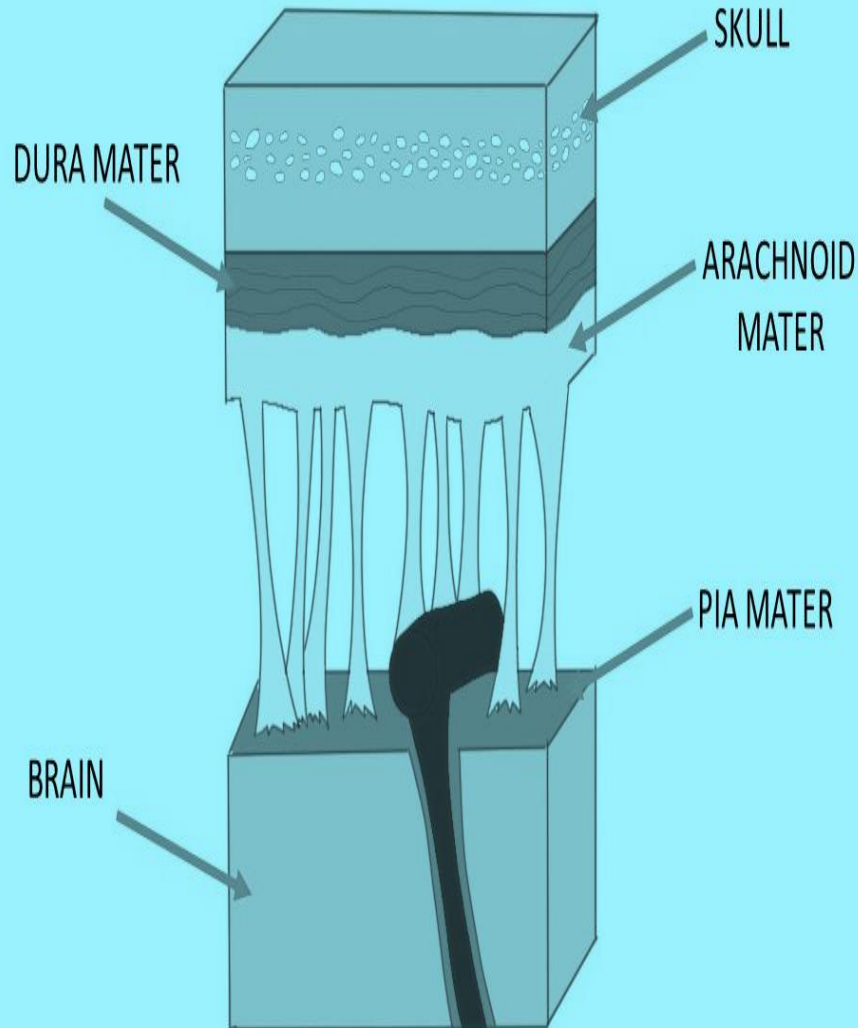
Types of head injuries

1- Scalp injuries

2- Skull injuries

3- Intra – Cranial injuries (Brain)

Anatomical structure of meninges



The Meninges

- The Meninges are the membrane covering the brain and spinal cord.
- The Meninges consist of three membranes:
 1. The dura mater,
 2. The arachnoid mater,
 3. The pia mater.



Intra- Cranial Injuries (Brain)

1- Concussion

2- Compression :-

A- Extra-dural Hemorrhage .

B- Subdural Hemorrhage .

C- Subarachnoid Hemorrhage .

D- Intra-cerebral Hemorrhage .

E- Depressed Cranial bone

Concussion

- It is a sudden transient loss of consciousness following head injuries.
- It is associated with temporary and brief arrest of brain and vital functions.
- Simple concussion is not associated with structural damage of brain and followed by complete recovery without residual signs.
- It is due to generalized vibratory waves affecting reticular formation which is responsible for the normal conscious state .

Clinical presentation of concussion

- loss of consciousness (seconds to minutes).
- Loss of reflexes, general muscular flaccidity.
- Equal normal pupils or dilated in severe concussion
- No signs of lateralization
- Weak rapid pulse, shallow rapid respiration, low blood pressure, subnormal temperature and pale face.
- Vomiting

Prognosis of concussion

- 1- Complete recovery.
- 2- Incomplete recovery (post-concussion “PC”)
- 3- Concussion passing to compression:-
 - A- With lucid interval (Extra-dural hemorrhage)
 - B- Without lucid interval (depressed bone)

Lucid interval

- It is a temporary recovery between the loss of consciousness in concussion and in compression.

Medico-legal importance of Lucid interval

- 1-** Patient should be under observation in hospital for 48 hours at least (mal-practice).
- 2-** Patient may mention to the name of assailant .
- 3-** The defense may deny that the cause of head injury such as the blow is the cause of death because the patient recovered after the injury.

