

Neurological Disorder From History to Diagnosis

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Outline

- What is neurology?
- What is a neurologist?
- Elements of neurological diagnosis
 - History
 - *Pathogenic* differential diagnosis
 - Examination (demonstration)
 - *Clinical* differential diagnosis
 - Laboratory tests
 - Final diagnosis

What is Neurology?

- Neuron (*Gk*) – *Nerve*

- Nerve *cell*

- Neurology

“Study and knowledge of the structure and function of the nervous system and its disorders”

- *Central Nervous System (CNS)*
- *Peripheral Nervous System (PNS)*
- *Autonomic nervous system (ANS)*

- Clinical neurosciences

- Basic neurosciences

Nervous system specialists

- Neurologist
 - Diagnostician. Clinical skills, investigations. Drug treatments.
- Neurosurgeon
 - Surgical treatment of neurological disease. Open and stereotactic procedures
- Neuroradiologist
 - Neuroimaging. Interventional neuroradiology
- Neurophysiologist
 - EEG, NCV/EMG, evoked potentials
- Neuropathologist
 - Biopsy analysis, autopsy
- *Psychiatrist*
 - *Mental illness ('organic' and 'functional')*

What's in a name?

- **'DOCTOR'** is a courtesy title used by a person who has received the degrees of Bachelor of Medicine and Bachelor of Surgery in the UK. Some dentists also now describe themselves as 'doctor'.
- **DOCTOR** is a title conferred by a University on a person achieving a doctoral degree. Only a small proportion of UK 'doctors' achieve a doctorate (MD, PhD etc)
- **A SPECIALIST** is a doctor who has completed training and achieved accreditation from a Royal College in a clinical discipline. Entry on GMC register.
- **A CONSULTANT** is a 'doctor' (usually a doctor) appointed to a consultant post in the NHS.
- **'MR' (OR MISS/MS)** denotes a *Fellow of the Royal College of Surgeons*. **Physician Consultants and Specialists are 'Dr'**.
- *Therefore*
 - Most 'doctors' are not doctors
 - Most 'doctors' are not specialists
 - Most specialists are not Consultants
 - Most Consultants are not 'Mr'
 - Most 'Mr's are neither specialists or Consultants

Why are patients referred to a Neurologist?

- Most doctors actually have little knowledge of disorders of the nervous system or how to conduct and in particular, to interpret, a neurological examination
- Many patients complain of symptoms which are difficult to understand. These often have a 'neurological' basis, even if there is no evidence of 'pathology' (i.e. the symptoms have a pathophysiological, or psychological basis)
- Patients with such symptoms are often referred to other specialists eg orthopaedics (back, neck problems), ENT (headaches) etc. Diagnoses often incorrect and treatments inappropriate
- 'Consumer demands'

