Neurology

Chapter : Brain tumours

Learning object 1 : Brain tumours

objectives

At the end of this learning object student will be able to:

- Classify brain tumours.
- Explain clinical pictures of brain tumours.
- Explain general symptoms of I.C.T.
- Compare between true localizing signs and false localizing signs.
- Explain signs that we can use to discover site of the tumours.
- Enumerate ways of investigation of case of brain tumours.

Slide 1 : **Classification of brain tumours**

Classification:

1. Tumours arising from the meninges: Meningiomas

2.Tumours arising from the brain tissue: Gliomas (astrocytoma, glioblastoma multiformis, medulloblastoma).

3.Tumours of the blood vessels: Haemangioma, Hamangioblastoma.

4.Tumours of the cranial nerves: Acoustic neuroma of the 8th nerve.

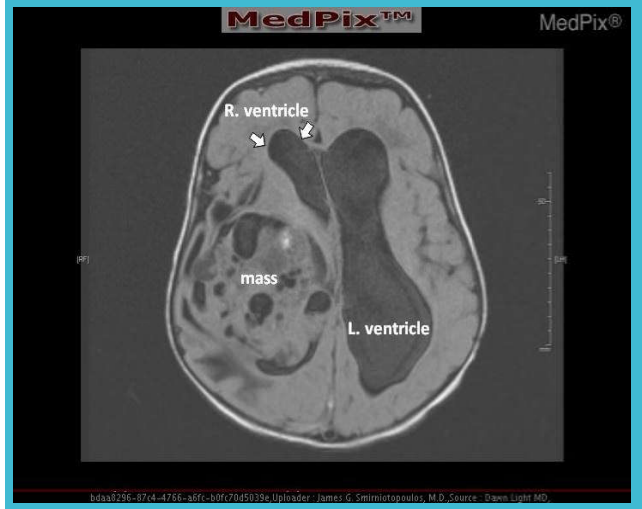
5. Pituitary tumours: * Suprasellar: craniopharyngioma.

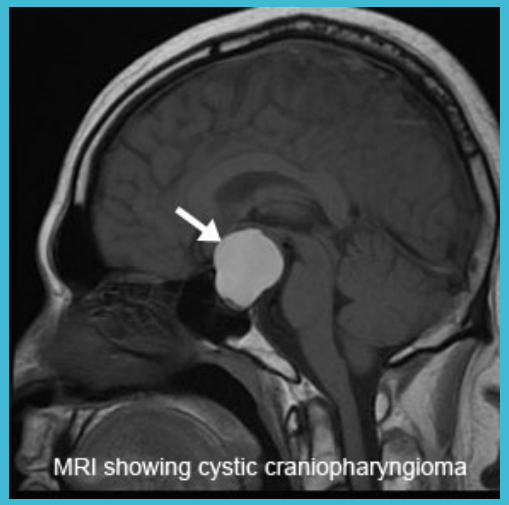
* Intrasellar: acidophil, basophil and chromophobe adenomas.

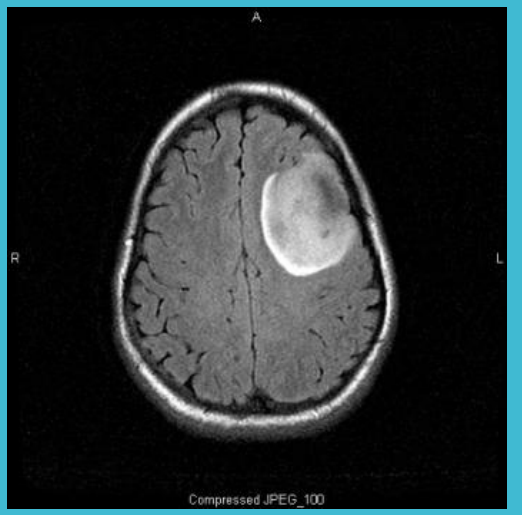
6. Secondary: * Metastatic from lungs, breast, G.I.T., kidney & prostate.

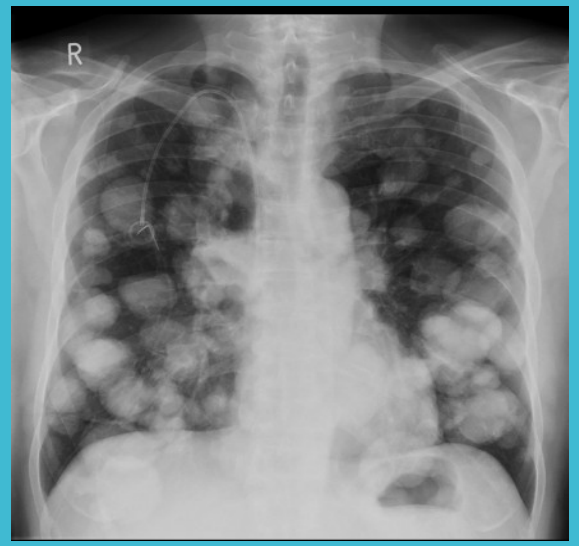
* Invasion of the brain by a nasopharyngeal tumour.

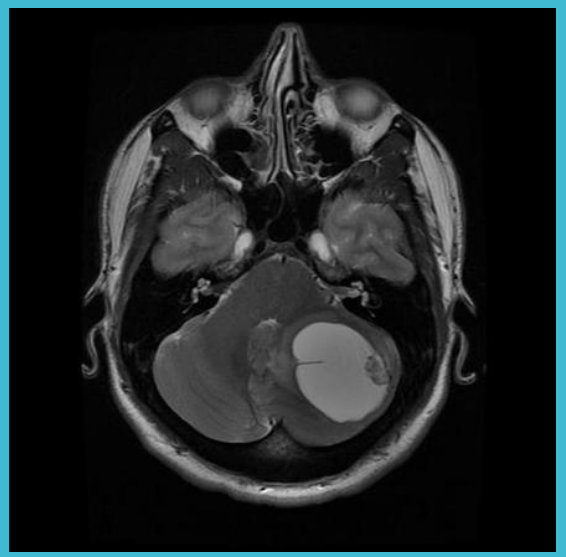
7-Congenital tumours: Teratoma, cholesteatoma.

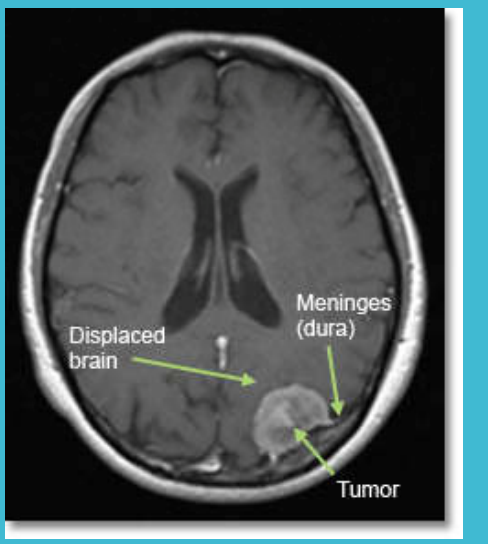












Clinical picture:

Brain tumours manifest clinically by:

a) General symptoms and signs of increased intracranial tension (↑ICT)

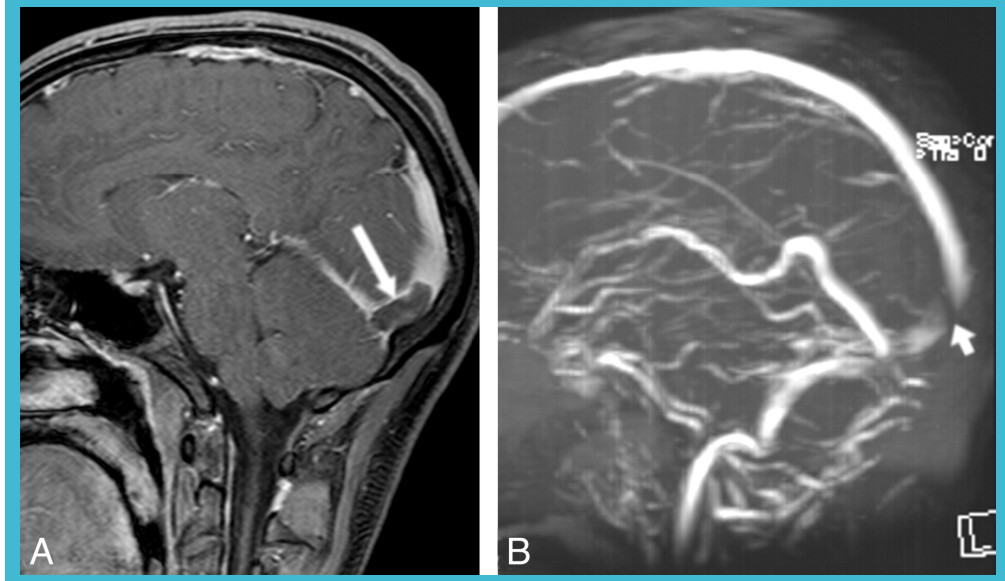
b) False localizing symptoms & signs regardless to the site of the tumour ,mostly due to increased I.C.T.

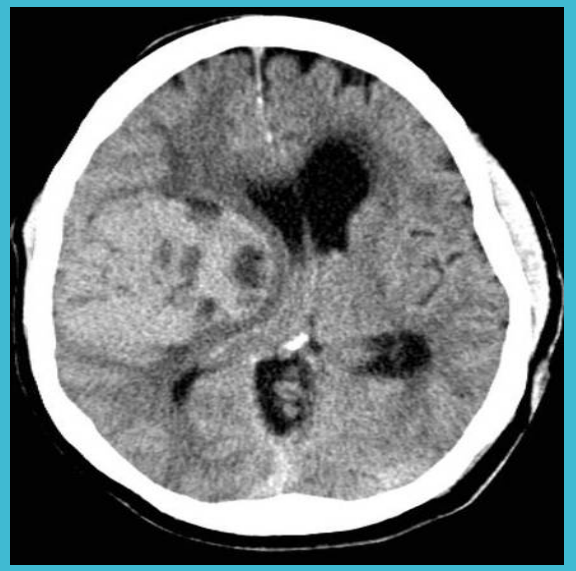
c) Specific symptoms and signs according to the site of the tumour (true localizing signs).

