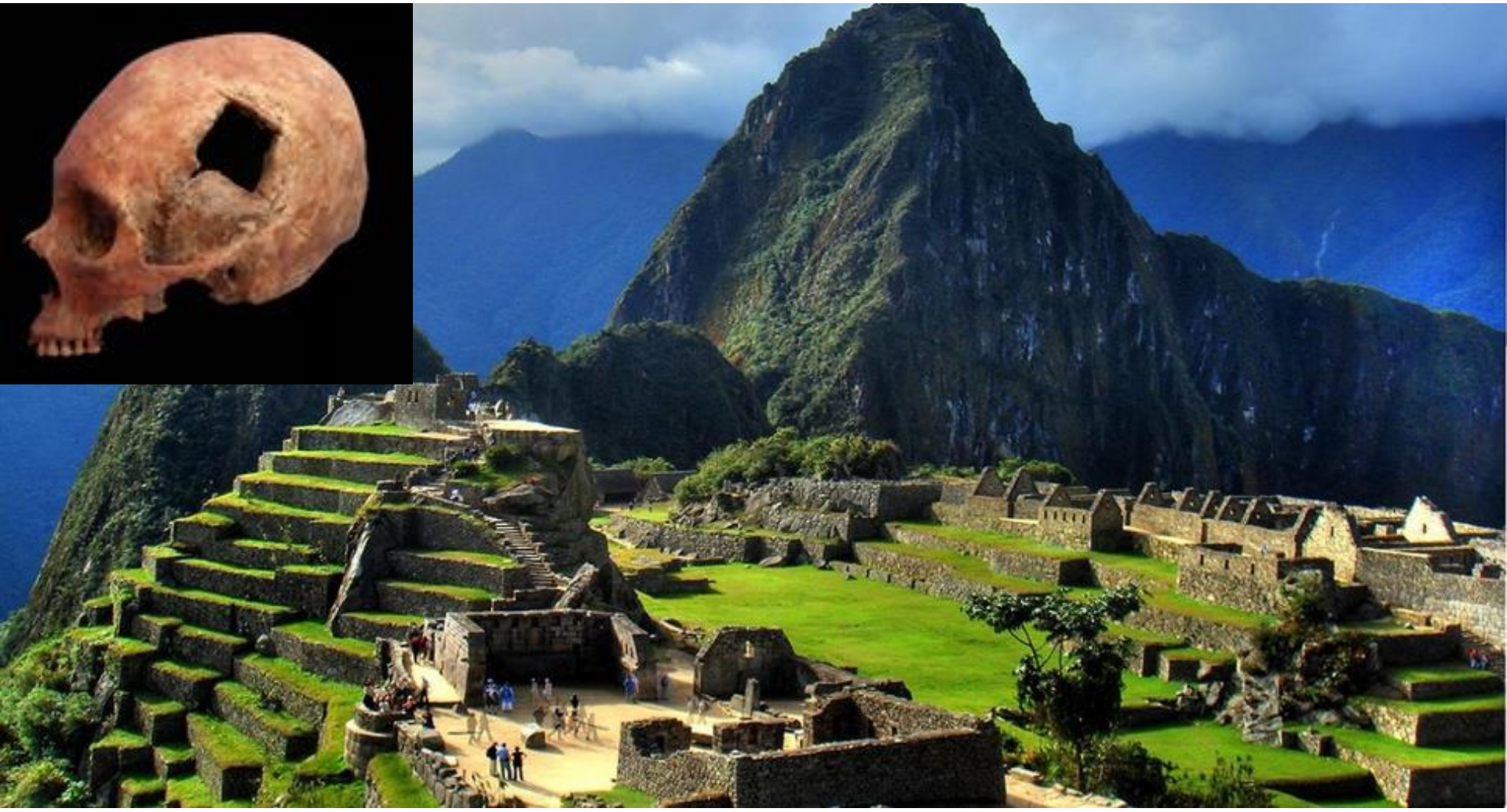
The University of Jordan

Lectures in Pictures

Neurosurgery

Dr.Tareq Kanaan

1: Cranial



Trephination dates back to 10 000 BC. Incas as recent as 1532

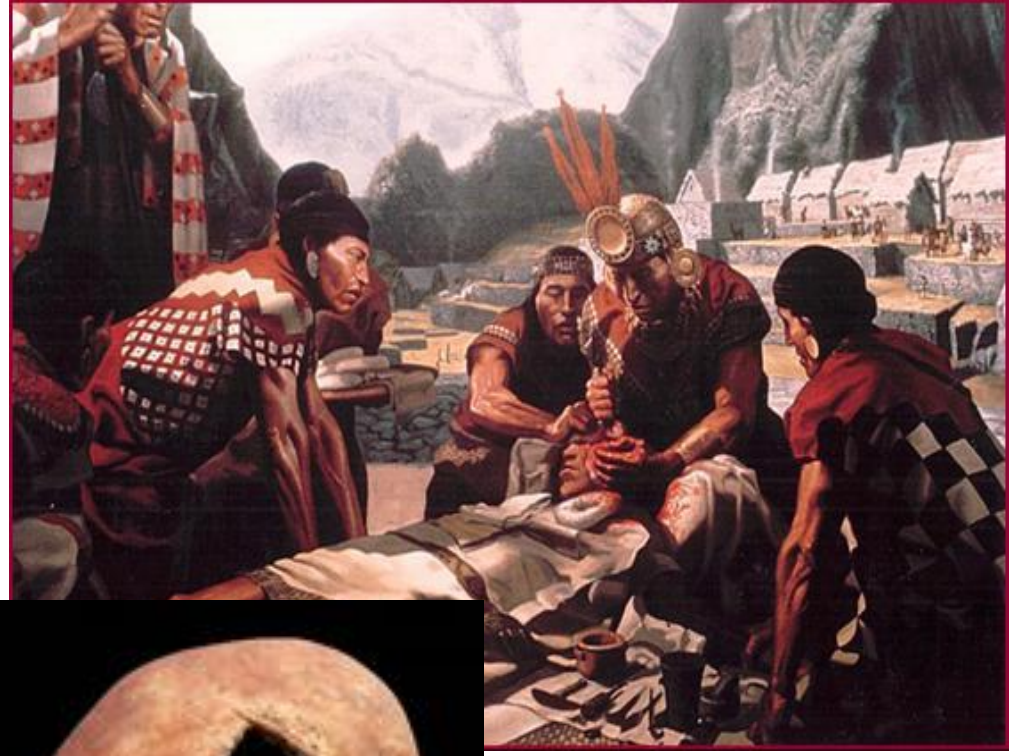
Neurosurgery is the 2ed most difficult profession in the world only next to hiking

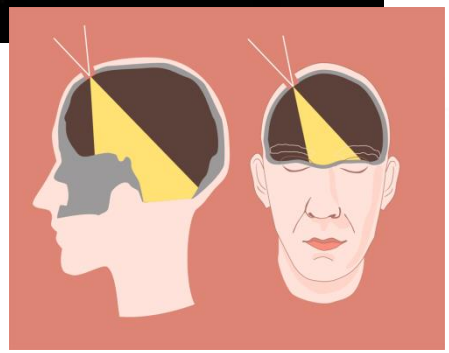
Trepanation :
drilling a hole into the skull to expose dura and brain and treat related problems like dainage of a subdural hematoma .
Same as **Burr hole**.

Craniotomy:
Removing a bone flap from the skull in order to perform surgery on dura or brain and fixing it back.

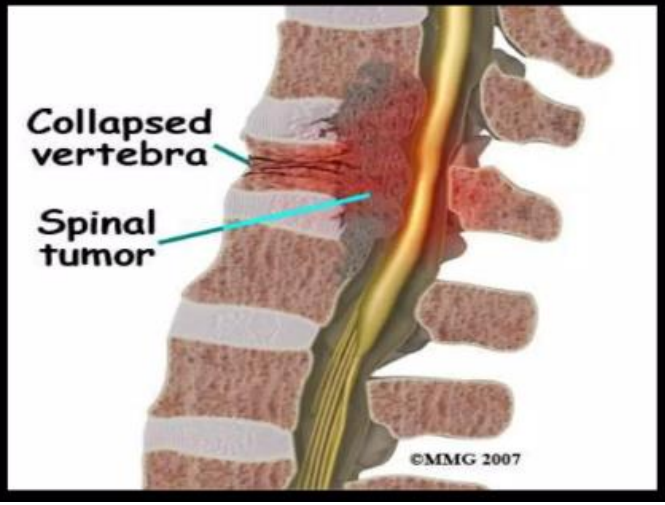
Craniectomy:
Removing a bone flap away from the skull and not putting it back again in order to decompress the brain .