NEUROLOGY: The armchair intellectual

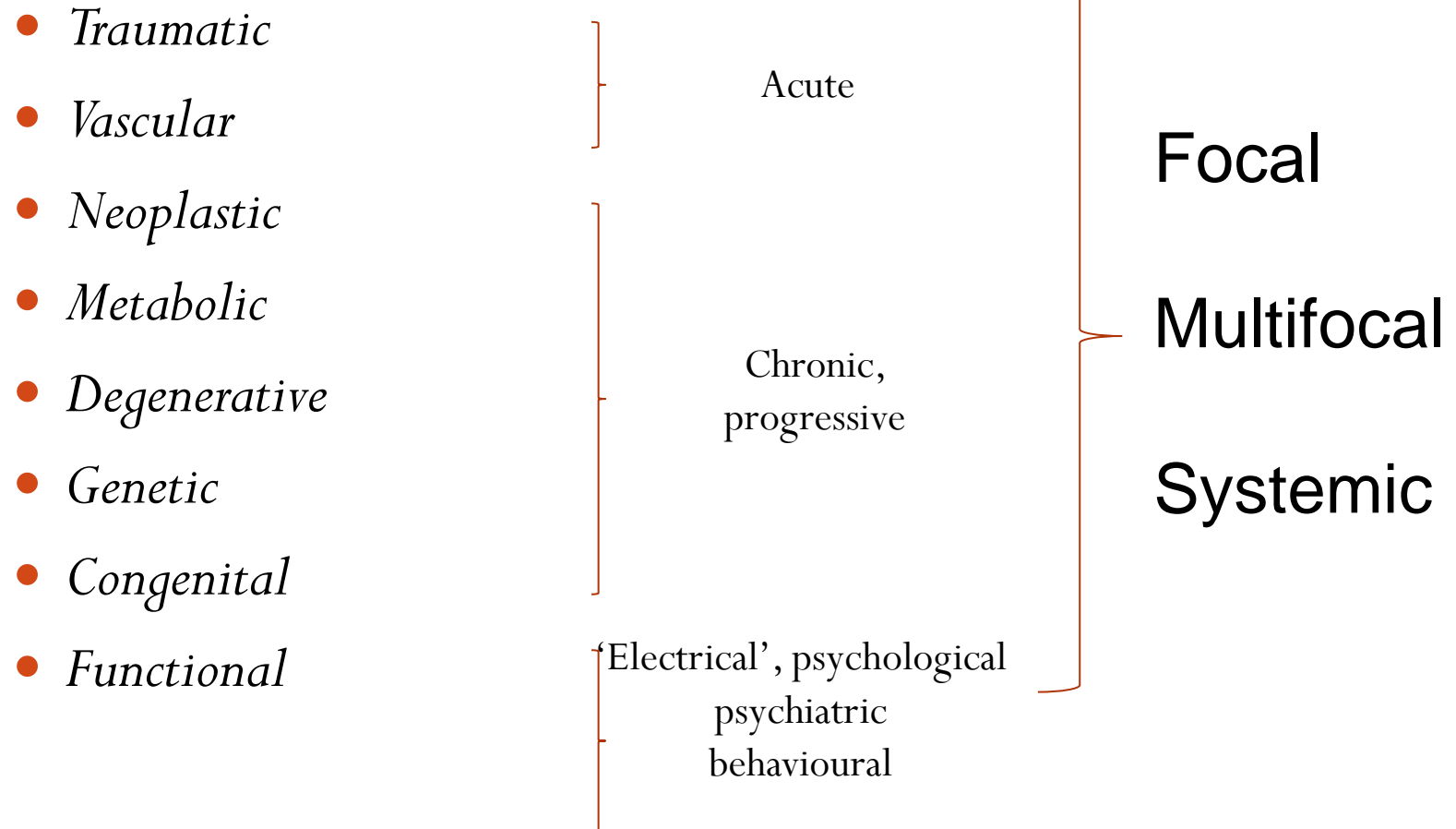


The neurological history

- Presenting complaint
 - Headache, blackouts, dizziness, weakness, sensory symptoms, memory difficulties *etc etc etc*
- Evolution of symptoms
 - Acute, subacute, chronic
 - Episodic, persistent
- Systematic review
 - Additional neurological symptoms. ?Focal, multifocal or systemic disorder
- Previous medical history
 - Earlier neurological symptoms, including symptoms seemingly unconnected
- Family history
 - Many neurological disorders have a genetic basis
- Social history
 - Consequences for job, family, driving, hobbies, sport, recreation
- Smoking, alcohol
- Drug history

Pathogenic Differential Diagnosis

The History tells you 'what it is'



Case 1

- 34 year old woman, c/o 1 yr headache. “Never before, all day every day, sometimes gets much worse”
- No response to pain killers.
- Came on after whiplash injury in RTA
- No other symptoms
- Episodes of unexplained abdominal pain and vomiting in childhood. ‘Grumbling appendix’
- “Mother had bad headaches”
- Three children under 6 yrs. Husband out of work
- Smoking 10/day. More now. No alcohol
- Up to 8 Co-dydramol per day

Case 2

- 48 year old woman c/o 1 year “Headache when I cough, bend over, strain. Can go on for 10 minutes”.
- Came on out of the blue but “always had headaches on and off, for years”.
- No other symptoms
- Father and grandmother “always had bad heads”
- Non-smoker but drinks alcohol moderately. No effect on headache
- Tried painkillers “but nothing works”. Not used now.

Pathogenic diagnosis

- Case 1

- Persistent, chronic process
- Unexplained abdominal pain as a child
- Family history
- Copious use of painkillers
- Focal

Traumatic

Vascular

Neoplastic

Metabolic

Degenerative

Genetic

Congenital

Functional

- Case 2

- Chronic process but new, acute symptoms
- New symptom provoked by activity
- Family history
- Focal

Next step – Examination!