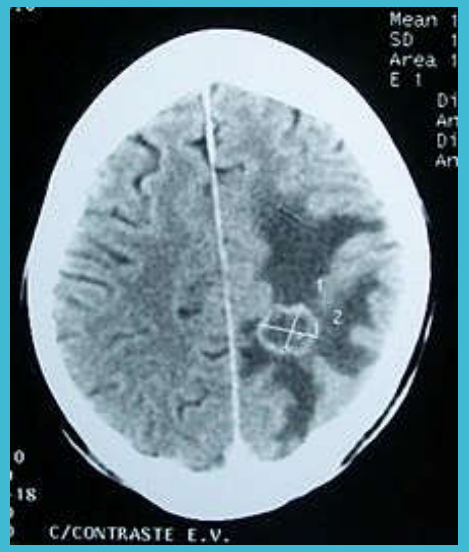
(1) General signs & symptoms of ↑ I.C.T.:

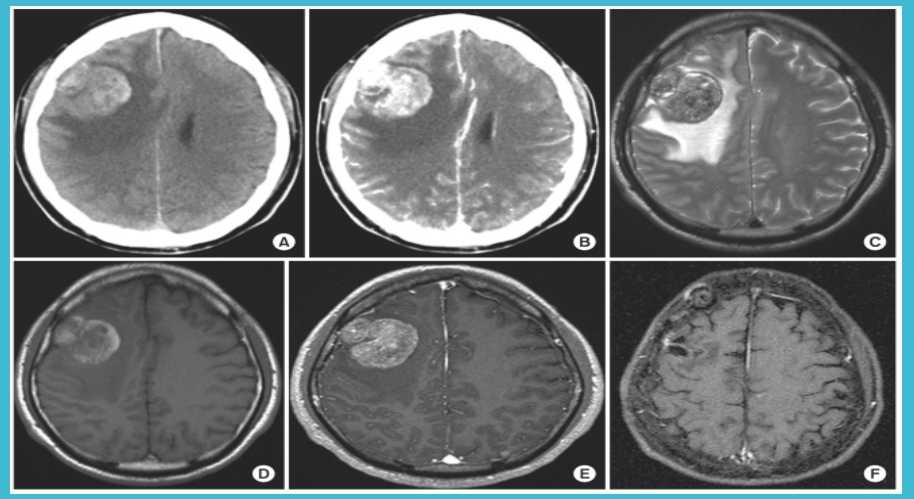
The increased I.C.T. is due to:

1. The tumour itself, which is a space-occupying lesion.
2. Obstruction of the venous return from the brain.
3. Obstruction of the C.S.F. drainage.
4. Hemorrhage into or degeneration of the tumour.





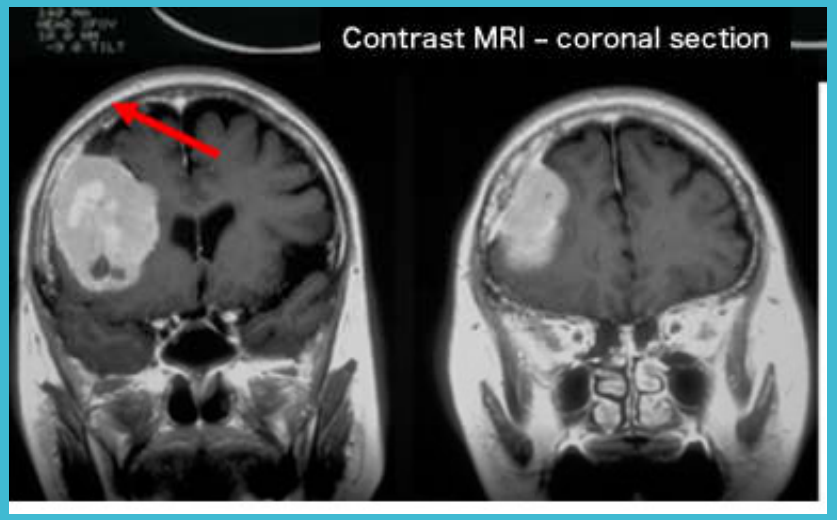


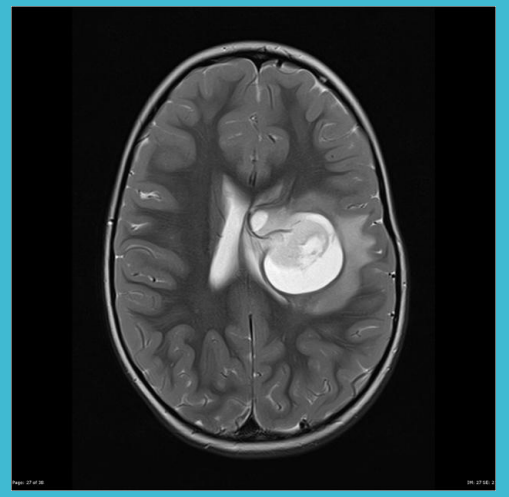


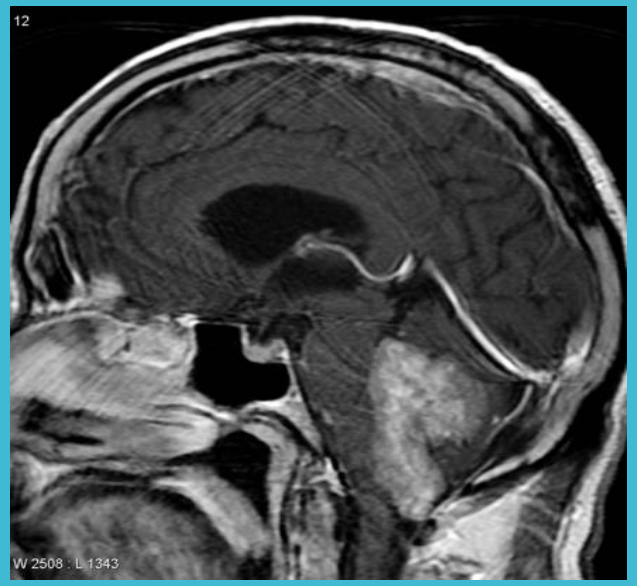
Slide 3 : **Headache**

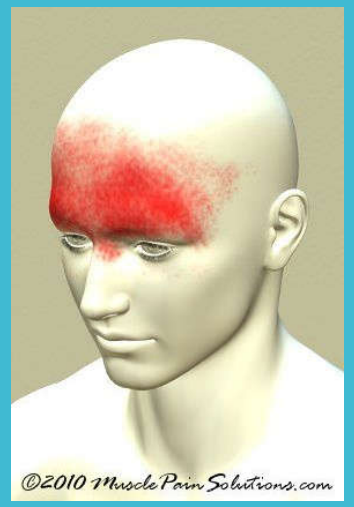
Headache:

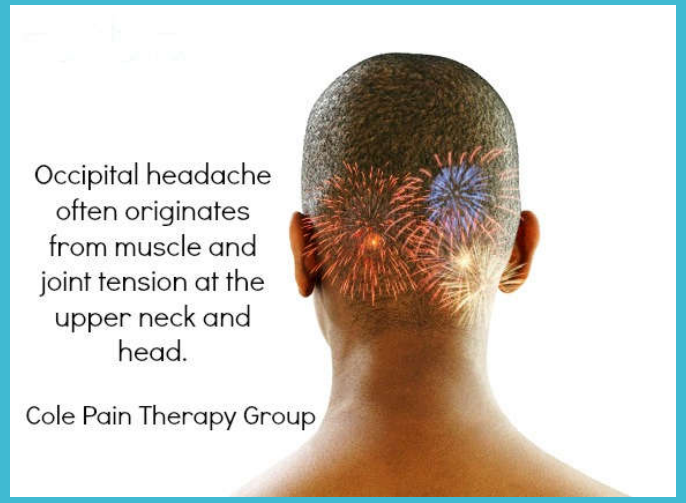
1. It is due to stretch of the meninges by the space occupying lesion.
2. It is dull aching, bursting in nature or throbbing.
3. Intermittent at first, more in the morning and is alleviated as the day passes, later become permanent.
4. It is exaggerated by conditions which increase the intracranial tension as coughing, straining, sneezing and stooping.
5. It has no significant value in the localization of the site of the tumour; however, generally, supratentorial tumours present with frontal headache, (which is of a late onset) while infra-tentorial tumours present with occipital headache (which is of an early onset and radiating to the neck),later become diffuse.