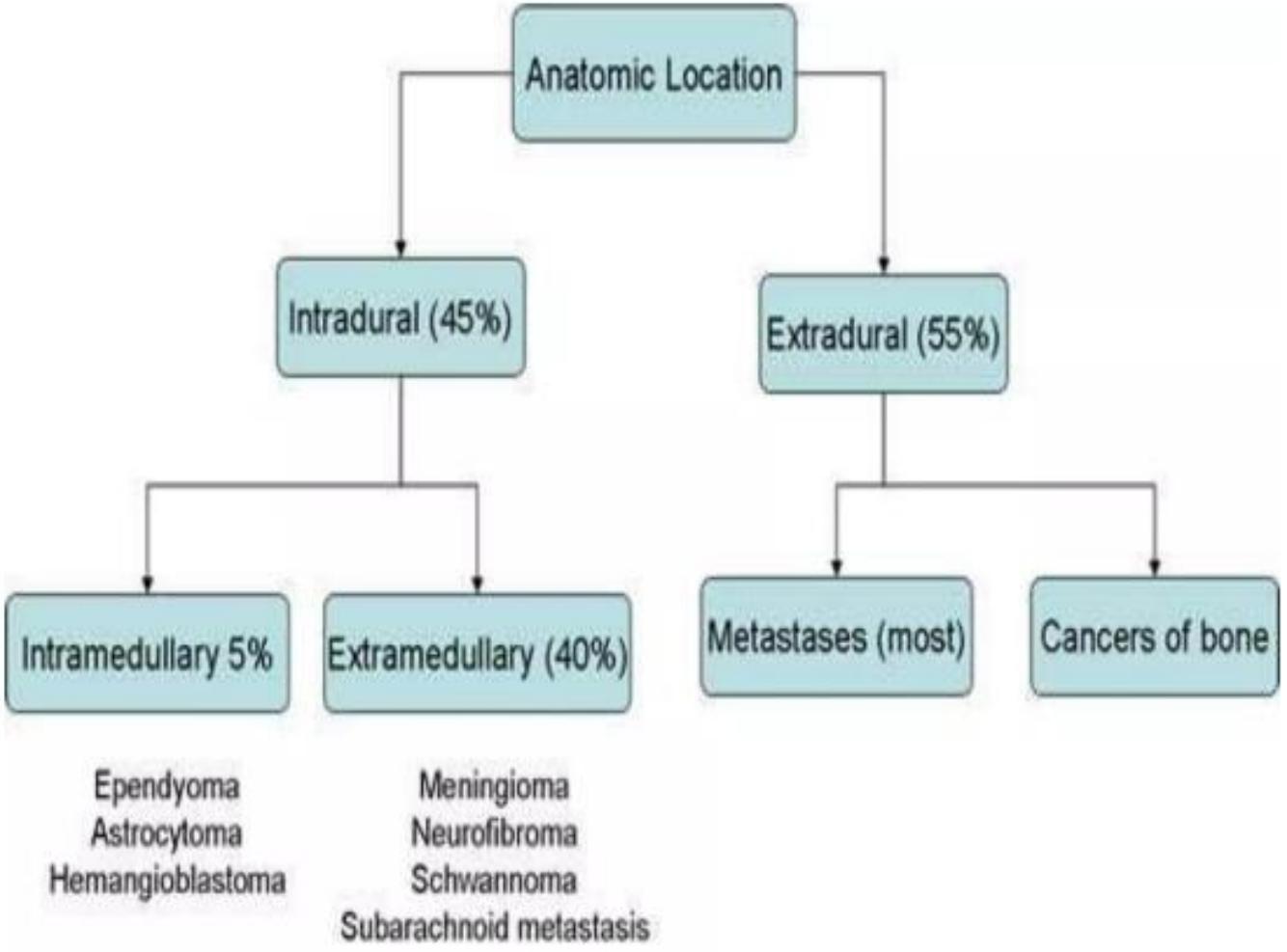
Cranioplasty:
Putting back something else than the bone flap like tetanium mesh or bone cement.





Radiological imaging of spinal cord tumour.




Anatomic Location
Intradural (45%)
Extradural (55%)
Intramedullary 5%
Extramedullary (40%)
Metastases (most)
Cancers of bone
Ependyoma
Astrocytoma
Hemangioblastoma
Meningioma
Neurofibroma
Schwannoma
Subarachnoid metastasis

Spinal Cord Tumours:

Extra-dural.
Intra-dural extra-medullary
Intra-medullary.

Spinal Cord Tumors are classified into:

Benign tumours.
Cysts, and other benign tumour like masses.
Malignant tumors.
Metastasis.

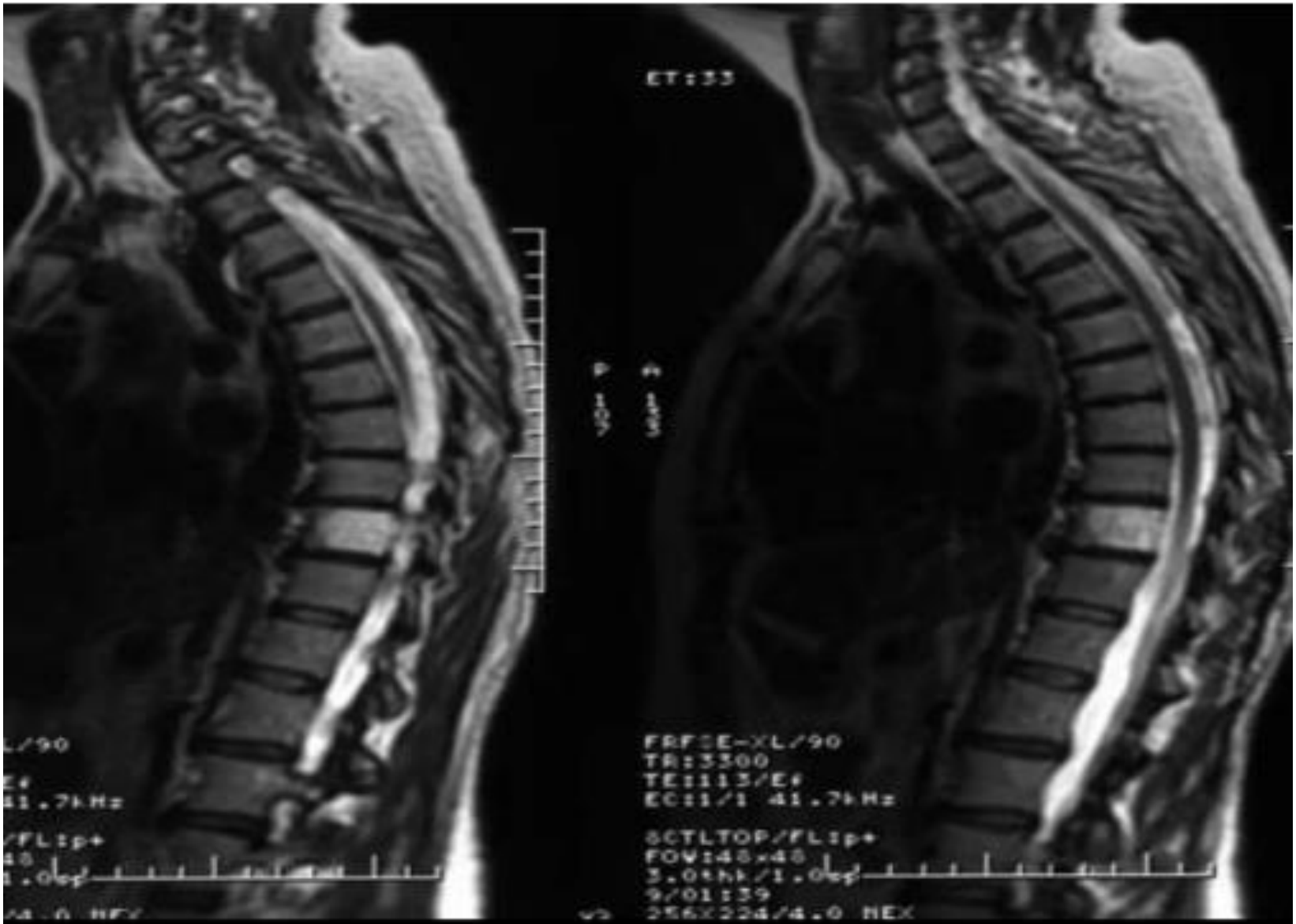
Extra-dural benign tumors:

-Hemangioma.

-Osteoid osteoma.

-Osteochondroma.