Neurological Examination

- COGNITIVE FUNCTION AND LANGUAGE

- CRANIAL NERVES

I – Olfactory

II – Optic

Pupils

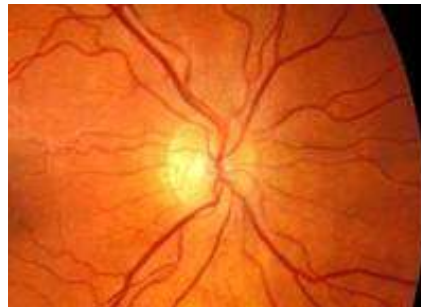
Fundi

Visual acuity

Visual fields

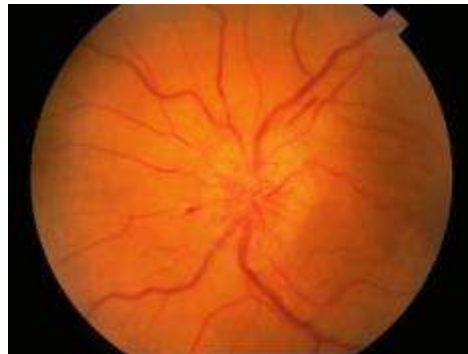


Left Horner's syndrome

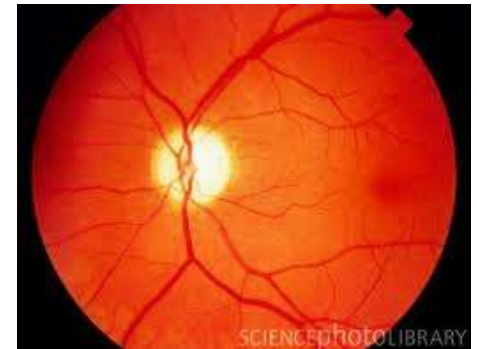


Normal fundus

Papilloedema



Optic atrophy



Neurological Examination

• CRANIAL NERVES

- III – Oculomotor
- IV – Trochlear
- VI Abducens



Left 3rd nerve palsy



Right 4th nerve palsy

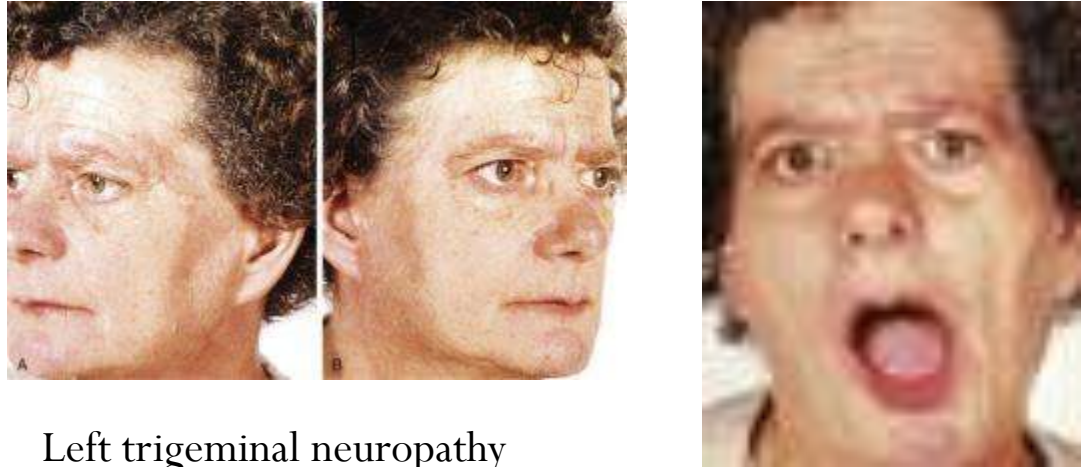


Left 6th nerve palsy

Neurological Examination

CRANIAL NERVES

- V – Trigeminal
 - Mastication
 - Facial sensation



Left trigeminal neuropathy

- VII – Facial motor



Left Bell's palsy