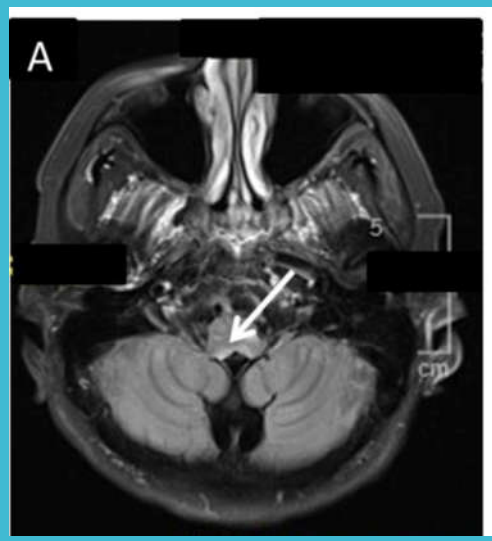


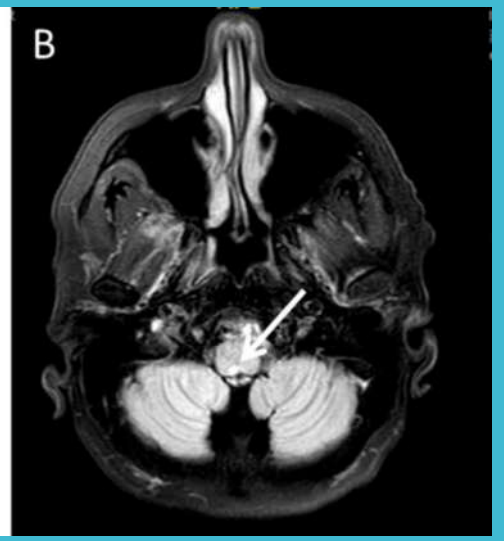


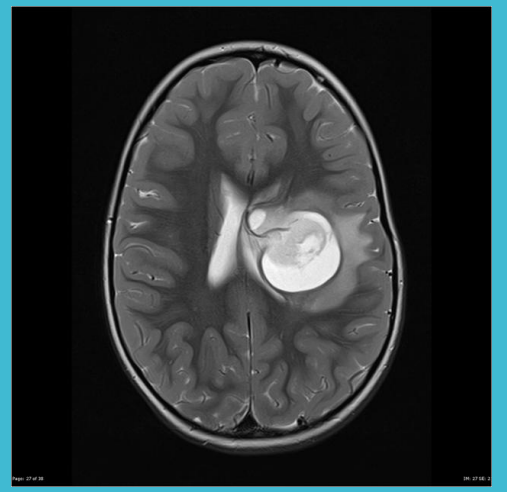
Slide 4 : **Vomiting**

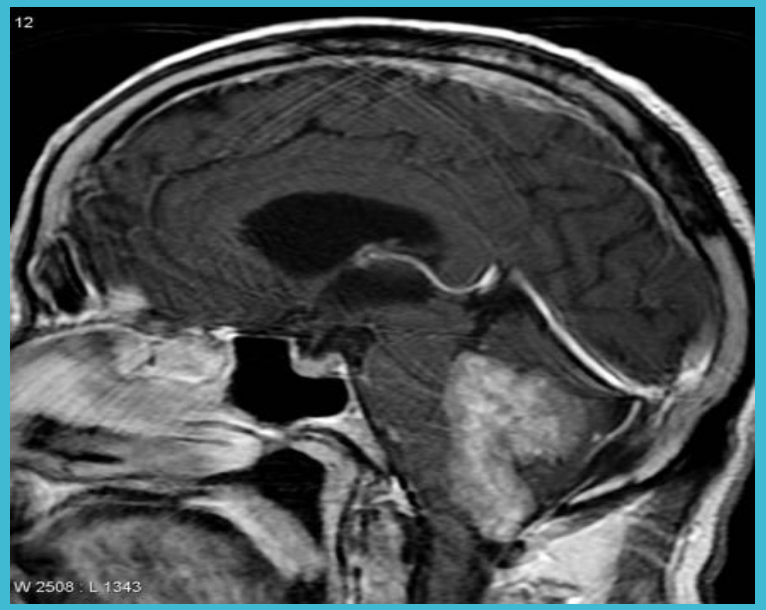
II. Vomiting :

1. It is due to stimulation of the vomiting centre in the medulla.
2. It is more frequent in the morning.
3. It is not related to meals, and is not preceded by nausea, projectile.
4. It usually accompanies the headache & may temporarily relieve it.
5. It is more frequent in infra than in supra-tentorial tumours.









Slide 5 : **Papilloedema**

III. Papilloedema:

1. This is a reliable sign of increased I.C.T.
2. The patient complains first of blurring of vision followed by gradual diminution of vision: failure of vision follows when post papilloedemic optic atrophy occurs.
3. The field of vision shows peripheral concentric contraction.
4. Fundus examination .: there is:

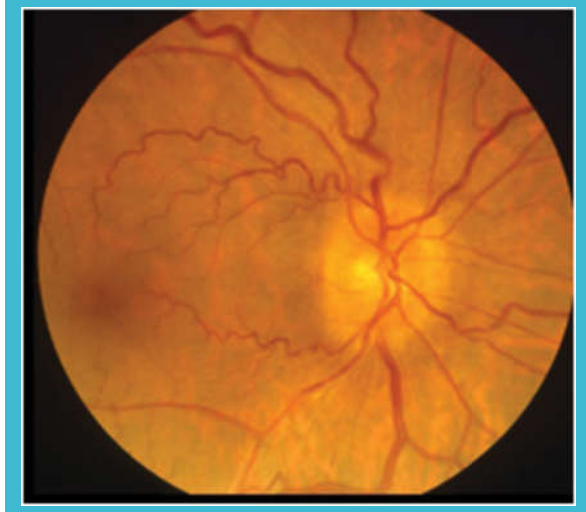
a. Congestion and tortuosity of the retinal veins.

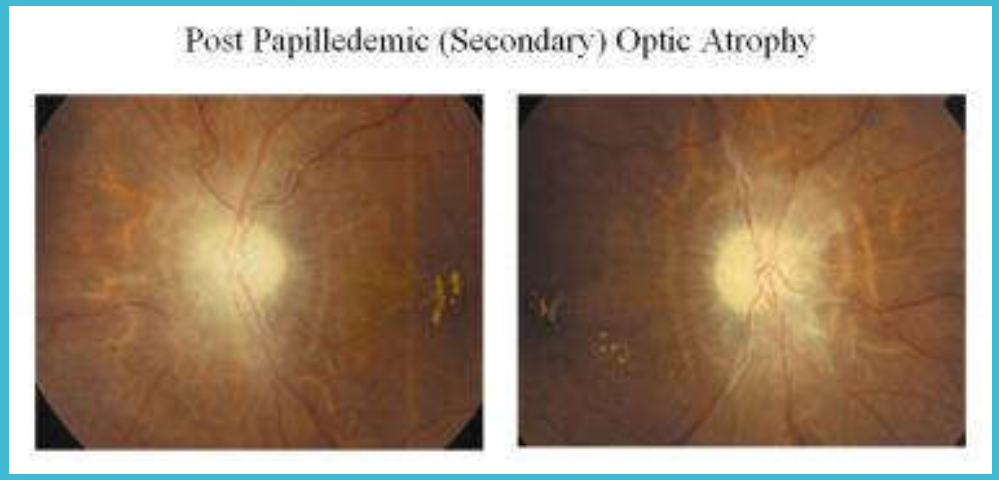
b. Haziness and blurring of the disc margins. c. Filling of the optic cup.

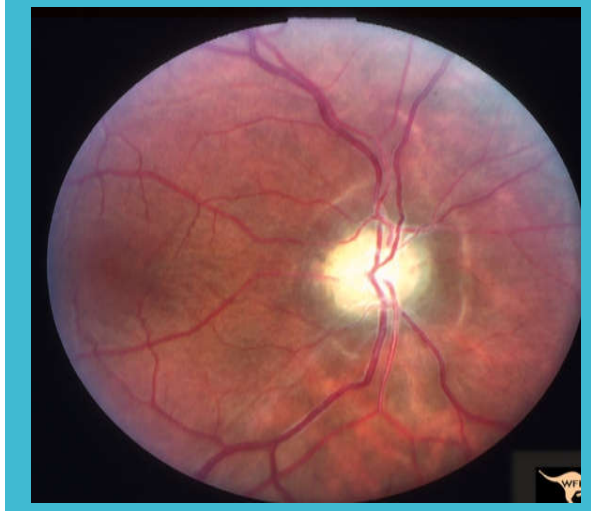
d. Thinning and attenuation of the retinal arteries.

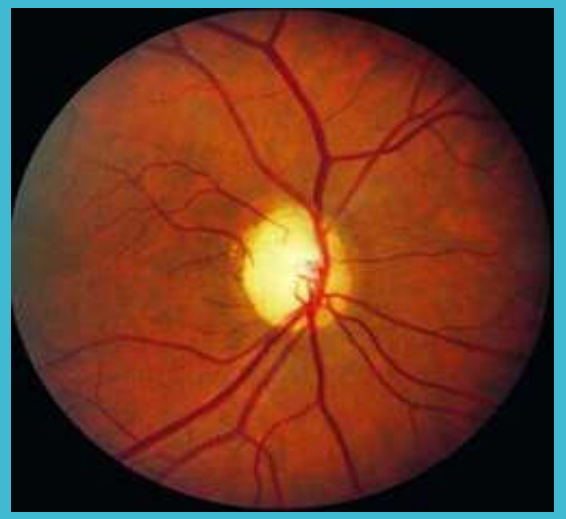
e. Retinal haemorrhages and exudates.

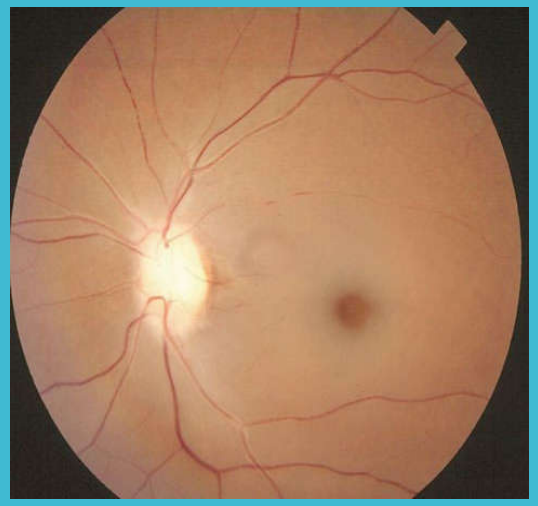
f. Post-papilloedemic optic atrophy may supervene.











Slide 6 : **False localising signs**

(2) False localising signs:

These are signs which may be present regardless of the site of the tumour & are due to increased I.C.T.:

Lateral ventricle dilatation:

- Mental confusion.

2. **3rd ventricle dilatation:**

- Bitemporal hemianopia (compression of optic chiasma).

-Hypopituitarism (compression of pituitary gland).

-Hypothalamic manifestations (compression of hypothalamus).

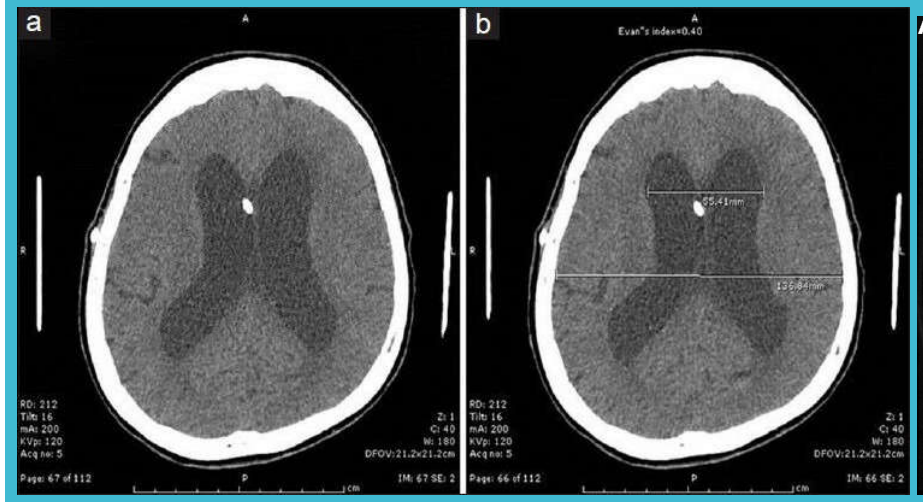
3. **4th ventricle dilatation:**

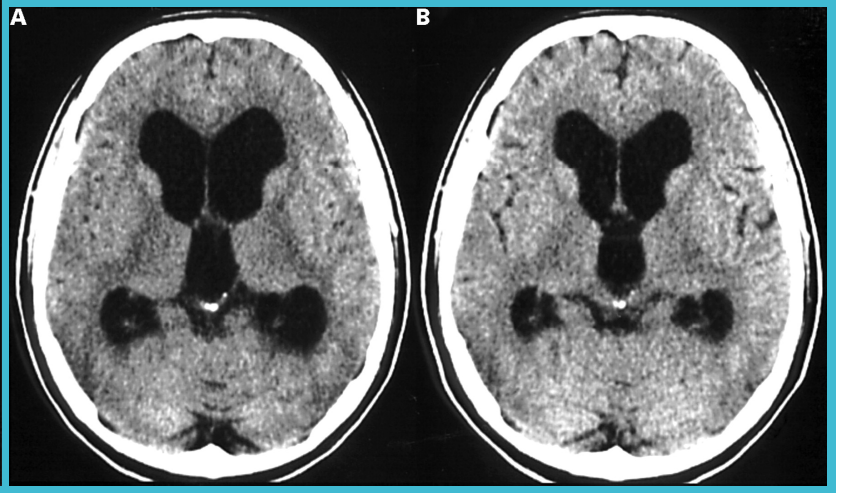
-Vomiting (irritation of vomiting centre).