Hemangioma.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FRFSE-XL/90
TR:3500
TE:113/E#
EC:1/1 41.7kHz
SCTLTOP/FLip+
FOV:48x48
3.0thk/1.0sp
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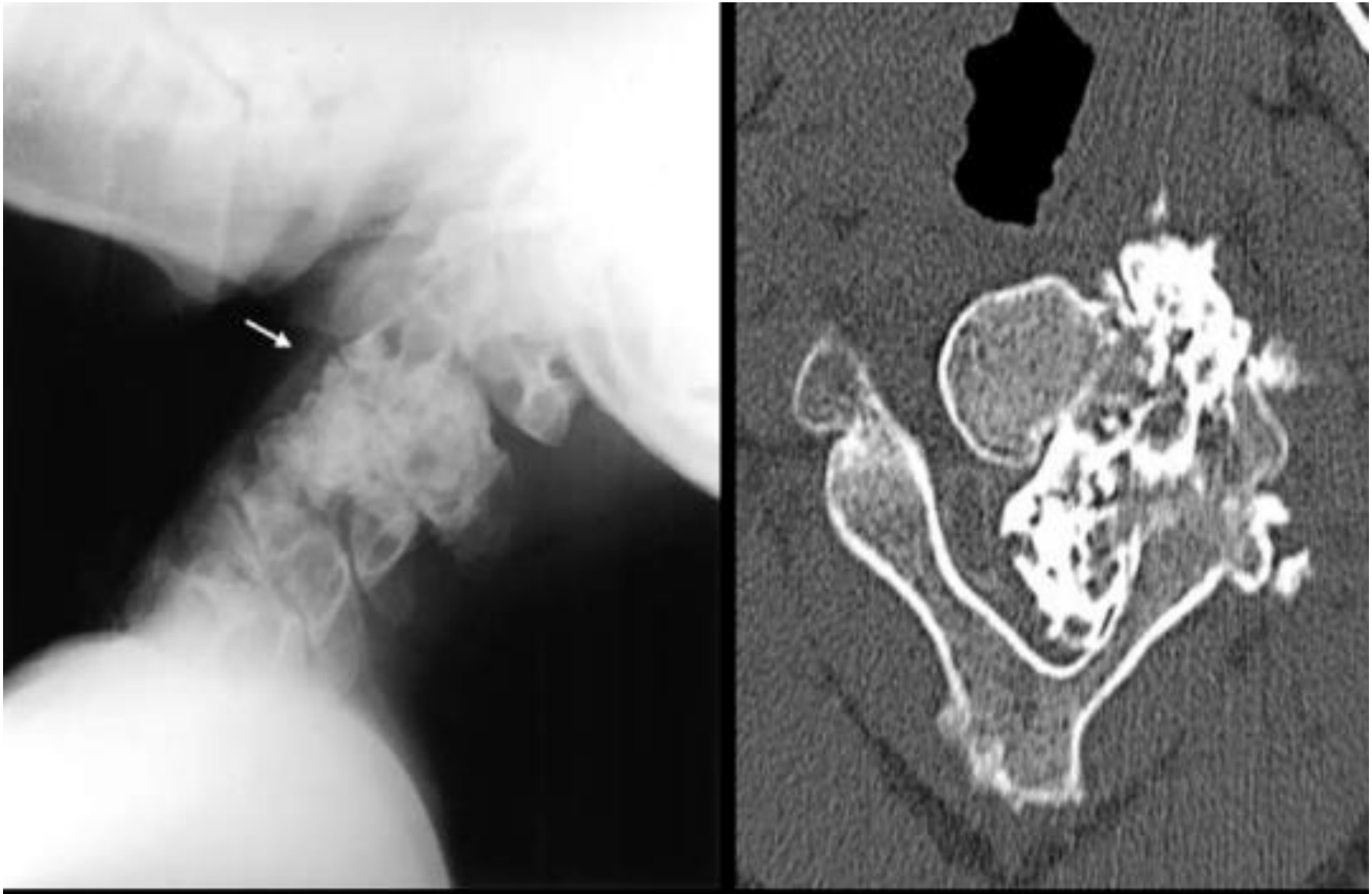
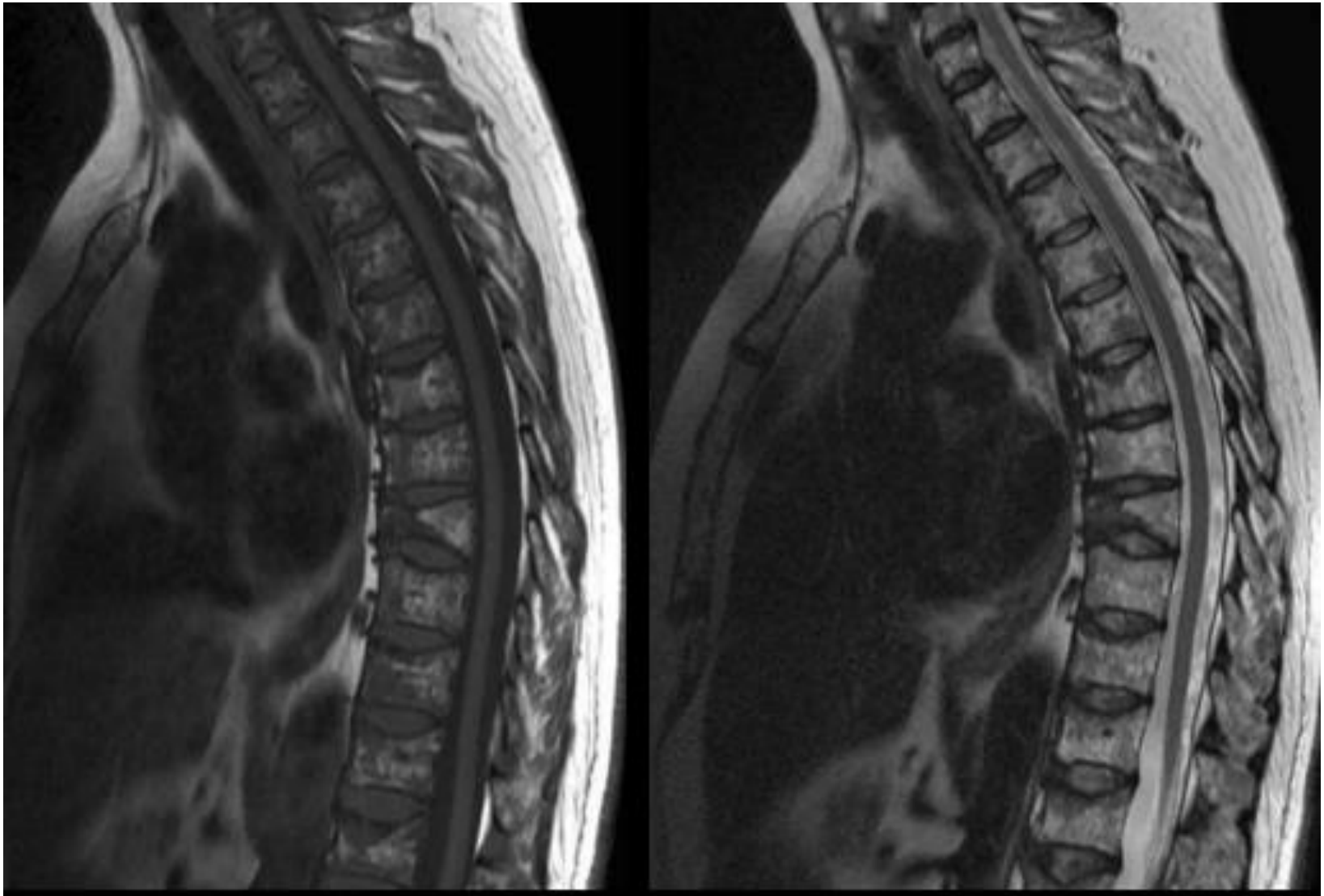
Hemangioma.

Sagittal T2-weighted image showing a T3 haemangioma with epidural extension compressing the spinal cord.

osteoid osteoma.



Osteochondroma at upper cervical cord in a patient with multiple exostoses.



Multiple myeloma.

Spinal metastases:

Spinal metastases is by far the most common extra-dural malignant neoplasm. Metastatic disease have any of the following:

vertebral metastases (94%)

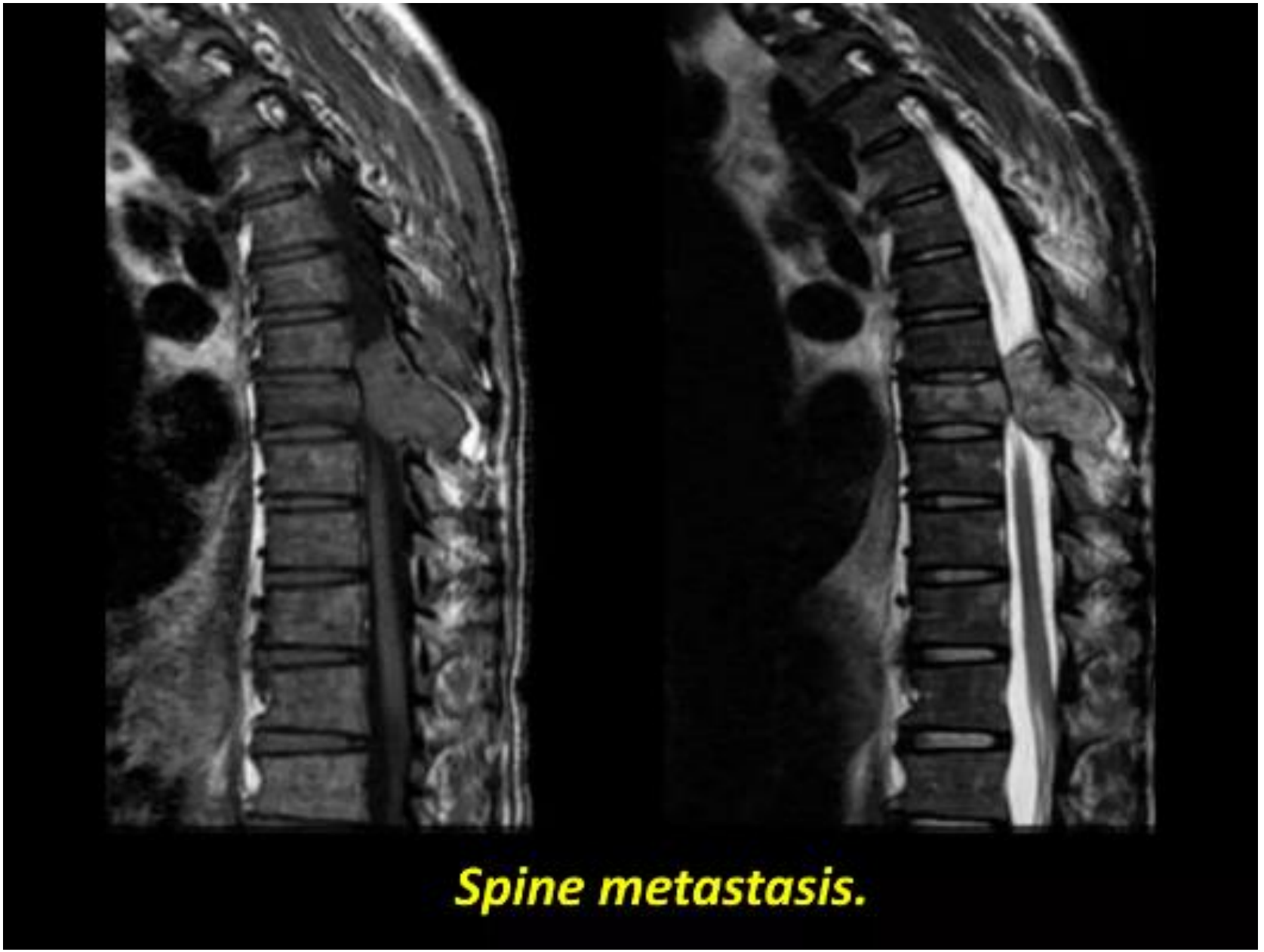
may have epidural extension

intradural extramedullary metastases(5%)