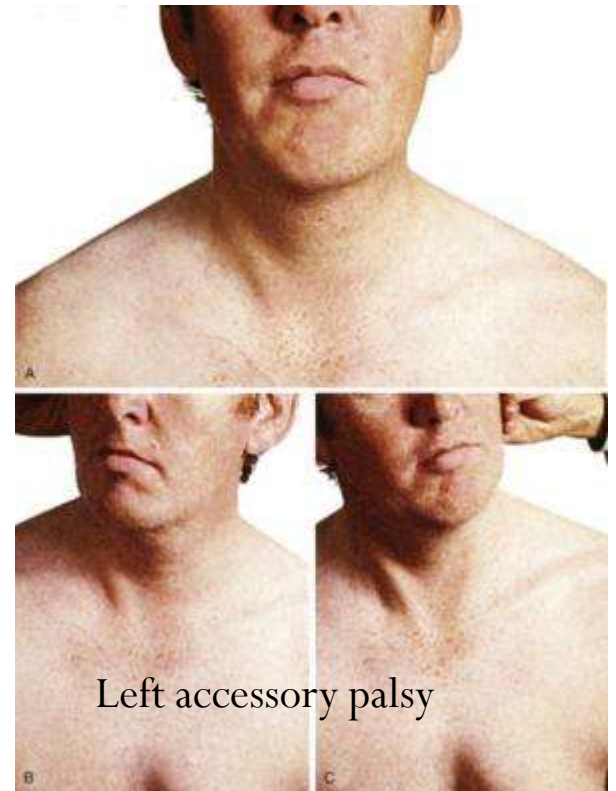
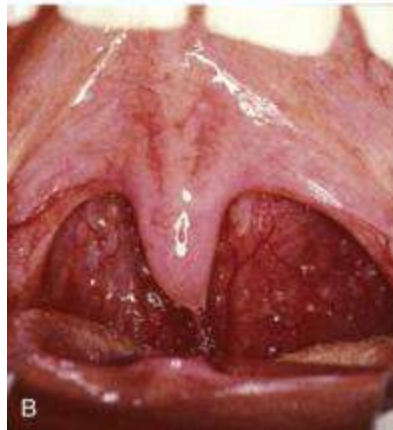
Neurological Examination

CRANIAL NERVES

- VIII – Auditory
 - Cochlear
 - Vestibular
- IX - Glossopharyngeal
 - Motor
 - Autonomic
 - Sensory
- X - Vagus
 - Motor
 - Autonomic
- XI – Accessory
- XII - Hypoglossal



Left palatal palsy



Left accessory palsy



Left hypoglossal palsy

Neurological Examination

UPPER EXTREMITIES

- Neck movement and strength
- Motor function
 - Muscle bulk
 - Tone
 - Power
 - Reflexes
 - Co-ordination
- Sensory examination

AXIAL EXAMINATION

- Shoulder girdle muscles
- Curvature
- Rise from supine
- Abdominal reflexes

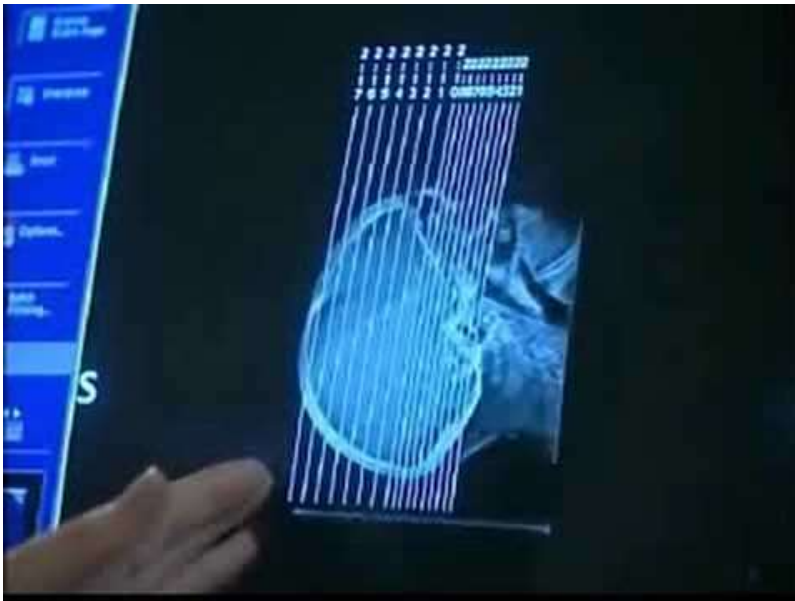
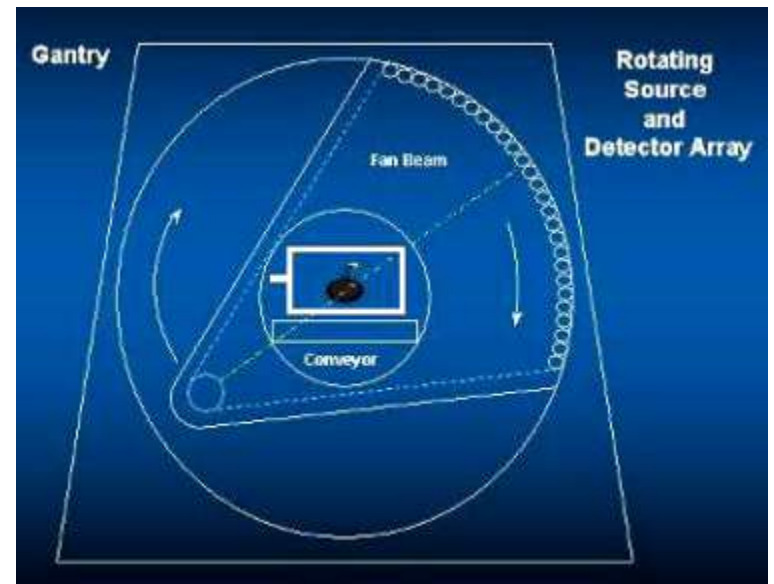
LOWER EXTREMITIES