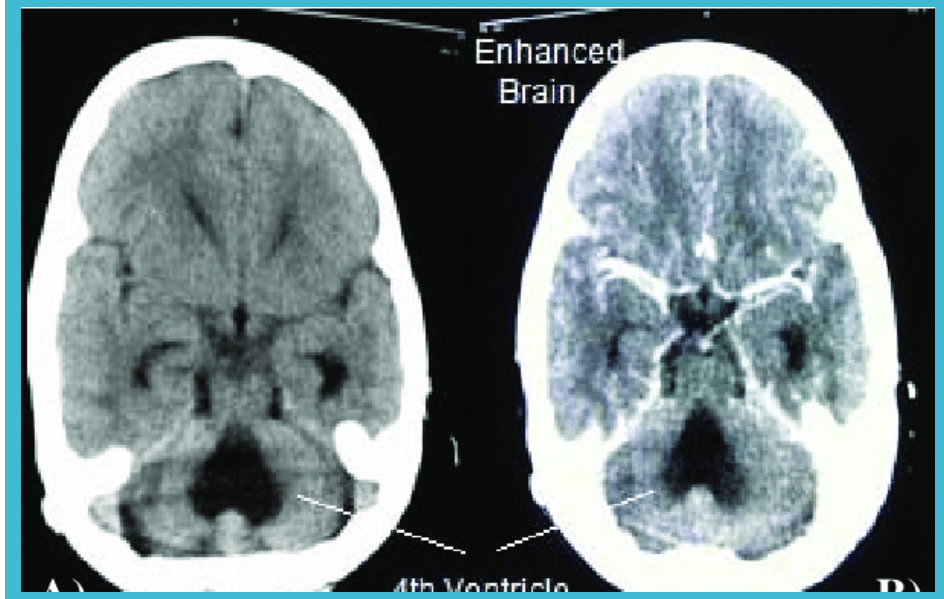
-Hypertension, bradycardia (irritation of vasomotor centre).

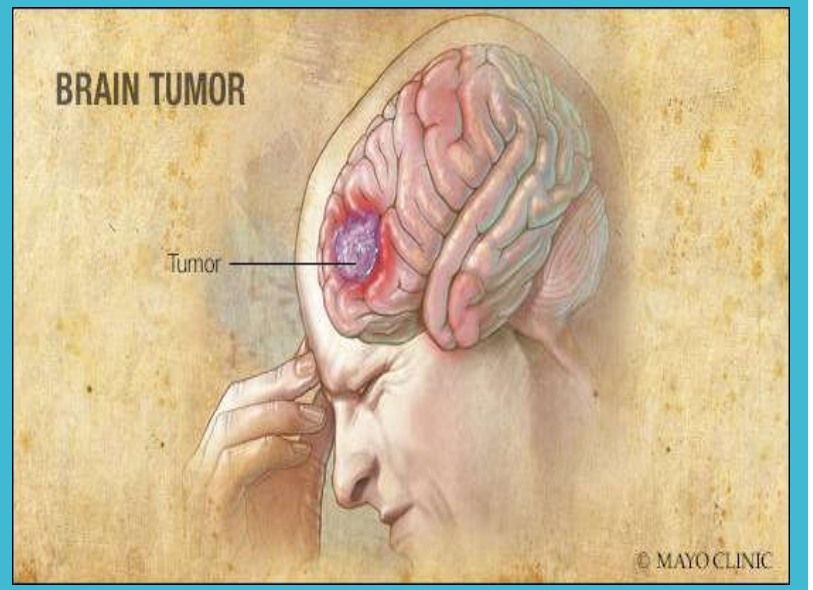
Cranial nerve palsies.

-Specially the 6th nerve as it has the longest intracranial pathway so, easy to be involved.









Slide 7 : **False localising signs**

Herniation syndromes:

(a) Tentorial (uncal) herniation:

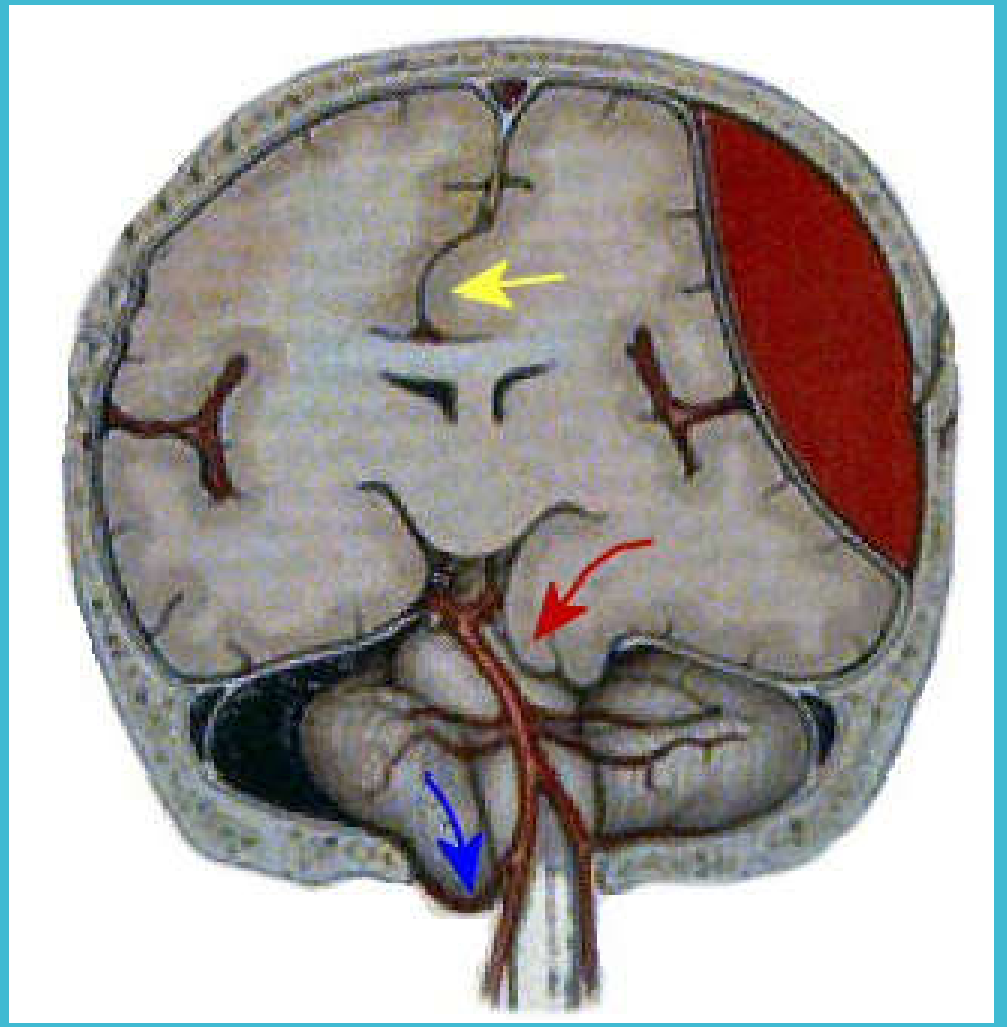
. -Supratentorial tumour leads to herniation of the uncus of temporal lobe into the tentorial hiatus resulting in:

* Compression of the reticular formation in the mid brain → impairment of consciousness.
* Compression of the 3rd nerve & its nucleus in the mid brain → dilated fixed pupil.

(b) Tonsillar herniation:

-Subtentorial tumour leads to herniation of the cerebellar tonsils into the foramen magnum resulting in:

* Compression of the medulla → respiratory irregularities & impairment of consciousness.
* Tonsillar impaction in the foramen magnum→ neck stiffness & head tilt.



Slide 8 : **True localizing signs**

(3) True localizing signs:
These signs depend on the site of the tumour.

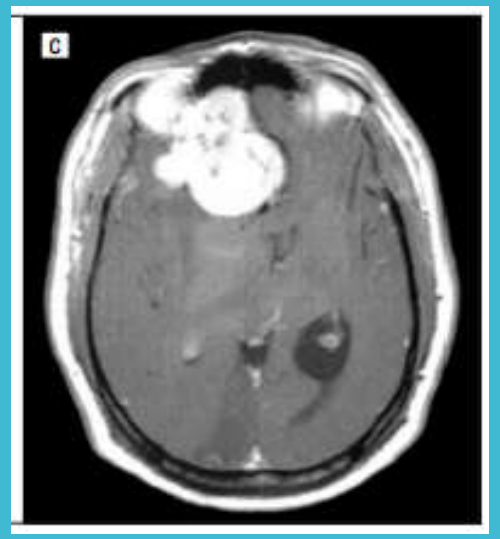
I) Frontal lobe tumours:

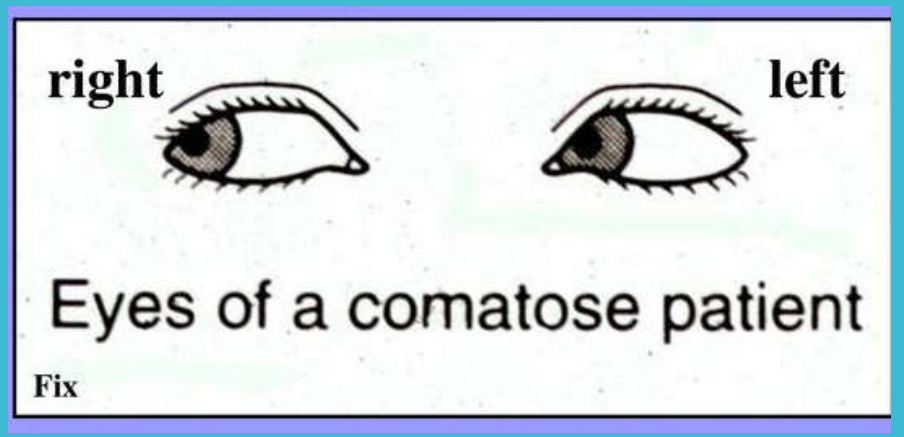
A. Destructive lesion:
one or more of the following:

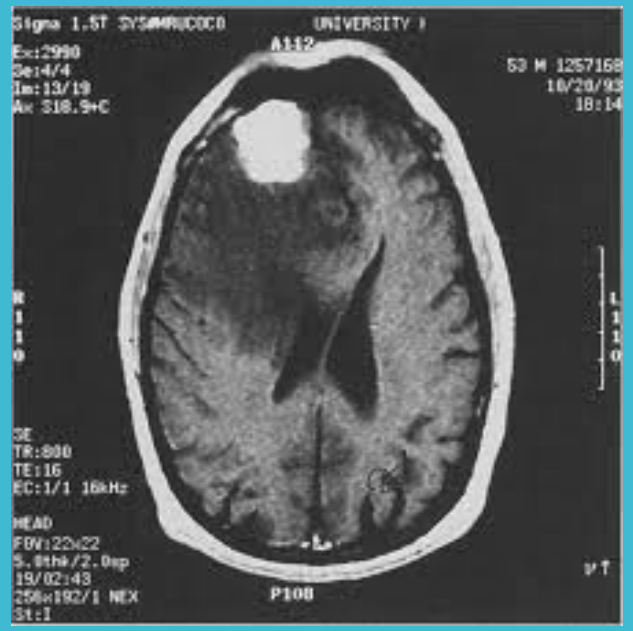
1.Mentality changes: with tumours of prefrontal areas
2. Progressive contralateral hemiplegia.
3. Motor aphasia and a graphia (if in the dominant hemisphere)
4. Paralysis of conjugate movements of the eyes, to the opposite side.
5. Forced grasp reflex.
6. Anosmia with tumours of inferior surface.

B. Irritative lesion:
Focal or Jacksonian contralateral convulsions.

N.B.: Tumours of the orbital surface of the frontal lobe near the optic nerves manifest by the **(Foster-Kennedy syndrome)** [ipsilateral primary optic atrophy & contralateral papillaedema].







Slide 9 : **Parietal, Temporal and Occipital lobe tumours**

II) Parietal lobe tumours:

A. Destructive lesions: one or more of the following:

1. Contralateral cortical sensory loss.
2. Lower quadrantic homonymous hemianopia.
3. Apraxia, alexia, jargon's aphasia (if in the dominant hemisphere).

B. Irritative lesion:

Focal or Jacksonian contralateral sensory fits.

III) Temporal lobe tumours:

A. Destructive lesion:

1. Auditory agnosia.
2. Mentality changes.
3. Upper quadrantic homonymous hemianopia.
4. Contralateral motor weakness(in deep lesions)

B. Irritative lesion:

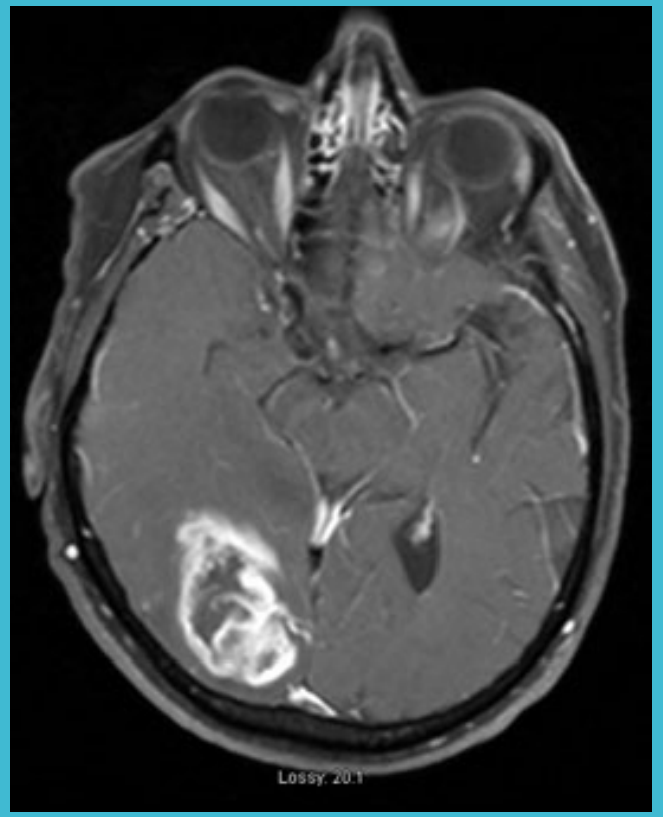
1. Uncinate fits.
2. Temporal lobe epilepsy.

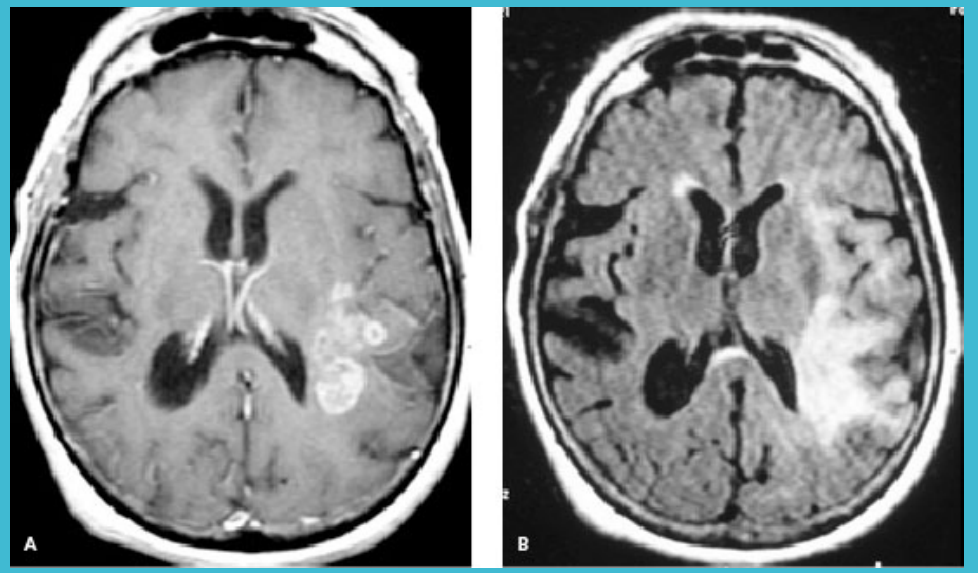
IV) Occipital lobe tumours:

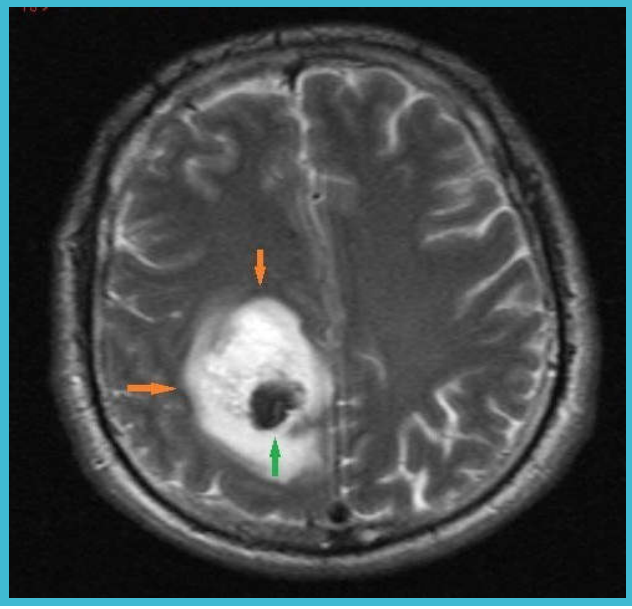
A. Destructive lesion:

1. Contralateral homonymous hemianopia.
2. Visual agnosia.

B. Irritative lesion: Unformed visual hallucinations.







Slide 10 : **Pituitary tumours**

V) Pituitary tumours: They may present with;

A. Hormonal Manifestations:

- Chromophobe adenoma → Hypopituitarism.
-Acidophil adenoma → Gigantism or acromegaly.
- Basophil adenoma → Cushing's syndrome.

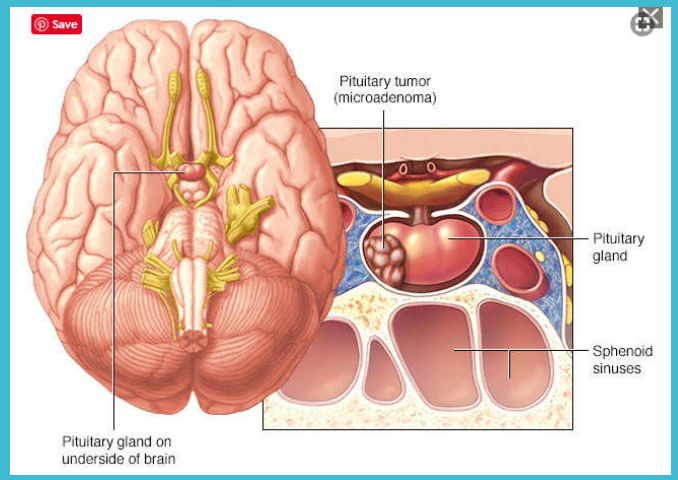
B. Neurological manifestations: 2ry to compression of neighboring structures.

