Imaging in Neuro-ophthalmology
(Clinician Concern)

Maher Assem, FRCS-Ed
Consultant Oculoplastic Surgeon
Egypt

* How to read ...?

* Neuro-ophthalmology
  Interventional Radiology

* Orbit
Fig. 10 - Internal surface of the base of the skull.

Fig. 207 - Lateral surface of the left half of the brain (semi-diagrammatic) to show the main sulci and gyri, and the division of the superolateral surface into lobes by means of the central sulcus and two arbitrary lines shown in black and white.
• What Ophthalmologist should know about Neuro-Imaging
• When to order CT
• When to order MRI
• Combined PET/CT
• The role of interventional Neuroradiologists
CT Scan

Differential Attenuation of X ray by tissues
- denser tissues attenuate more x rays -
MRI

Measurement of relaxation properties of protons after excitation with radiofrequency energy
1 - CT or MRI

T1- WI  T2- WI
Contrast
Without contrast

[CT scan image without contrast]

Without contrast

[CT scan image with contrast]
Without contrast
Without contrast
Without contrast
Contrast

Contrast
Contrast

4 - C.T. --- 1st Choice

- Orbital Trauma
- F.B.
- Ca -- TED (decompression)
- Osseous → Cartilaginous → Fibro-osseous lesions OR Suspicion of bony erosion
- I.C. aneurysm clips
- Cardiac Pacemakers – Defibrillators
- Claustrophobia
5 - **MRI. --- 1st Choice**

- Acute proptosis
- *IO tumor with EO extension*
- Wood foreign body
- *ON Sheath complex lesion*
- Contraindications to CT
### Nomenclature

<table>
<thead>
<tr>
<th></th>
<th>Bright</th>
<th>Dark</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT scan</td>
<td>Hyper-dense</td>
<td>Hypo-dense</td>
</tr>
<tr>
<td>MRI</td>
<td>Hyper-intense</td>
<td>Hypo-intense</td>
</tr>
<tr>
<td>US</td>
<td>Ecchogenic</td>
<td>Eccholucent</td>
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</tbody>
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### Brain
2 - Sections

Axial
Coronal

Sagittal

- Optic chiasm
- Hypothalamus
- Pituitary stalk
- Sphenoid sinus
- Pituitary gland
- Posterior pituitary
Visual Field Defects with important localizing Value
Acromegaly
Pituitary macro-adenoma > 1 cm
Craniopharyngioma
Sphenoidal Ridge meningioma
Level/Visual Field Defects with important localizing Value

Without contrast
Without Contrast

Intermittent Cranial Nerves Affection

- MS
- Aneurysm

MRI (T2 WI)  
MRA
HYDROCEPHALUS
Shunt

Periventricular Plaques, T2 WI, MS
Down Beat Nystagmus

Arnold Chiari Malformation
**Down Beat Nystagmus**

![Image of Down Beat Nystagmus](image_url)

**Convergence Retraction Nystagmus**

![Image of Convergence Retraction Nystagmus](image_url)
Posterior Fossa Lesions – Hemangioblastoma Cerebellum

**Nystagmus with Localizing Value**

- **See Saw Nyst.** *(Chiasmal lesions, Parasellar lesions)*
- **Convergence Retraction Nystagmus** *(Pinealomas)*
- **Down beat Nystagmus** *(Cervico Medullary junction)*
- **Up beat Nystagmus** *(Ponto-medullary junction, post fossa lesions)*
Combined PET/CT

- Morphologic & Metabolic Information in single Examination
- **PET tracers**
  * F-18-Fluro-2-deoxyglucose (FDG)
  - Uptake in Tumours & Inflammation (SUVmax)
- Selective PET tracers
  * Ga-68-DOTA-TATE (agonist of SSTR meningeomas – Neuroendocrine tumours)
  * F-18-Fluoroethylcholine (FEC) CA. prostate mets.
Combined PET/CT
Combined PET/CT

PET/CT-monitoring of hepatic metastases

PET/CT before therapy
$SUV_{max} = 11.4$

3 months after radioembolization
$SUV_{max} = 5.4$
Ch Melanoma 1y after Enucleation & silicon ball implantation.

Interventional Radiology
High Flow AVM
Cercoid Aneurysm
Mixed Flow ( AV Fistula )
Rt side Head trauma
Lt side CCF

Bilateral CCF
CTA  Bilateral CCF

Lt CCF with 6th n palsy
ICA. Balloon
Before Balloon  

After Balloon

2 Balloons in Lt. ICA.
Pre

Coil insertion

Post

Poly Vinyl Alcohol (particles)
Conclusion