- Motor function
 - Muscle bulk
 - Tone
 - Power
 - Reflexes
 - Co-ordination
- Sensory examination
- Romberg, Unterberger tests
- Gait analysis
 - Heel walking
 - Toe walking
 - Tandem walk
 - Hopping

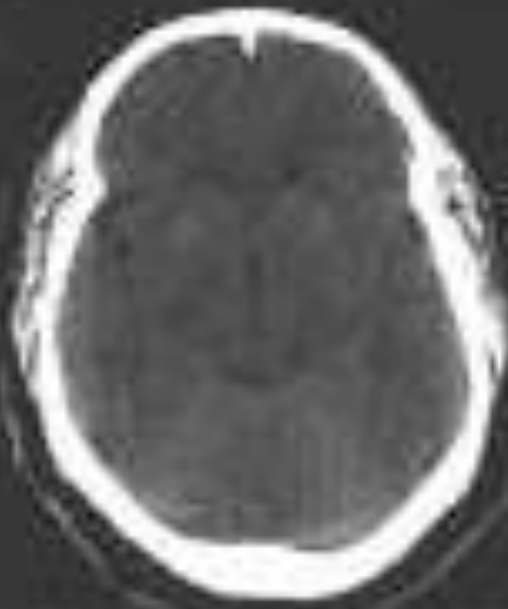
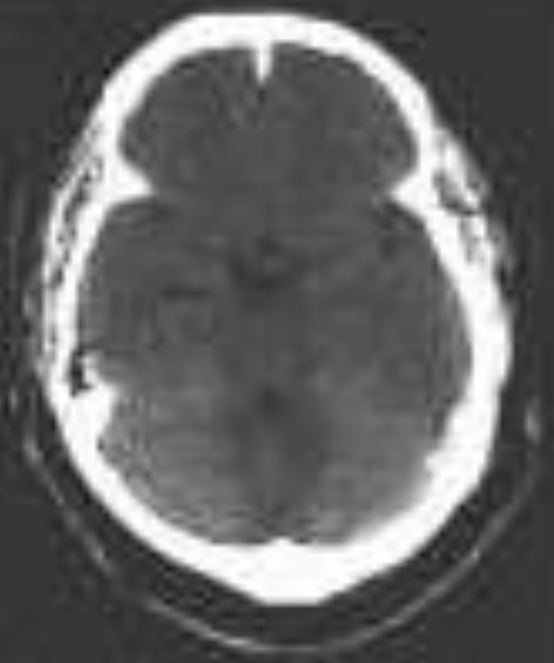
Differential Diagnosis

Neurological Clinical Examination

- *History* – What it is (acute, chronic, episodic, progressive)
- *Examination* – Where it is (focal, multifocal, systemic)
- *In our two cases*
 - **Case 1** – Normal examination. Probably a functional disorder
 - **Case 2** – Normal examination but headache reproduced by Valsalva test
- Relevant investigations!