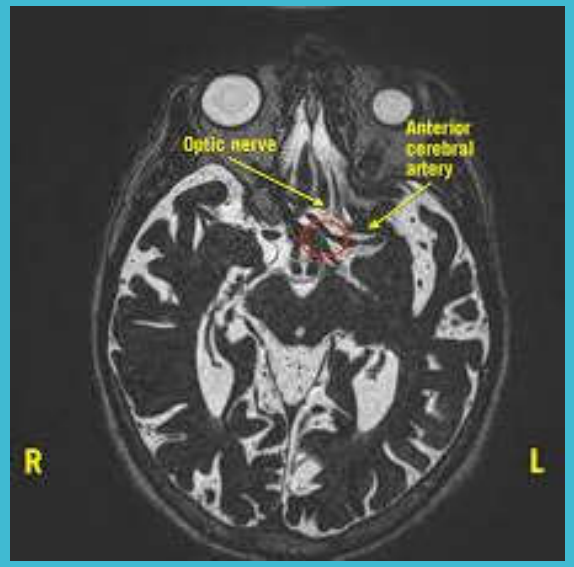
1. Anteriorly:

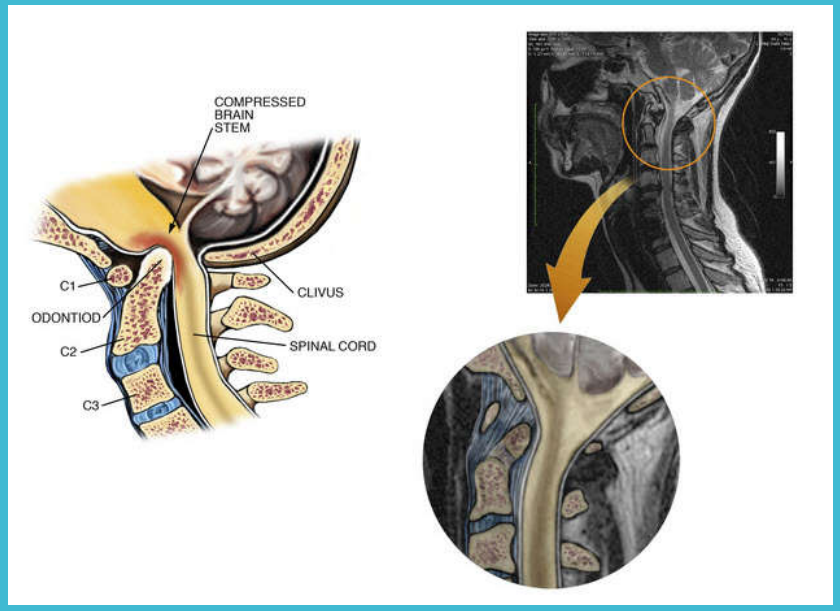
- Compression of the optic chiasma → bitemporal hemianopia.
- Compression of the optic nerve → optic atrophy.
- Compression of the olfactory tract → anosmia.

2. Posteriorly:

- Compression of the upper brain stem → bilateral pyramidal signs and ophthalmoplegia.







Slide 11 : **Pituitary tumours**

V) Pituitary tumours:

B. Neurological manifestations:

3. Laterally:

- Compression of the optic tract → homonymous hemianopia.
- Compression of the cavernous sinus → 3rd ,4th & 6th cranial nerve paralysis and loss of sensations over the area of the face supplied by the ophthalmic division of the 5th nerve.

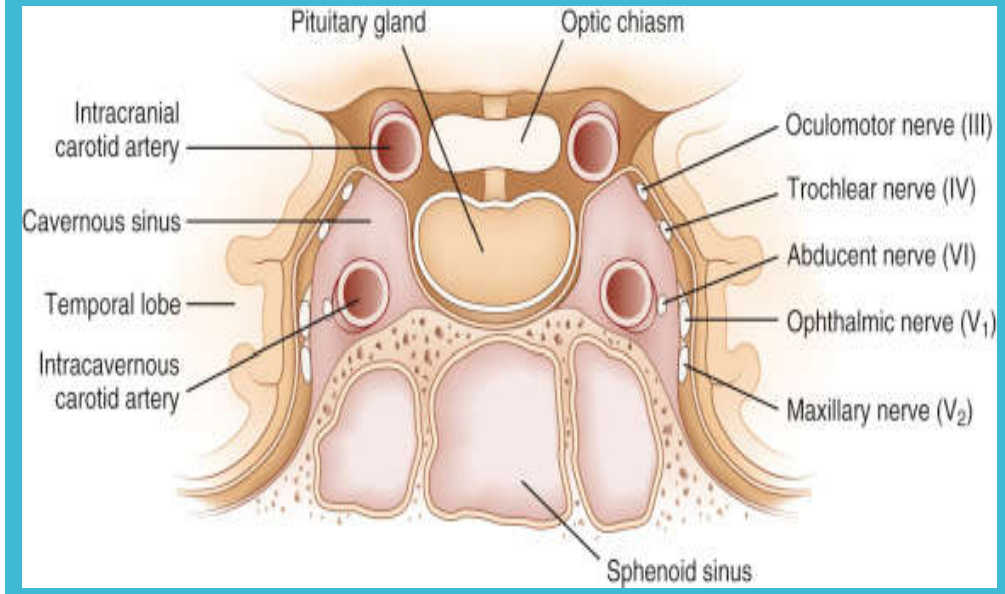
4. Superiorly:

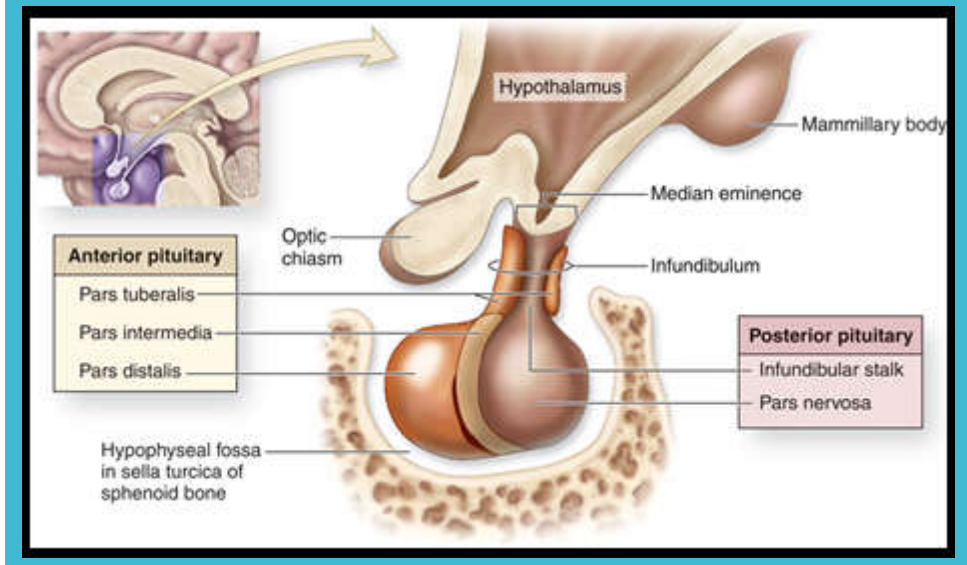
- Compression of the hypothalamus → hypothalamic manifestation e.g. Diabetes insipidus, hypersomnia, adiposity or autonomic epilepsy.

C. Headache:

Typically it passes through 3 phases:

- It starts bitemporal due to increased intrasellar pressure.
- Then it disappears due to rupture of the sella turcica.
- Lately it reappears & is generalised with the increased I.C.





Slide 12 : **Cerebello-pontine angle tumours**

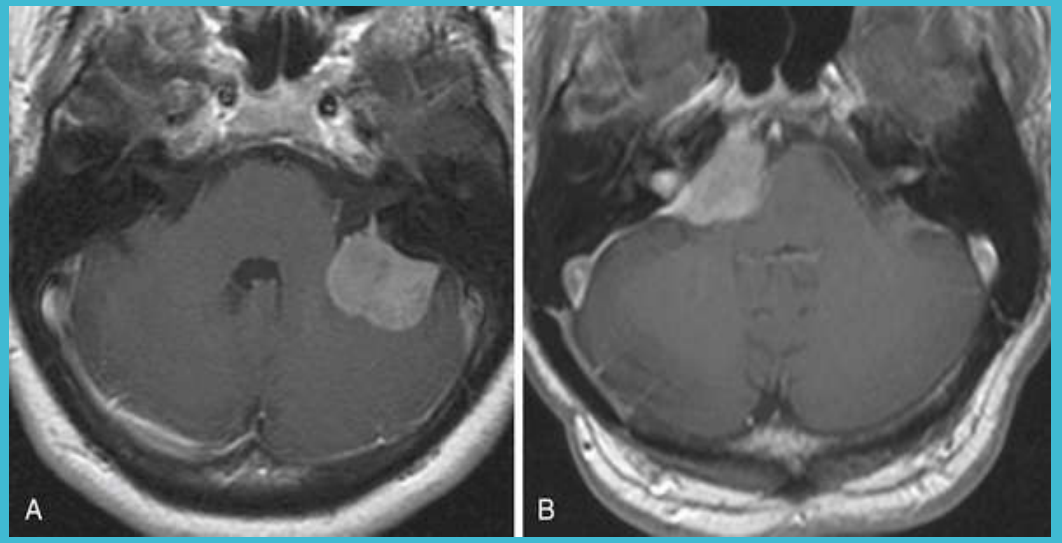
VI) Cerebello-pontine angle tumours: (C.P.A. tumour): They include:

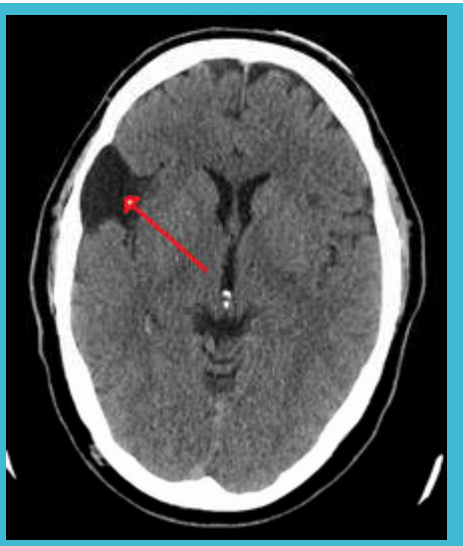
1. Neurofibroma (acoustic neuroma) of the 8th cranial nerve.
2. Less commonly: • Meningioma. • Cholesteatoma. • Arachnoid cyst.