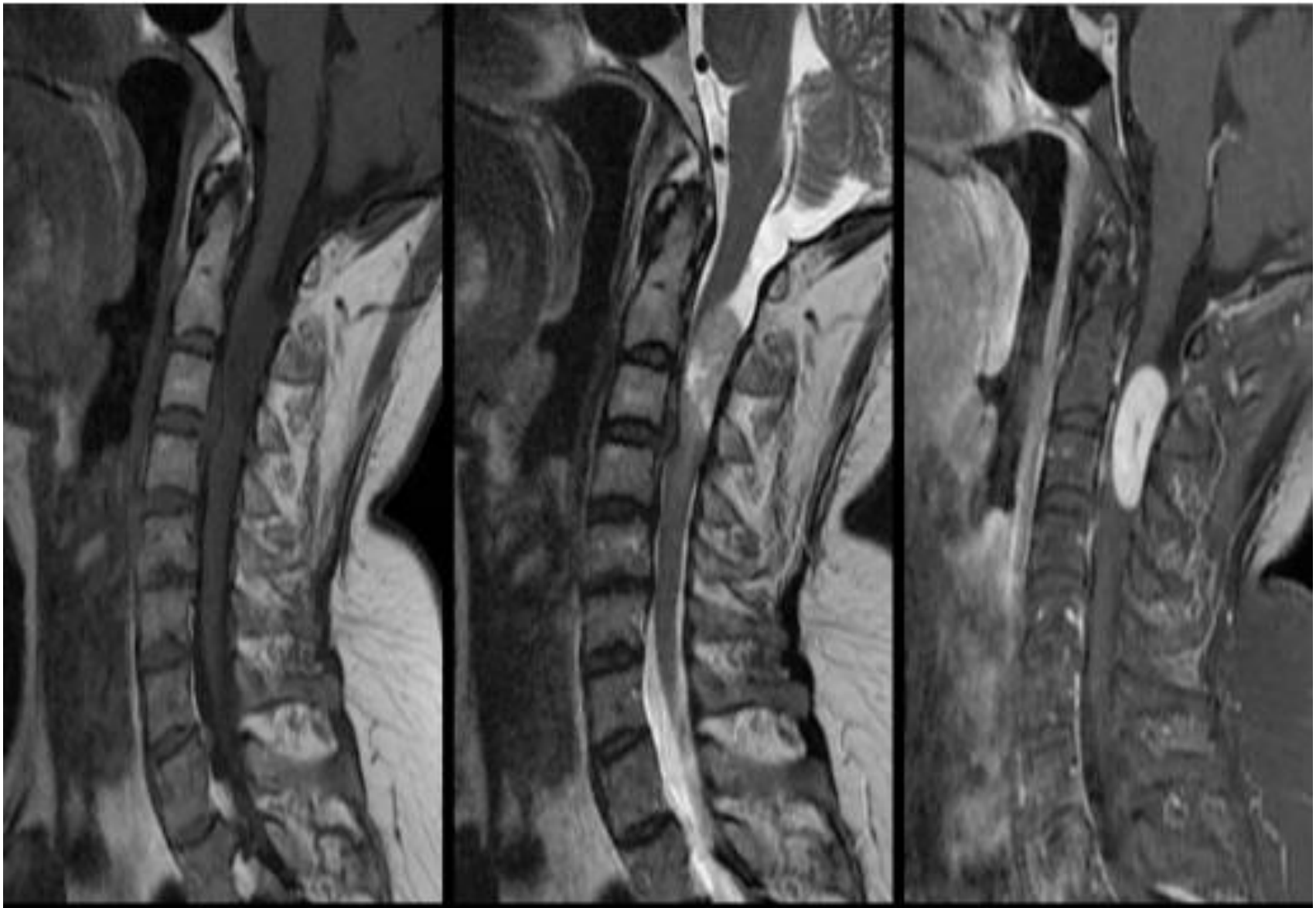
intramedually metastases (1%).

In adults, the initial site is the vertebral body, usually the posterior aspect.

Most metastasis arises from the, breast: 22%, lung: 15%, prostate: 10%, lymphoma: 10%, kidney: 7%, gastrointestinal tract: 5%, melanoma: 4%, unknown: 4%, others: 24%.



Spine metastasis.



Cervical Spinal schwannoma.

Spinal meningioma.

Intramedullary spinal tumours.

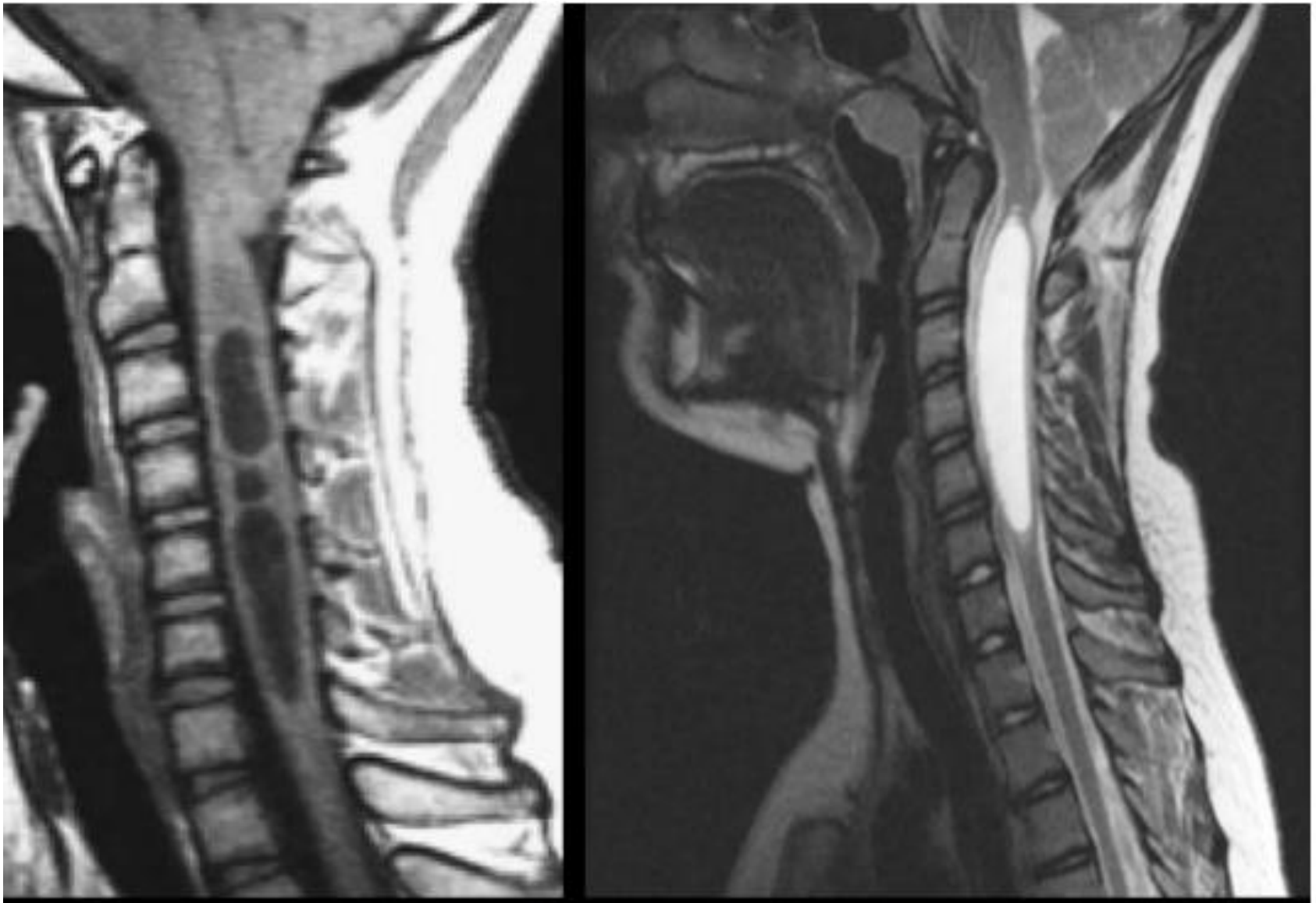
Intramedullary spinal tumours are rare, representing 4-10% of all CNS tumours. They account for 20% of all intraspinal tumours in adults and 35% of all intraspinal tumours in children .

Classification: They can be classified according to many ways:

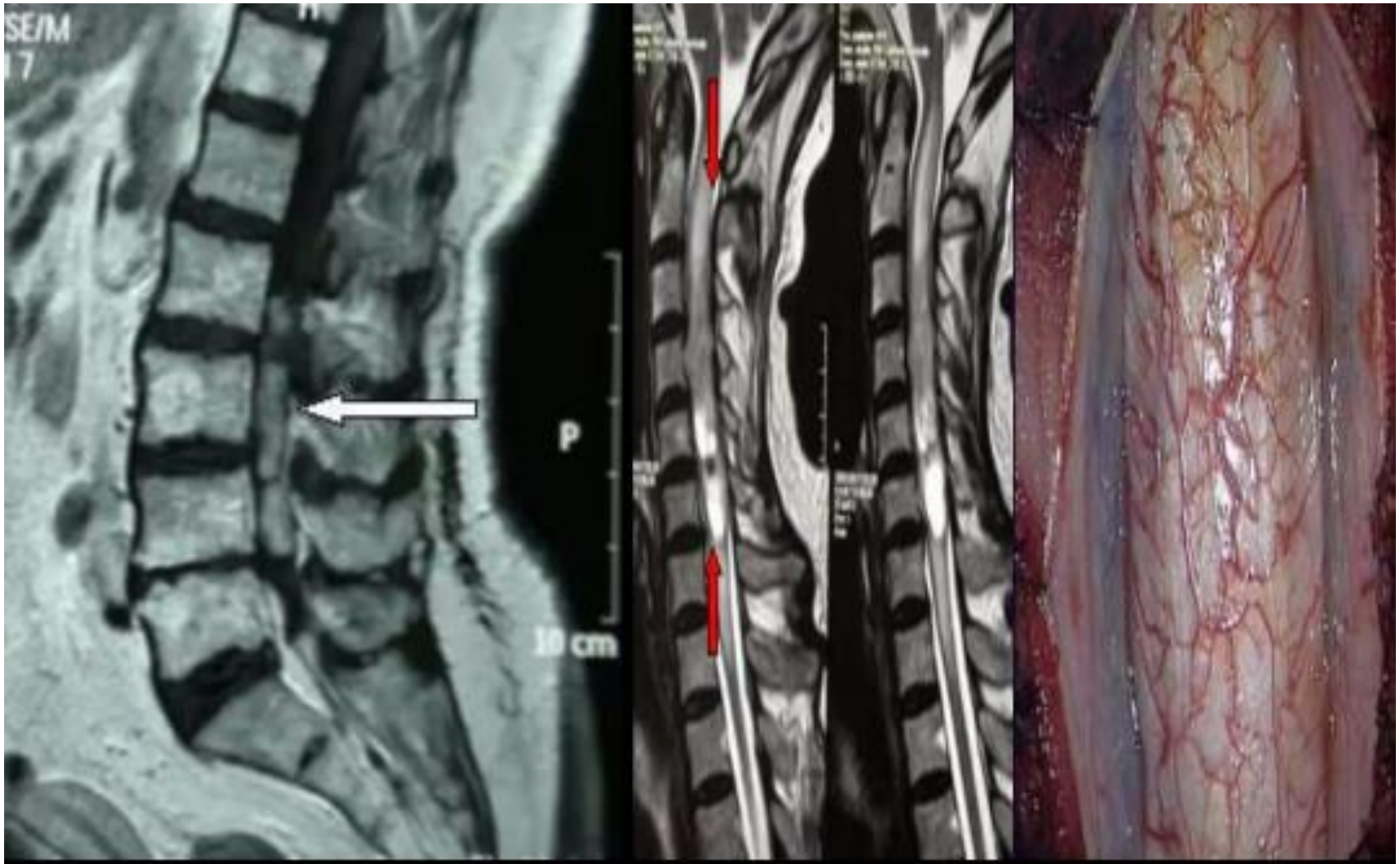
intramedullary neoplastic lesion:

- glial neoplasms: 90-95% of all intramedullary tumours
  - spinal ependymoma: 60% of all glial spinal cord tumours
  - spinal astrocytoma: 33% of all glial spinal cord tumours
  - spinal ganglioglioma: 1% of all glial spinal cord tumours
- non-glial neoplasms:
  - highly vascular lesions
    - spinal hemangioblastoma and spinal paraganglioma
  - other rare lesions
    - intramedullary metastasis
    - primary lymphoma of the spinal cord
    - spinal primitive neuroectodermal tumour
    - solitary fibrous tumour

intramedullary benign masses: Syringohydromyelia, MS , transverse myelitis arachnoid and ependymal cyst.

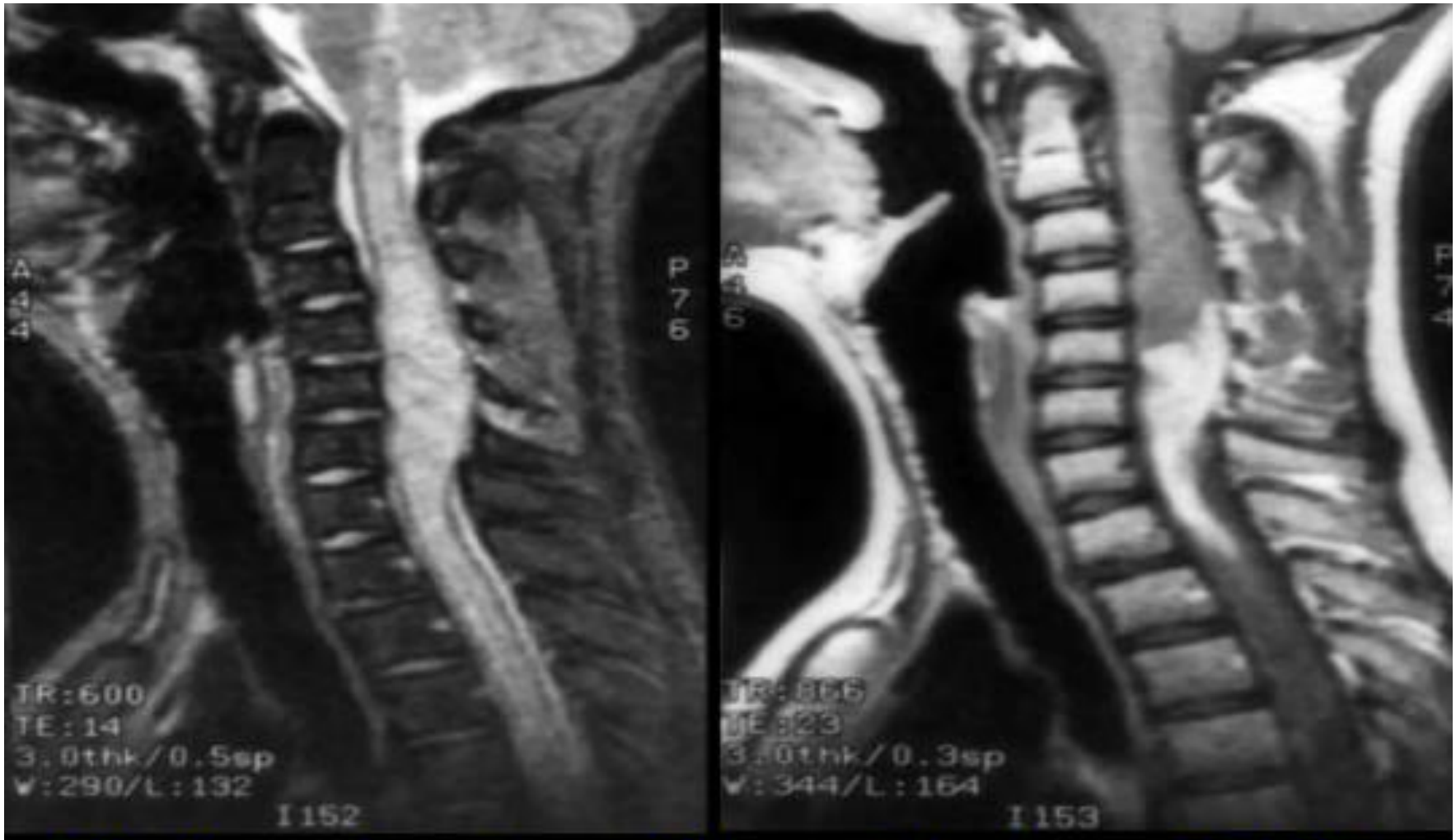


Two cases of Syringohydromyelia.

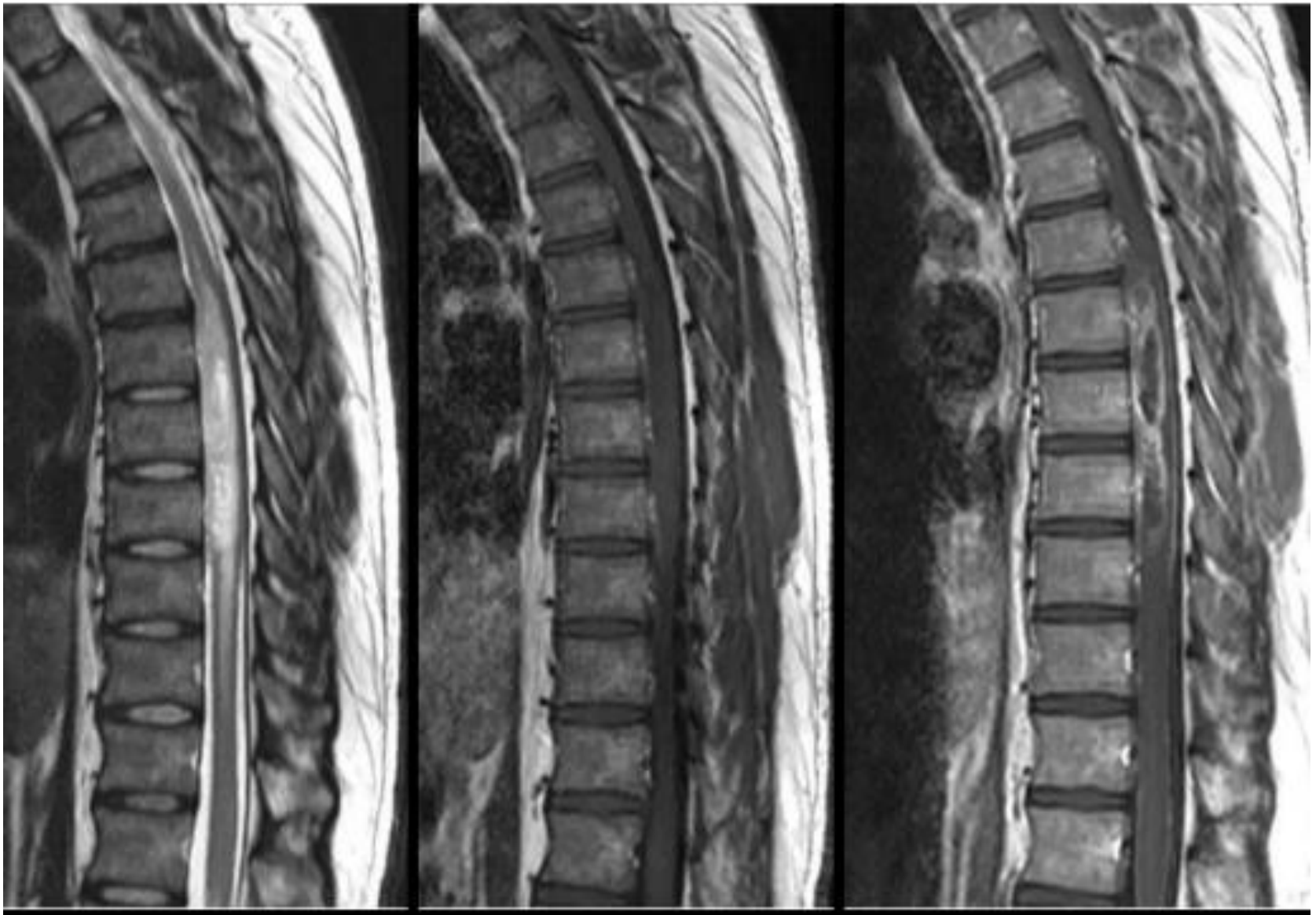


Large filum terminalis ependymoma (arrows).