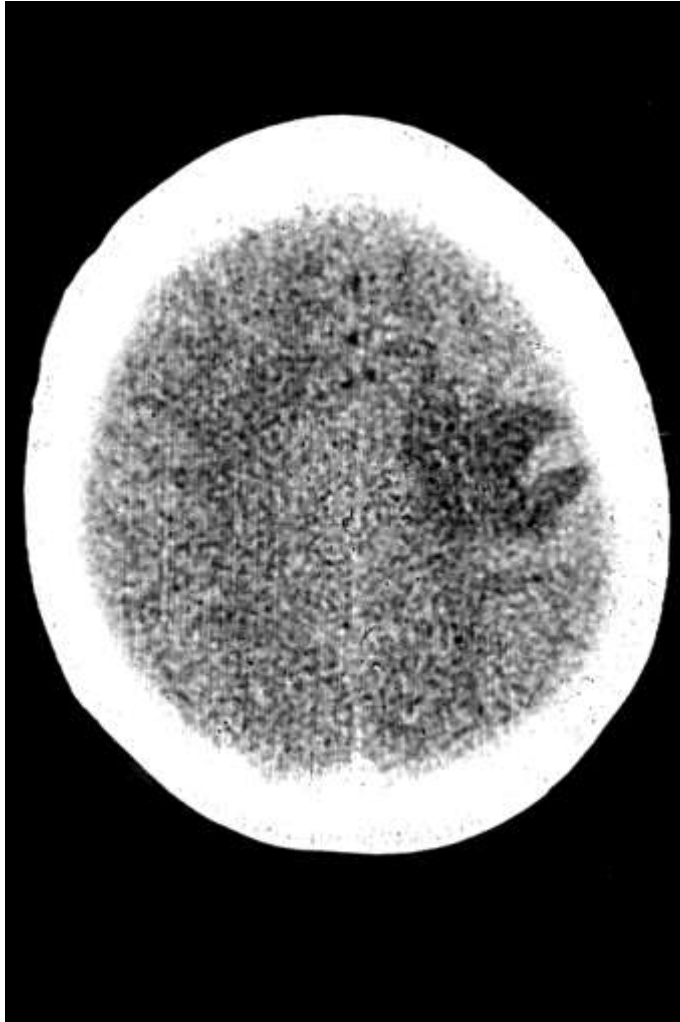


CT scanning



Normal CT scan

'Stroke' on CT



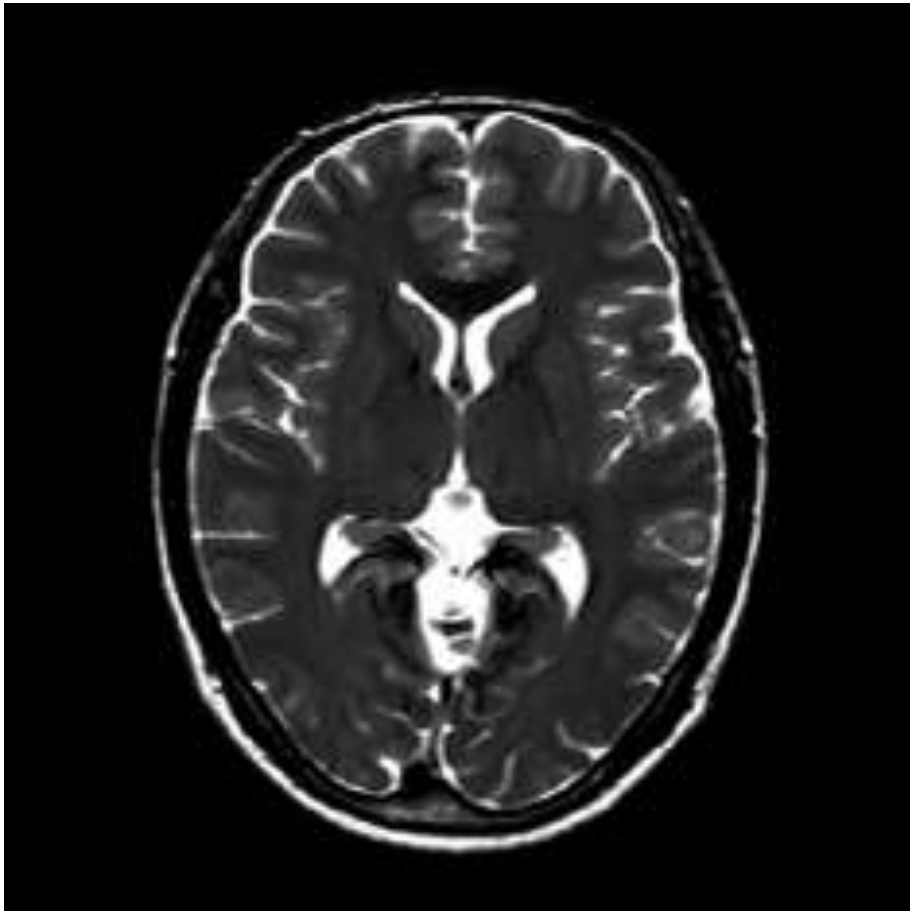
Left frontal Infarct



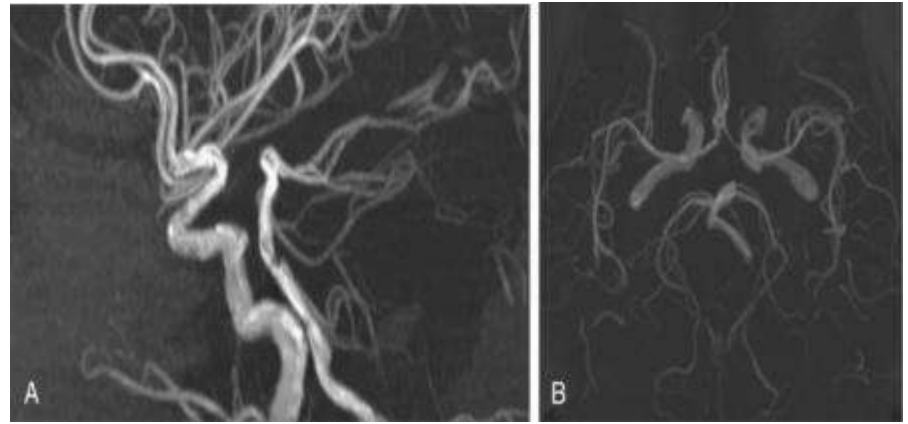
Left parenchymal haemorrhage

Magnetic Resonance (MR) imaging

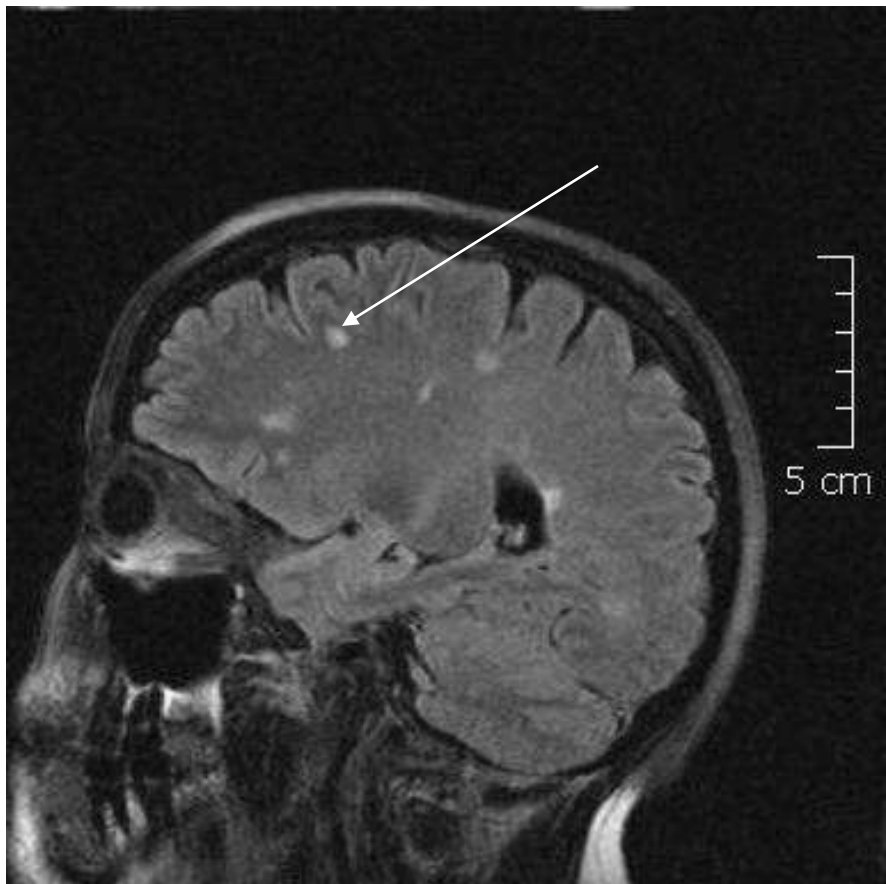
- Similar looking machinery to CT
- No radiation source
- Measures movement and spin of paramagnetic atoms (protons, phosphorus, carbon) in a high field strength, homogenous magnetic field, following radiofrequency pulsing
- Signal defined by quantity and mobility of atoms eg CSF v bone
- Very high definition of anatomy eg white matter v gray matter