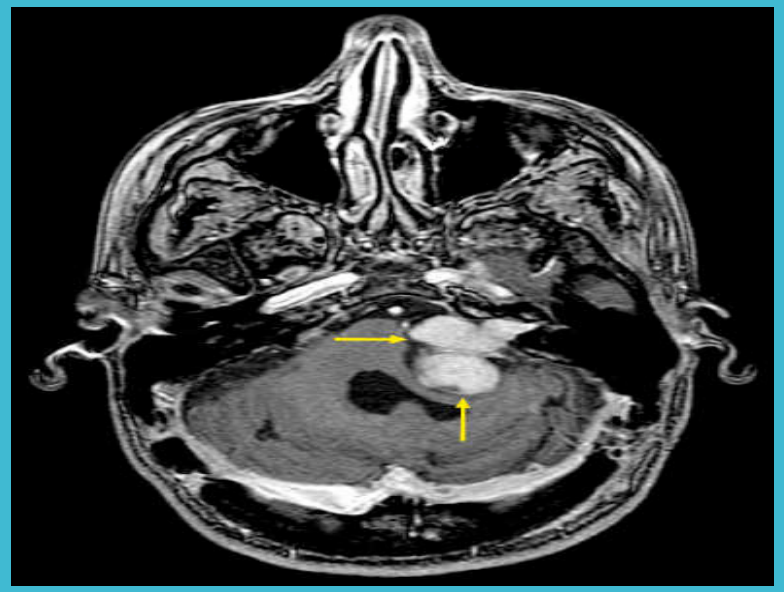
Clinical Picture of C.P.A. tumour:

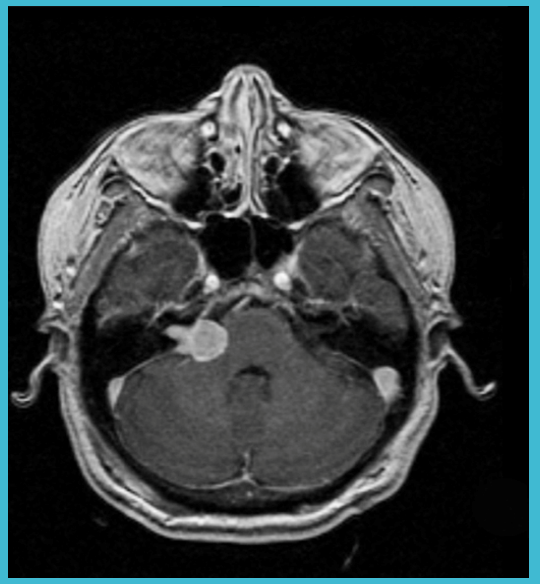
1. Ipsilateral cerebellar ataxia.
2. Ipsilateral affection of the 8th, 7th & 5th nerves running in the CPA → progressive deafness, facial palsy, facial pain & weakness of the muscles of mastication.
3. Contralateral hemiparesis (pyramidal compression in pons).

N.B.: The neurofibroma of the 8th nerve may be: - Solitary. associated with subcutaneous fibromas along peripheral nerves, cutaneous fibroma (mollusca fibrosa) & caf au lait patches in, **Von Recklinghausen's disease(neurofibromatosis type 1).**









Investigation of a case with brain tumour:

1) Proper history taking and clinical examination.

2) Examination of visual field.

3) Fundus examination for papilloedema.

4) Local examination of the skull for :

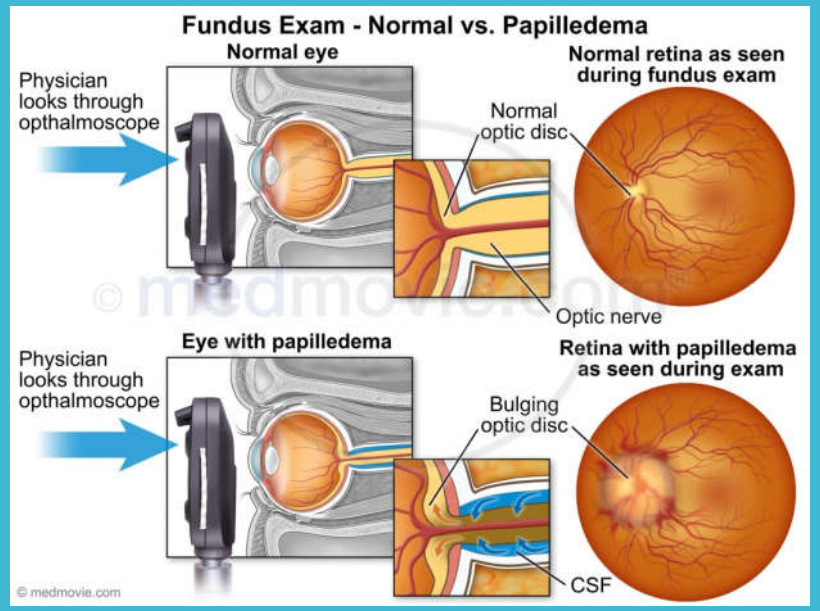
a) Enlargement.

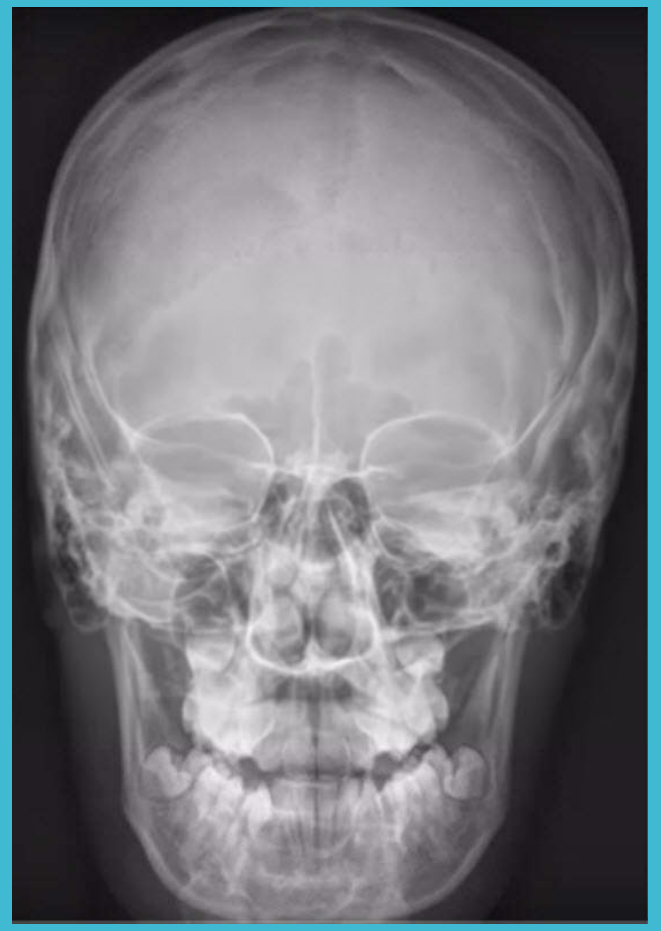
b) Dilated tortuous veins.

c) Bony bosses.

d) Angiomatous malformations.

e) McEwen's sign: cracked pot note on percussion.





Slide 13 : **Investigation of a case with brain tumour**

5) Plain x-ray of the skull: which, might show:

a) Features related to ↑ICT.

1- Separation of the cranial sutures.

2- Beaten-silver appearance or finger prints.

3- Sellar changes:

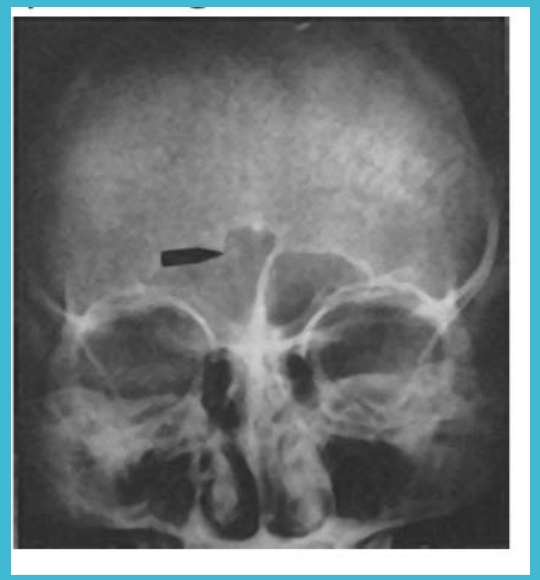
- Enlargement of the sella turcica.
- Rarifaction and destruction of the dorsum sellae and the posterior clinoids.
- Encroachment on the sphenoid air-sinus

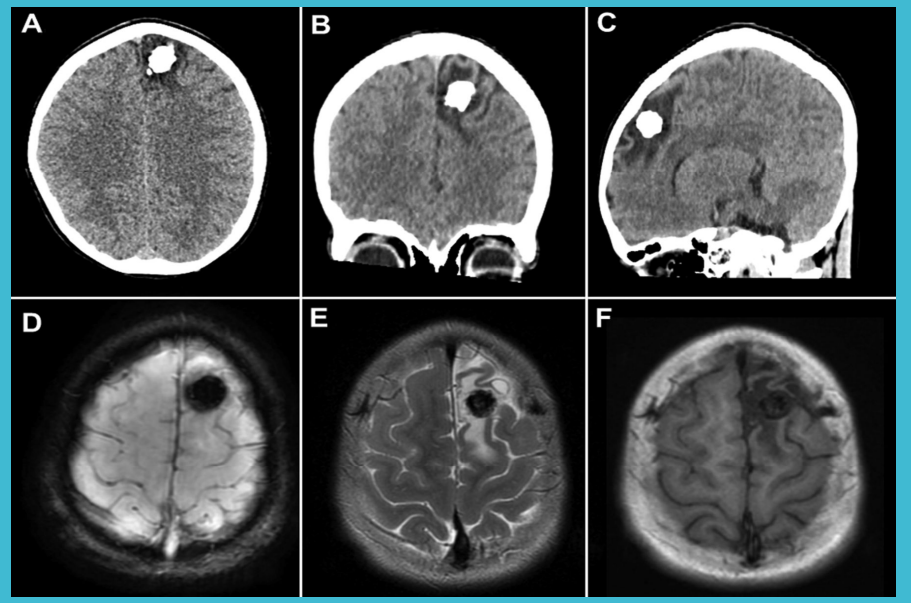
b) Lateralising signs denoting the side of the tumour: Shift of calcified pineal body or falx cerebi.

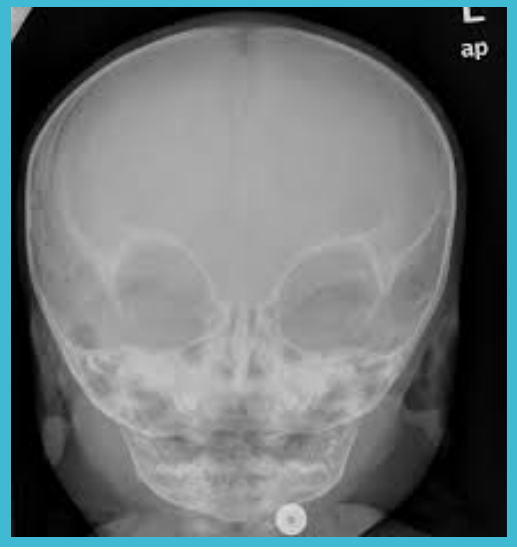
c) Signs denoting the site of the tumour:

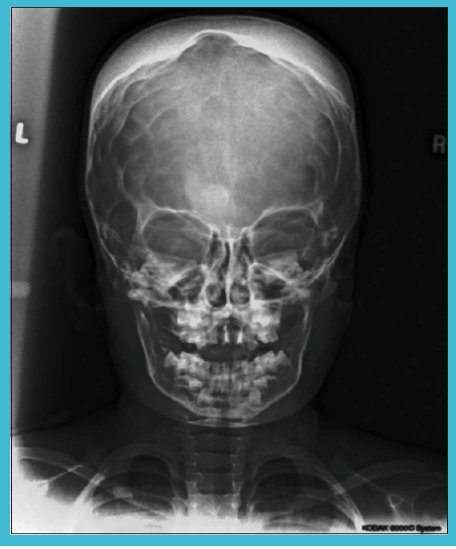
1.Localised calcification.