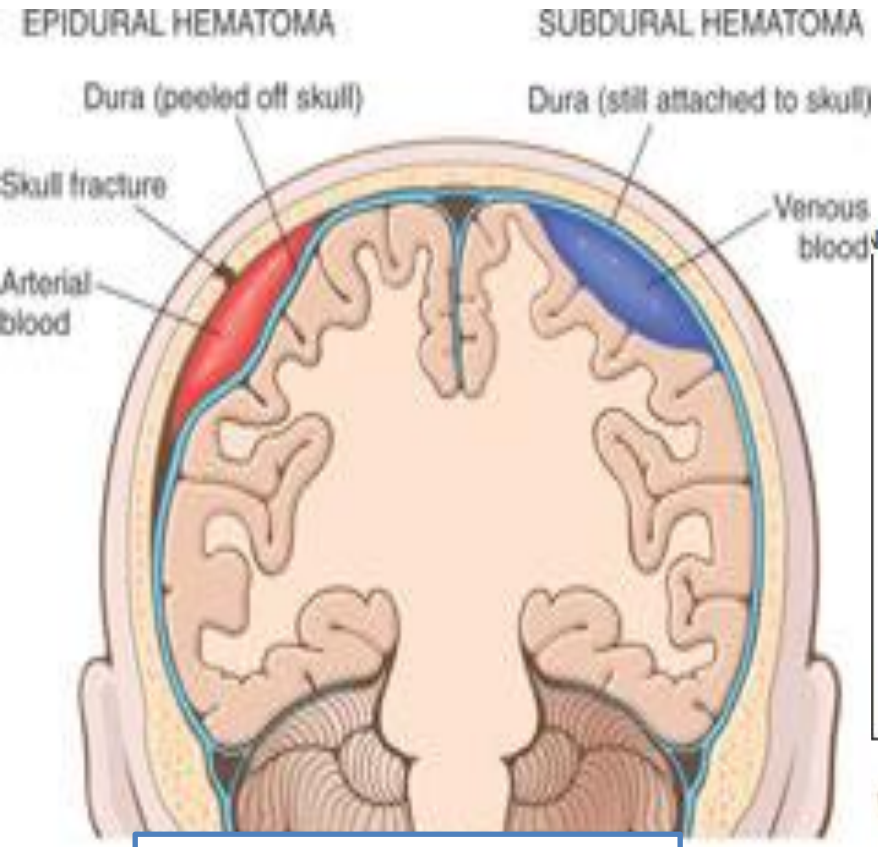
Intramedullary cervical ependymoma (red arrows).



A fibrillary astrocytoma of the cervical spine on T2 (left) and T1 with contrast (right). Note the indistinct cord edema, expansion and partial contrast enhancement



Spinal astrocytoma.



Epidural :above the dura
Usually arterial
Middle meningeal Artery

subdural :under the dura and above the brain
Usually venous
Bridging Veins
Venous sinuses

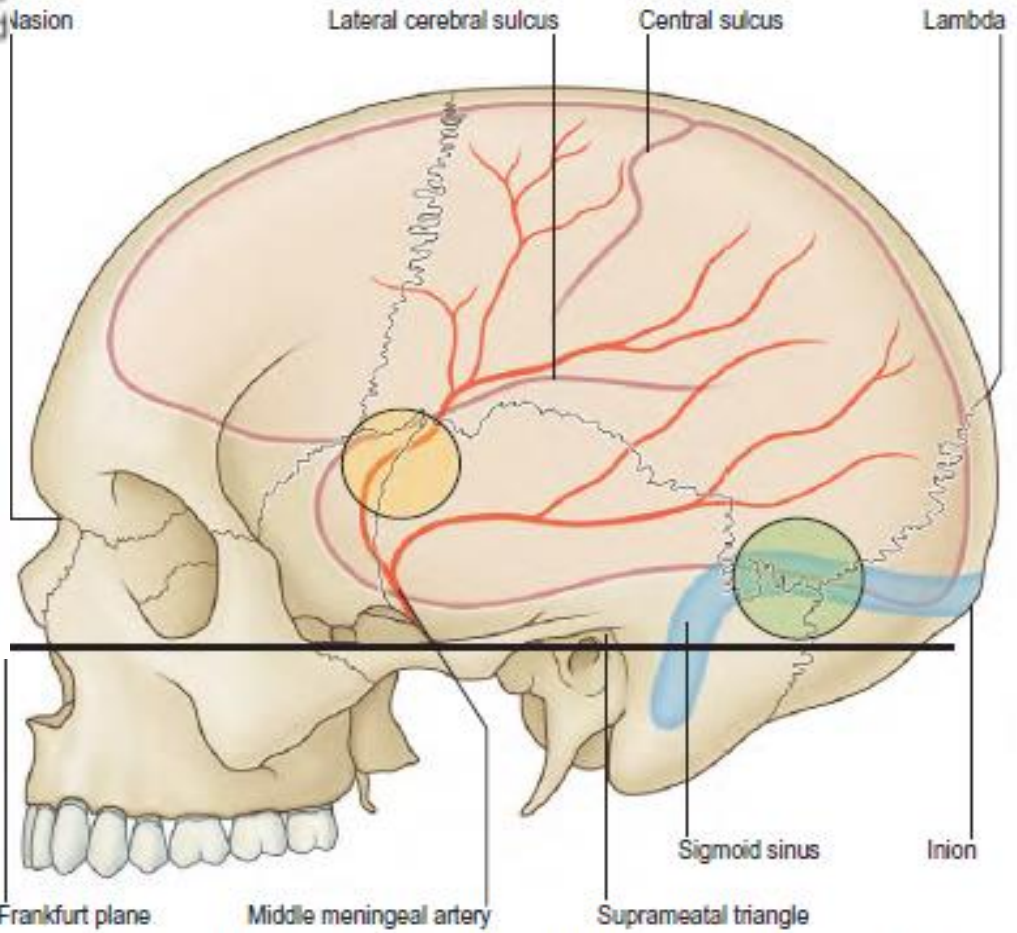
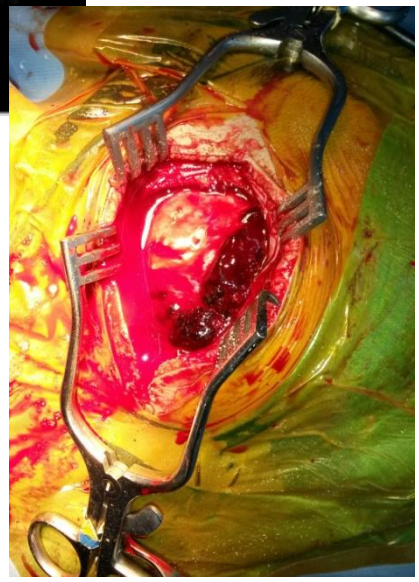


Fig. 27.7 The relations of the brain, the middle meningeal artery and the transverse and sigmoid sinuses to the surface of the skull. Area enclosed in yellow circle (including the pterion) for trephining over the frontal branch of the middle meningeal artery and lateral Sylvian fissure; area enclosed in green circle for trephining over the transverse sinus.

Epidural = Extradaural hematoma

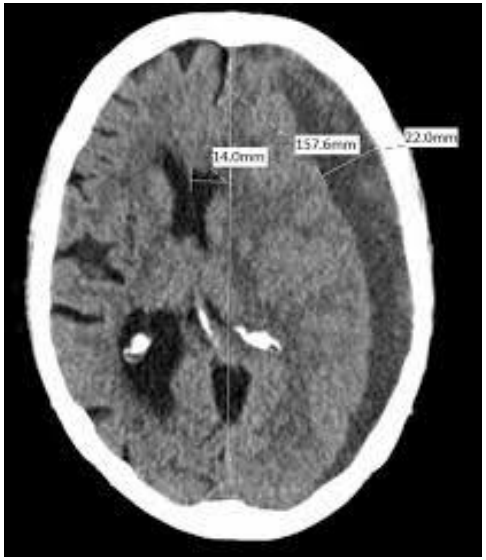
Typical appearance of EDH on CT scan :

- **Bi convex lense shape**
- **Arterial bleeding due injury to anterior branch of middle meningeal artery.**
- **Usually due to trauma over the pterion (weak point)**
- **Treatment: craniotomy and evacuation of blood clot as it cannot be sucked out through a burr hole .**



Typical EDH on CT scan :
Bi convex lense shaped
Always acute
Arterial bleeding

Typical acute SDH on CT scan:
Lunar shaped
bleeidng isHyperdense:
white like bone
Venous bleeding



Typical chronic SDH on CT scan:
Lunar shaped
bleeidng is hypodense like CSF
Venous bleeding

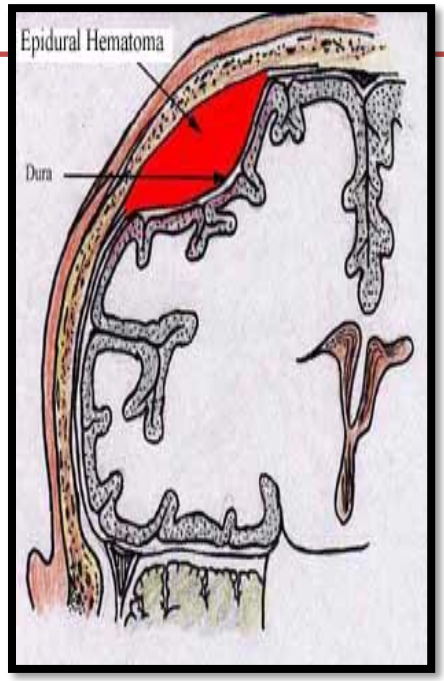
Lucid interval

lucid interval is a temporary improvement in a patient's condition after a traumatic brain injury, after which the condition deteriorates

It occurs after the patient is knocked out by the initial concussive force of the trauma, then lapses into unconsciousness again after recovery when bleeding causes the hematoma to expand past the point at which the body can no longer compensate

A lucid interval is especially indicative of an epidural hematoma.
An estimated 20 to 50% of patients with epidural hematoma experience such a lucid interval.
It can last minutes or hours

To stop the hemorrhage, the torn artery or vein must be ligated or plugged. The burr hole through the skull wall should be placed about 1 to 1.5 in. (2.5 to 4 cm) above the midpoint of the zygomatic arch.