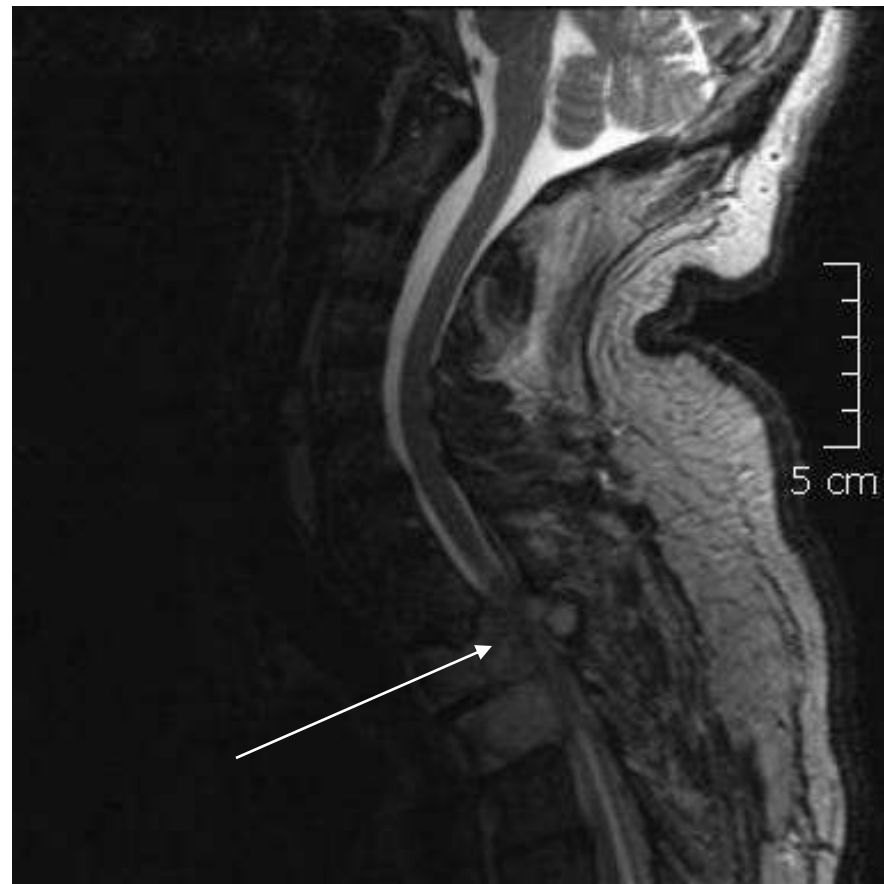
T2-weighted MRI brain scan



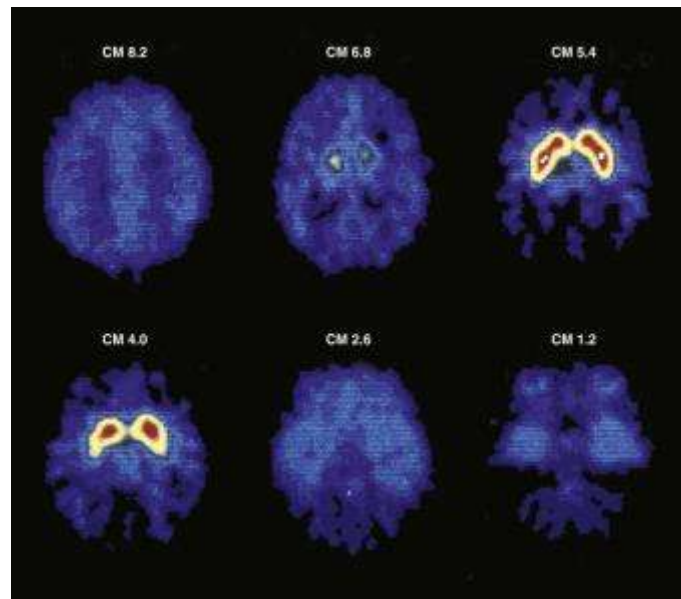
MR angiogram



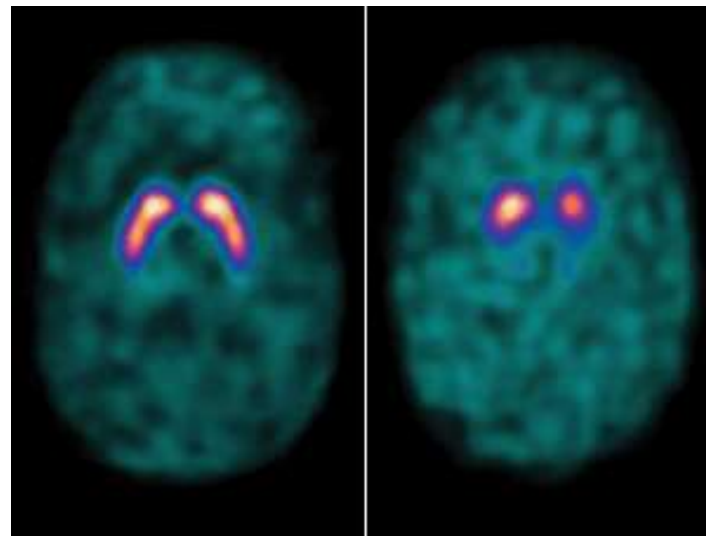
MS plaques



Spinal cord compression

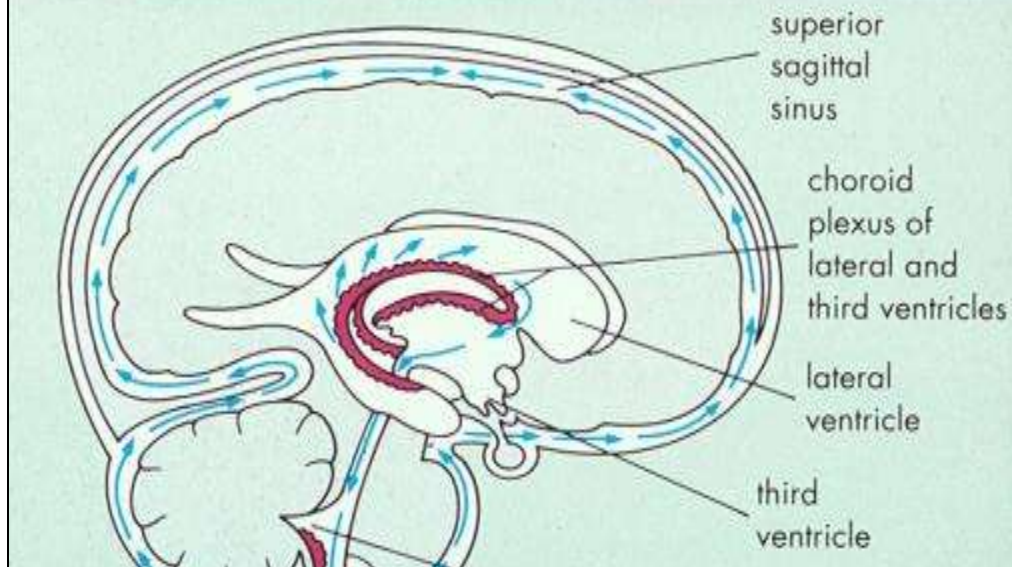


PET scanning with ^{18}F -fluorodopa

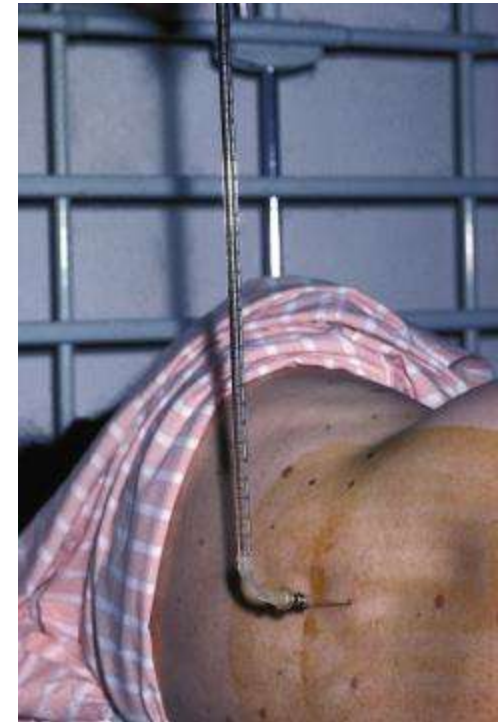


DaT scanning using Ioflupane I 123

Cerebrospinal Fluid Circulation



Production of CSF

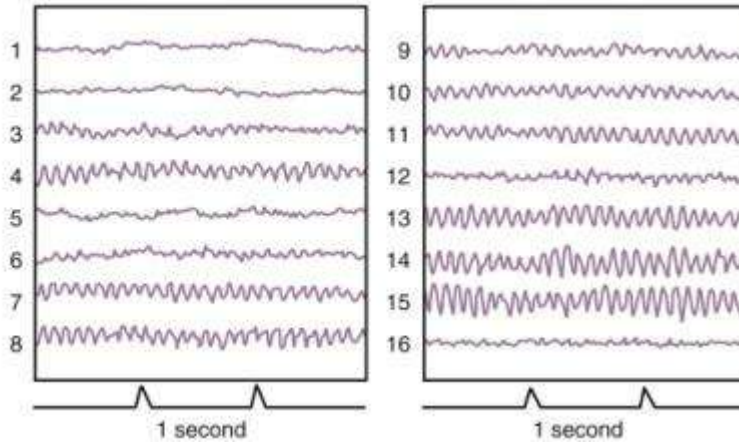
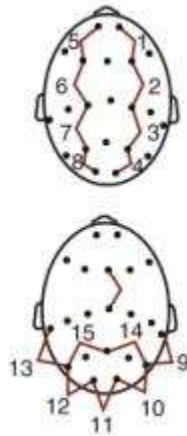


Lumbar puncture

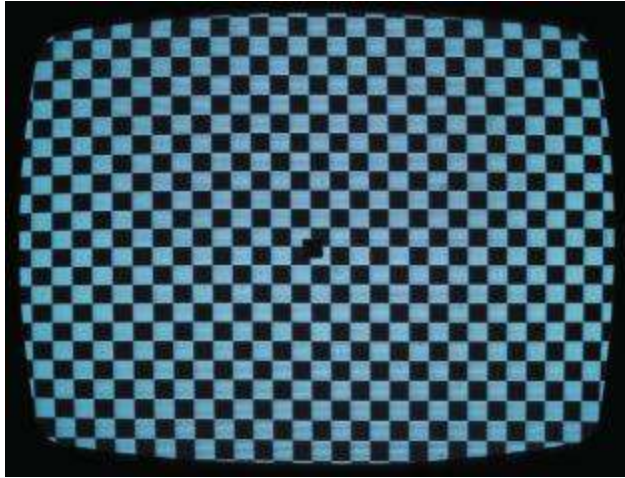




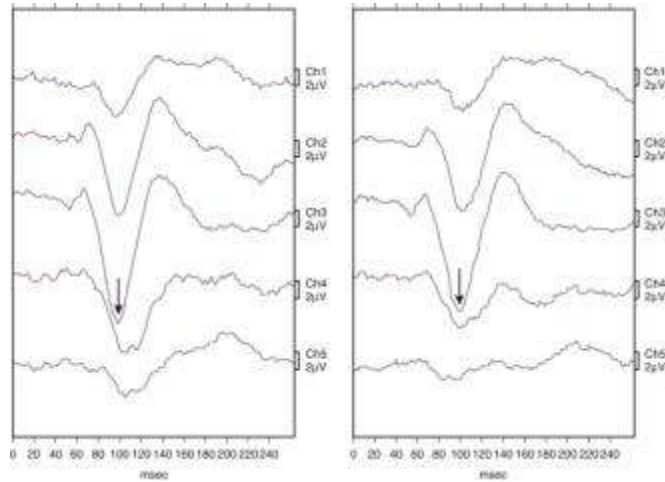
NORMAL 16 CHANNEL ELECTROENCEPHALOGRAM