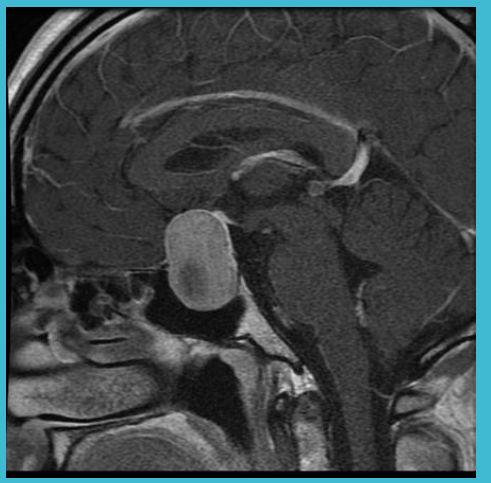
2.Localised erosion and destruction of the skull bones











Slide 14: **C.T. scan and M.R.I.**

6) C.T. scan: (computerised tomography of the brain): It shows:

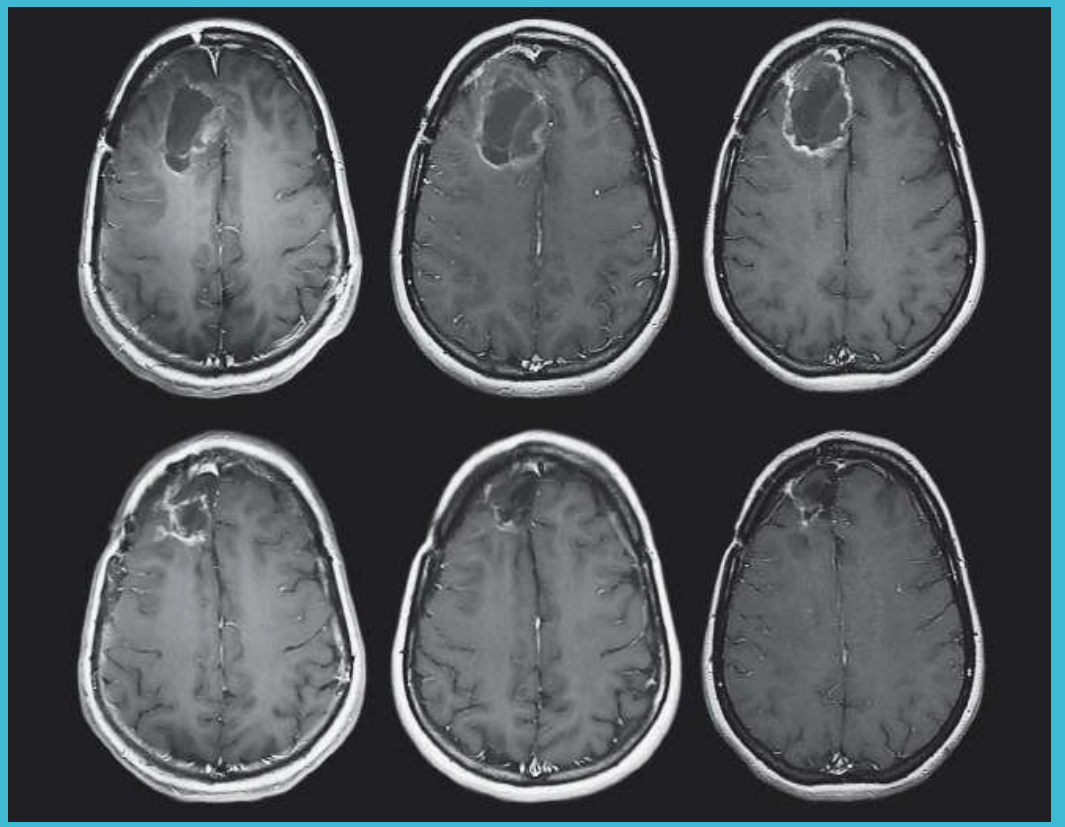
A. The site and size of the tumour, its density and any cystic degeneration or calcification.

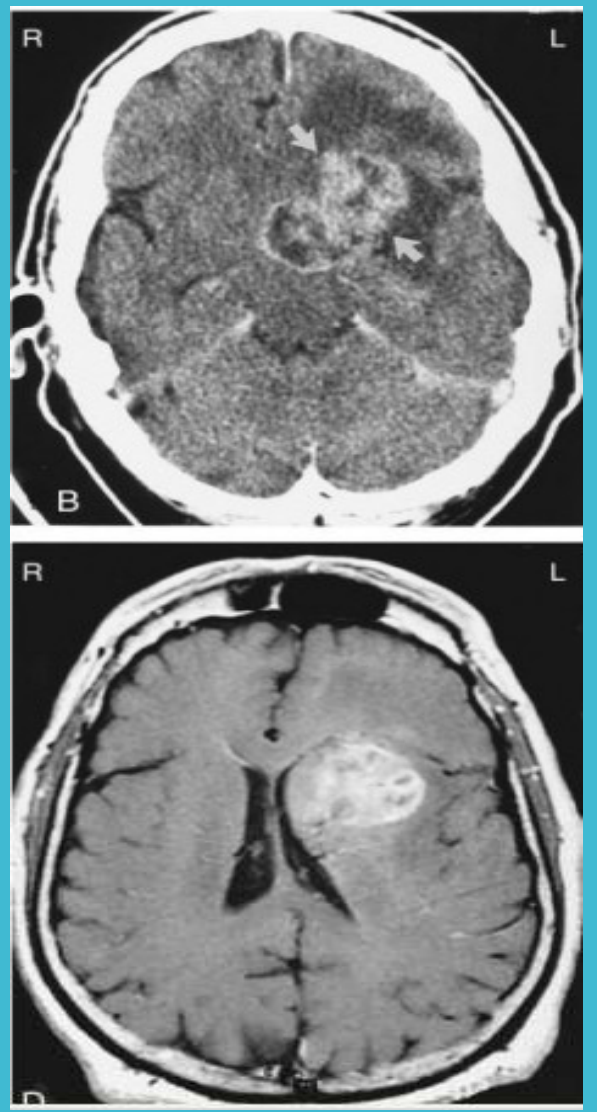
B. The size of the cerebral ventricles.

C. Any midline shift.

7) M.R.I.: (Magnetic resonance imaging):

This is one the most recent methods of investigation. Tumours can be diagnosed not only anatomically but also pathologically.

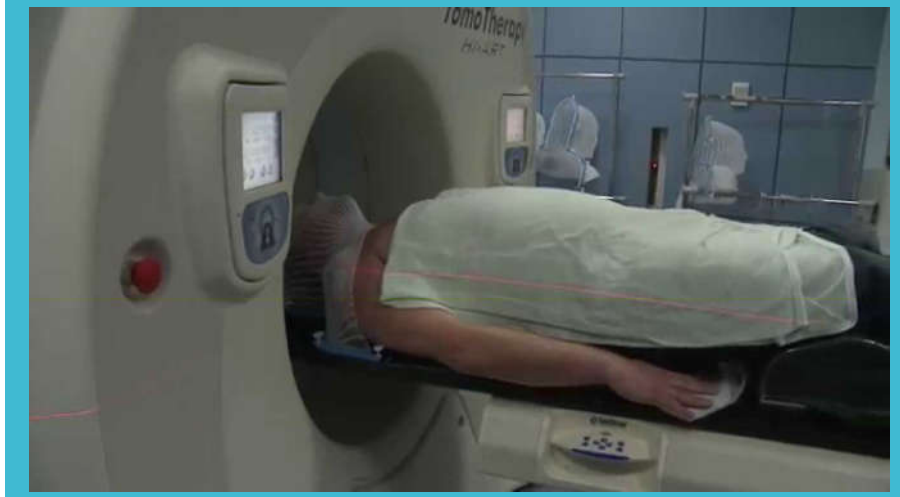


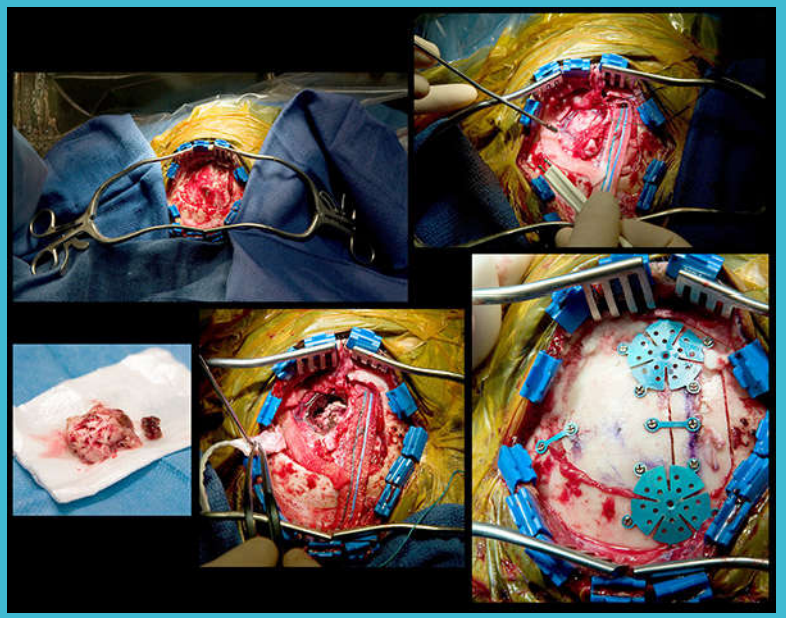


Slide 15: **Treatment**

Treatment:

1.Symptomatic : For increased I.C.T., fits.
2.Surgical : if accessible.
3.Palliative : Radiotherapy, chemotherapy if not accessible.





summary

In this learning object, we presented classification of brain tumours that include congenital and pituitary tumours, then we presented general signs of I.C.T, and we presented false localizing signs and true localizing signs.
We discussed also different ways of investigation of cases of brain tumours like x-ray of the skull, C.T. scan, and M.R.I scan.