Subdural Hemorrhage

A subdural hemorrhage is caused by a violent shaking of the head (e.g., child abuse or car accident) and commonly occurs in alcoholics and elderly..

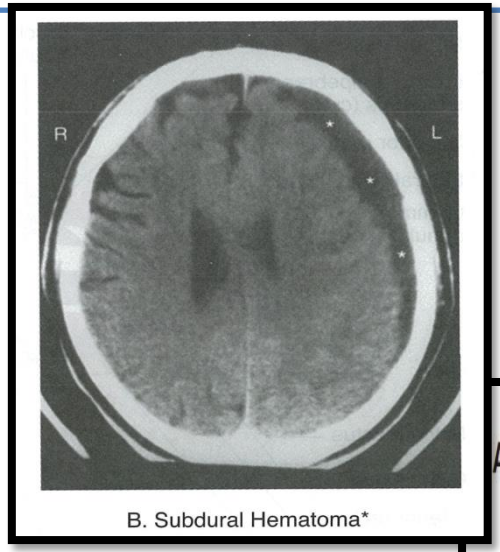
The blood vessels involved are the **superior cerebral veins ("bridging veins").**

Clinical features include:

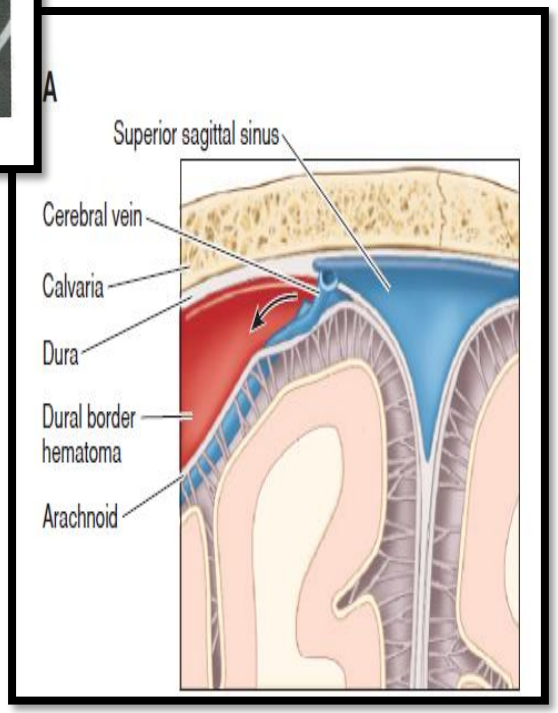
A CT scan shows a **thin, crescent-shaped hyperdensity that hugs the contours of the brain;**

venous blood is located between the dura and arachnoid; blood accumulates slowly (days to weeks after trauma);

➢**no blood in the CSF after lumbar puncture.**



B. Subdural Hematoma*



Raccoon eyes :

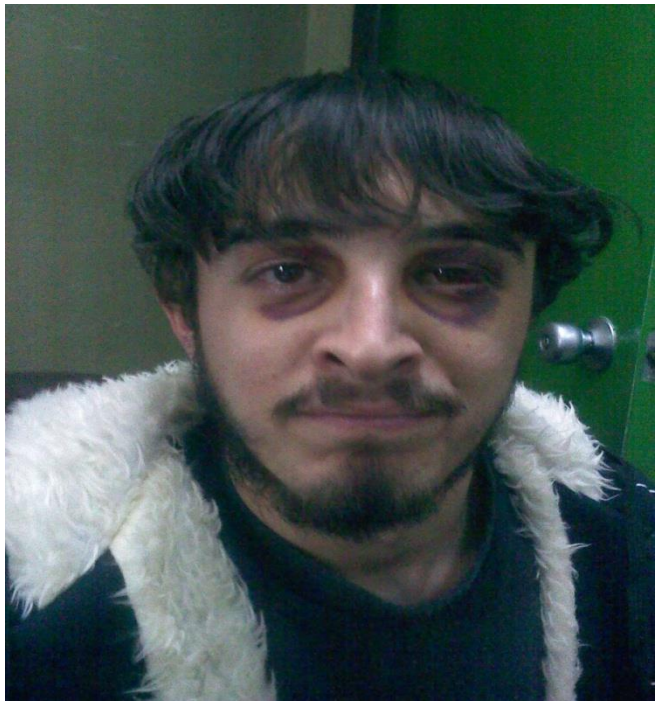
Indicates base of skull fracture even if we cannot see it on a CT scan .

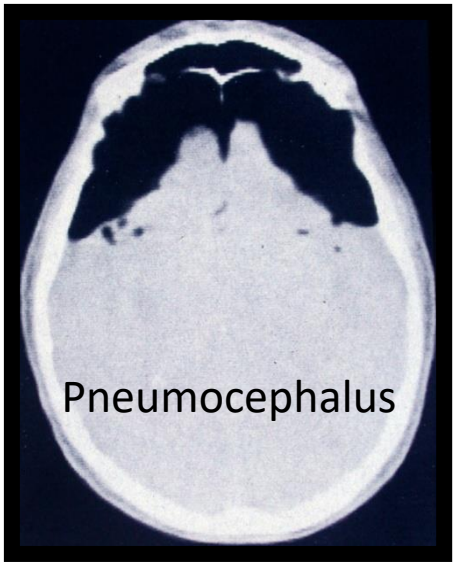
What other signs of base of skull fracture do you Know??

- •Battle sign: hematoma behind the ear
- •Pneumocephalus : subdural air in CT scan.

Why it is important to identify??

Bec. of possible serious complications like CSF rhinorea or ottorhea and then meningitis

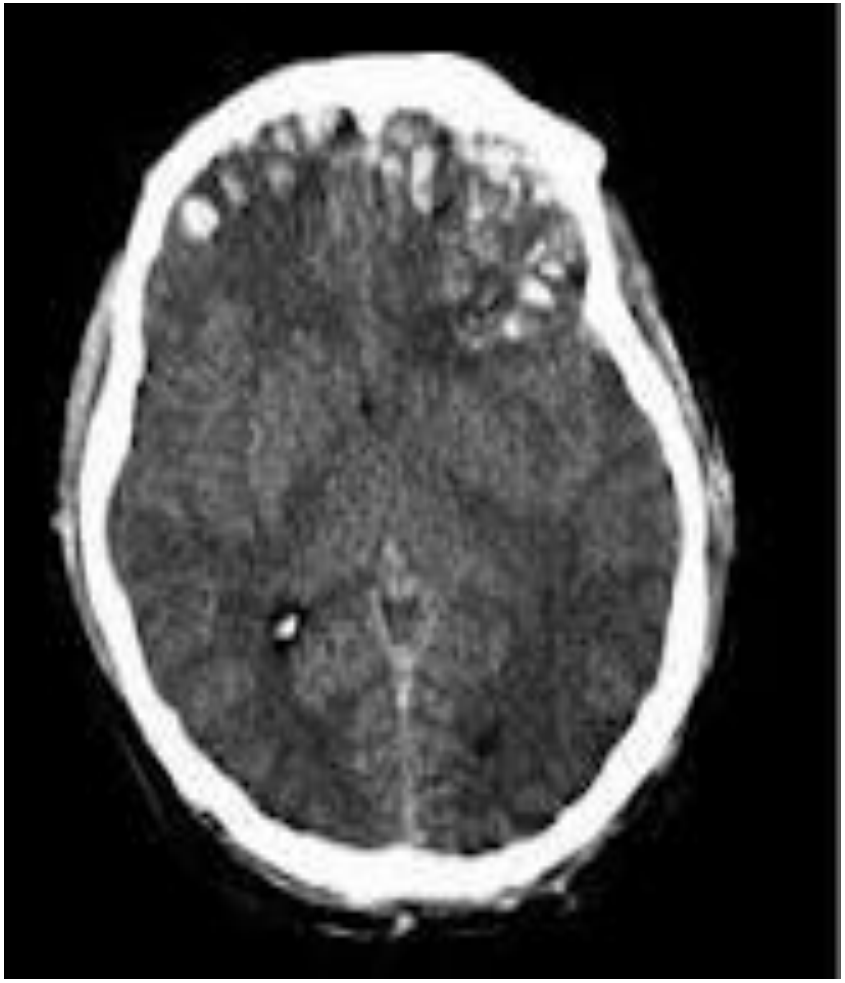




- Brain Contusion :

-Intra-parynchymal localized bleeding

-If it exceeds 3 cm then it is an intacerebral hematoma



This is a brain MRI :