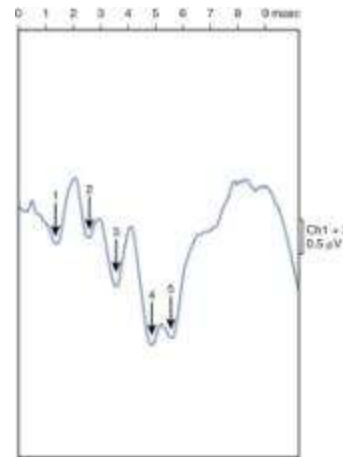
Electroencephalography (EEG)



VEPs



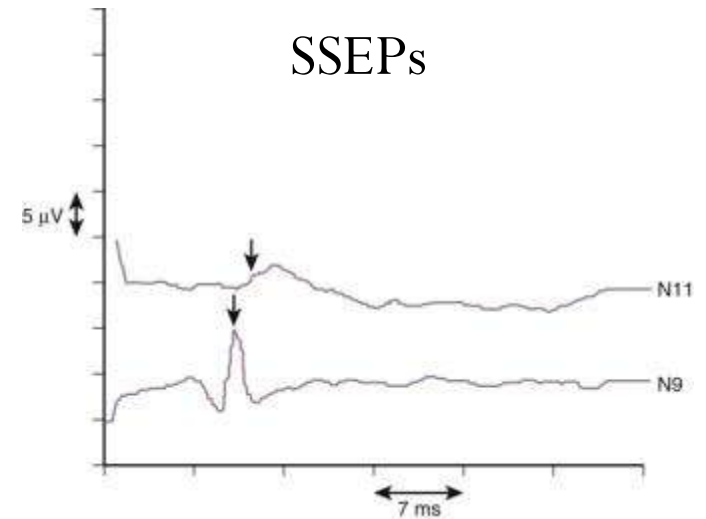
BAEPs



Evoked potentials



SSEPs



From History to Diagnosis

Case 1

- ‘New onset daily persistent headache’ (IHC2 classification)
- Triggered by neck injury in RTA
- Exacerbated by medication overuse, family stress
- Childhood abdominal migraine, mother migraineur
- = *Chronic post-traumatic migraine + MOH*

Case 2

- Episodic headaches for years
 - Family history of headache
 - Now, *cough headache*
 - Valsalva positive
- = *Left posterior fossa meningioma*

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THANKYOU FORYOUR ATTENTION
QUESTIONS??