Compression

- It causes an increase in the intracranial pressure.
- It causes cerebral irritation (cerebral congestion) followed by cerebral paralysis (cerebral anemia).

- **Clinical presentation**

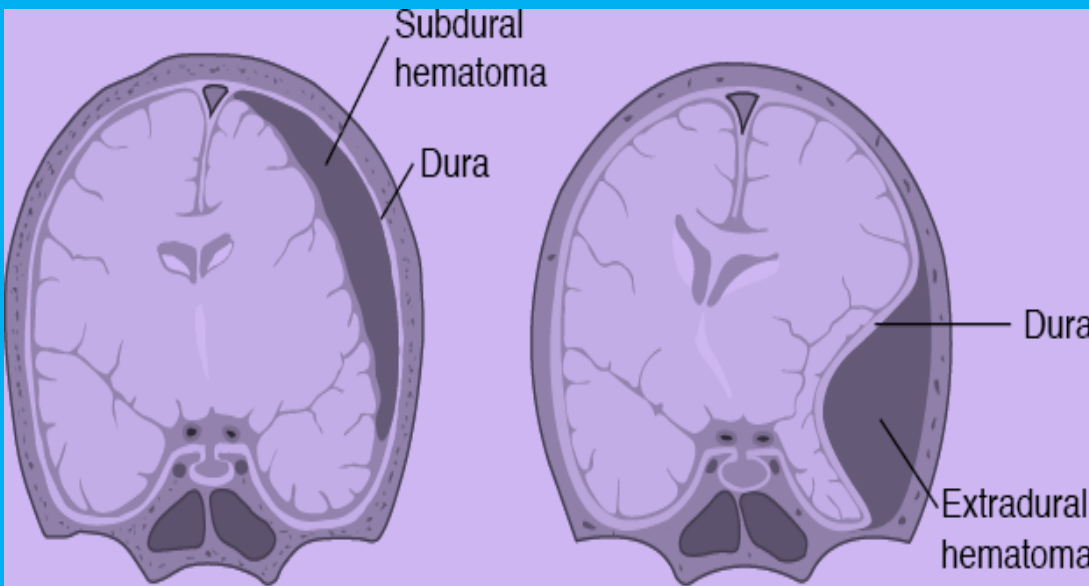
loss of consciousness, vomiting, papilledema, slow pulse and breathing, high blood pressure and focal neurological signs (lateralization signs)

- **lateralization signs**

Unequal pupils, unilateral exaggerated reflexes, unilateral hyper or hypotonic, and unilateral fits

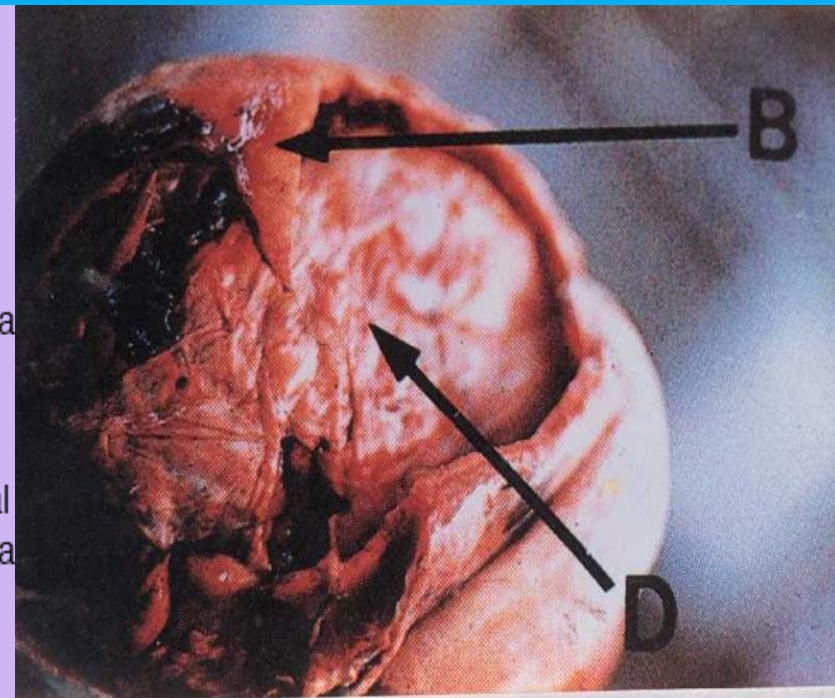
A- Extradural hemorrhage

- It is due to trauma by a blow on the side of the head leading to rupture of middle meningeal artery (temporal bone fissure) or venous sinuses .