-we can see a lesion in Rt pariatal Lobe

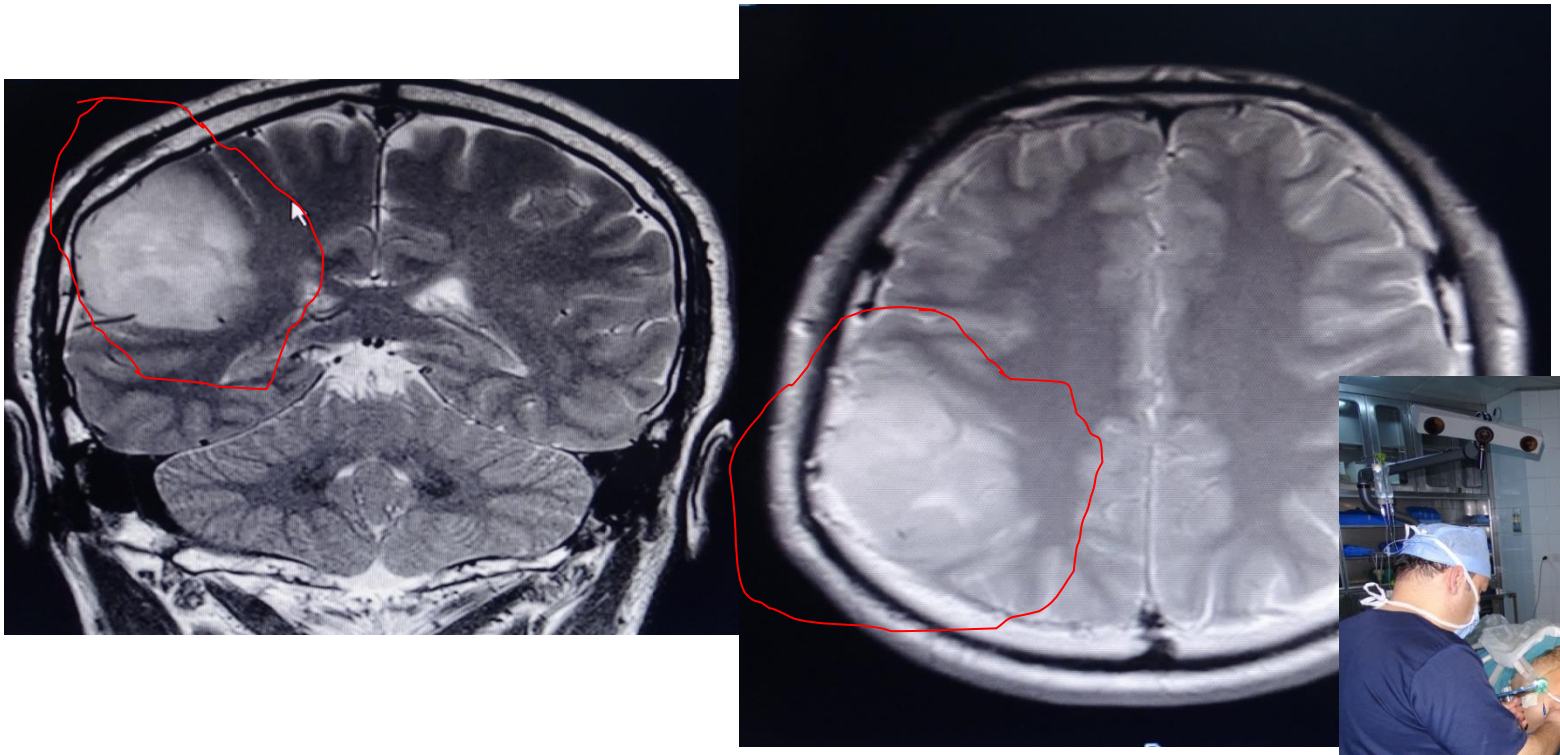
-homgenous but does‘t have well defined borders

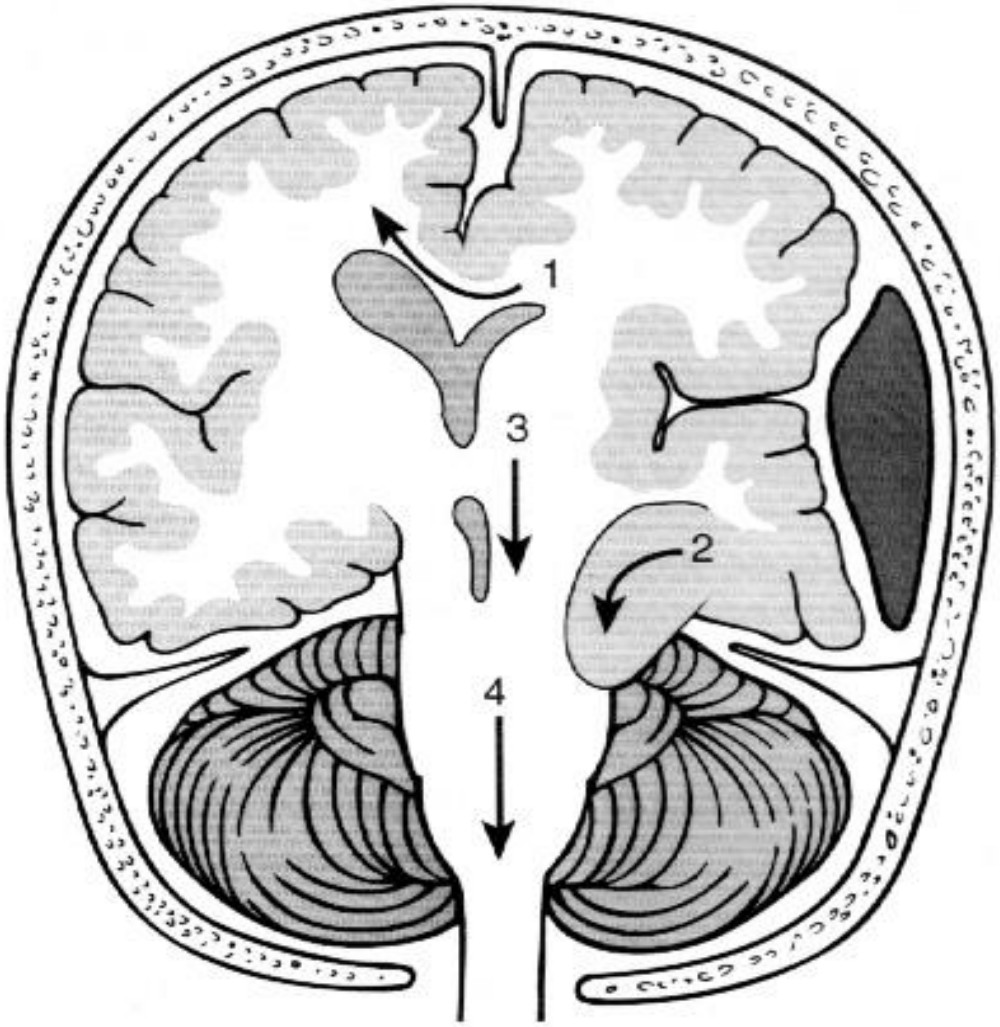
-Typical of low grade primary brain tumor

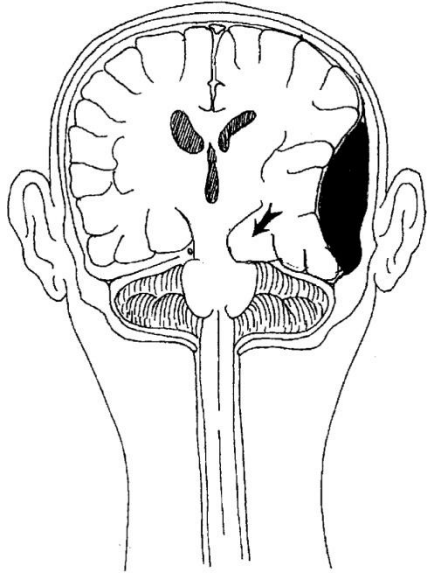
-Best management : Stereotactic biobsy or navigation guided biobsy :

if low grade :observe

if high grade : radiation







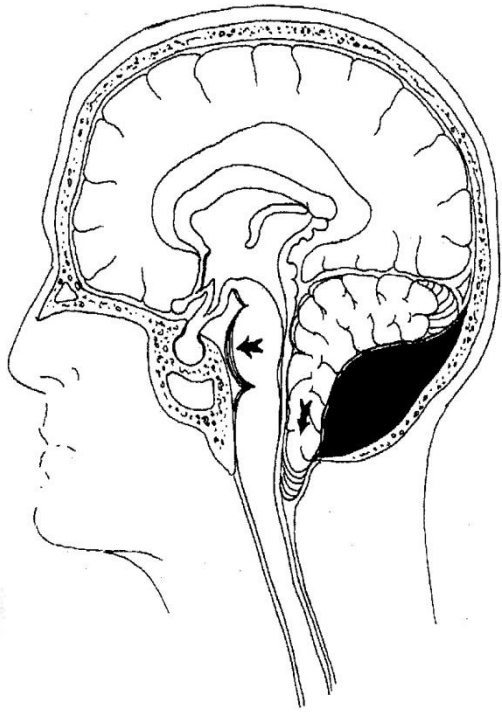


Fig. 3.3 Brain herniations. A lateral supratentorial mass will cause displacement of the lateral ventricles with (1) subfalcine herniation of the cingulate gyrus below the falx cerebri; (2) herniation of the uncus into the tentorial hiatus; (3) caudal displacement of the brain stem. Raised pressure within the posterior fossa may cause herniation of the cerebellar tonsils into the foramen magnum (4). (Adapted from Jennett and Teasdale 1981. Reproduced with permission.)

SAH : Subarachnoid hemorrhage :

- The most common cause is trauma.
- Spontanous SAH : m.c. Cause is rupture of berry aneurysm(seen in convensional Angiogram here) .
- Presentation: worst headache of my life , decrease level of consciousness.
- Classification of cases : Hess and Hunt or WHO
- Treatment :
    - Coilling : intervensional radiology
    - Clipping : surgery

How do you describe this brain lesion ???

- Shape :Well circumscribed, rounded
- Contents :Cystic .CSF intensity fluid
- Location :Rt occipital
- No enhancement with contrast
  (i.e no vascularization).
- This is a typical Brain Hydatid cyst.