Source: Atchabahian A, Gupta R: *The Anesthesia Guide*
www.accessanesthesiology.com

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Extradural hemorrhage

B- Subdural hemorrhage

1- Traumatic subdural hemorrhage

A- Acute subdural hemorrhage

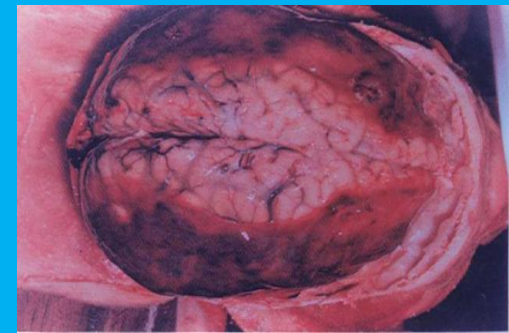
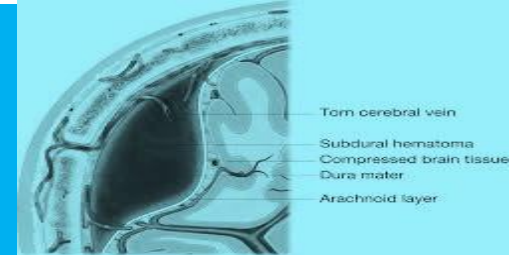
It is due to tearing of the vessels of subdural space related to cranial fracture

B- Chronic subdural hemorrhage

It is due to minor trauma in alcoholic person leading to successive hemorrhages over months

2- Pathological subdural hemorrhage

It is an extension of subarachnoid or intra-cerebral hemorrhage



C- Subarachnoid hemorrhage

- It occurs between arachnoid and pia mater.
- It is due to **pathological** cause as the following:-

1- Extension of pathological intra-cerebral hemorrhage

2- Rupture of aneurysm

Hemorrhage in subarachnoid space due to rupture of congenital or mycotic aneurysm (bacterial endocarditis)



D- Intra-cerebral hemorrhage

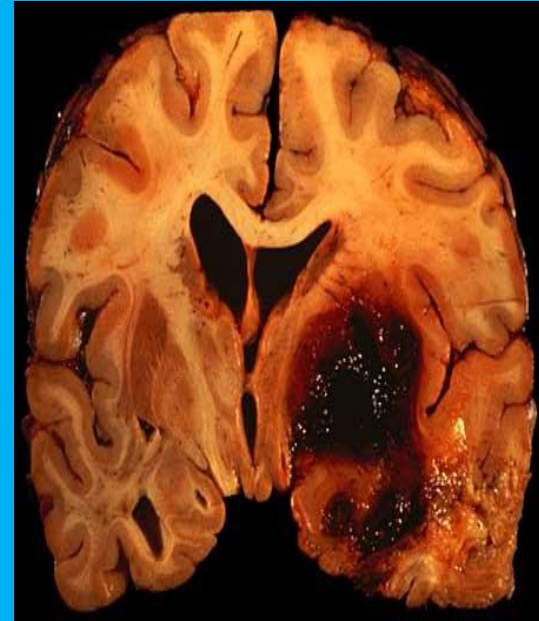
1- Traumatic

A- Coup injury

Direct relation to the site of trauma

B- Contre-coup injury

Opposite to the site of trauma



2- Pathological (cerebral apoplexy)

Hemorrhage inside the brain substance due to hypertension with diseased arteries(atherosclerosis)

E- Depressed cranial bone

- It is a traumatic Coup injury.
- Intra-cerebral hemorrhage is in a direct relation to the depressed fracture.
- Patient passes directly from concussion to compression.

Diffuse axonal injury (DAI)

- It is shearing (tearing) of the brain's long connecting nerve fibers (axons) when the brain is shifted and rotated inside the bony skull.
- It causes brain changes that are microscopic and may not be visible on (CT) or (MRI) scan.
- It may cause brain injury, rise of intracranial pressure and coma.

Causes of diffuse axonal injury

It results from the brain movement in the skull (acceleration or deceleration):-

- Motor car accidents
- Sport accidents
- Violence
- Falls
- Child abuse (Shaken Baby Syndrome)

Complications of head injuries

- 1- Retrograde Amnesia
- 2- Post-traumatic Automatism
- 3- Post- traumatic Neurosis
- 4- Epilepsy
- 5- Sepsis (brain abscess, meningitis, sinus thrombosis)
- 6- Permanent Infirmary

Cause of Death

1- Early :-

A- Concussion

B- Compression

C- Cerebral Laceration

2- Delayed :-

A- Brain abscess

B- Sinus thrombosis

C- Meningitis

Thank you