

INTRACRANIAL MASS

for 5th class: medical college: Al Mustansiriyah University

by

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Differential diagnosis: “tumour, pus or blood”

The history is important for localizing and differentiating mass lesions

Important common features on CT (with and without contrast enhancement)

- lesions (may be isodense without contrast)
- midline shifts and herniations
- effacement of ventricles and sulci (often ipsilateral)

A. TUMOUR

1. primary versus metastatic

2. primary tumours (benign or malignant) rarely metastasize

their presenting symptoms

- local effects dependent on site: focal deficits, lobe syndromes, seizures
- raised ICP acute or chronic depending on tumour growth rate
- sudden onset of symptoms after hemorrhage (5-10%)

3. consider by

- location (supratentorial vs. infratentorial)
- age (adult vs. child)

Table 1. Tumour Types: Age, Location and Clinical Features

	Supratentorial	Infratentorial
children (< 15 years, primarily infratentorial - 80%)	astrocytoma - all grades e.g. optic nerve astrocytoma craniopharyngioma ependymoma other: dermoid/epidermoid, pineal tumours, primitive neuroectodermal tumors	cerebellar astrocytoma medulloblastoma ependymoma choroid plexus papilloma brain stem astrocytoma
adult (>15 years, primarily supratentorial - 80%)	astrocytoma (40-50%) metastatic (20-30%) meningioma (15%) pituitary adenoma (5%) oligodendroglioma (5%)	metastatic (20-30%) schwannoma (6%)e.g. acoustic neuroma hemangioblastoma(5%) medulloblastoma (5%)
signs and symptoms	raised ICP focal or lobar effects • seizures • mental status changes • personality changes • visual field deficits • endocrine disturbances (with pituitary tumour)	raised ICP local effects in posterior fossa • extremity ataxia • truncal ataxia • CN palsy - often multiple • nystagmus • LOC • long tract signs

Symptoms according Position of the tumor

Frontal lobe

Changes in personality
Swearing or behaving in a way that patient normally wouldn't (loss of inhibitions)
Being irritable or aggressive
Difficulty walking
Loss of sense of smell

Temporal lobe

Forgetting words
Short term memory loss

Parietal lobe

Difficulty speaking or understanding what is said to patient

Occipital lobe

Sight problems or loss of vision on one side

Hindbrain (cerebellum)

Poor co-ordination
Uncontrolled movement of the eyes
Dizziness

Brain stem

Poor co-ordination
Drooping eyelid or mouth on one side
Difficulty swallowing
Difficulty speaking
Seeing double

Investigations

CT, MRI, stereotactic biopsy (tissue diagnosis)

Management

1. medical

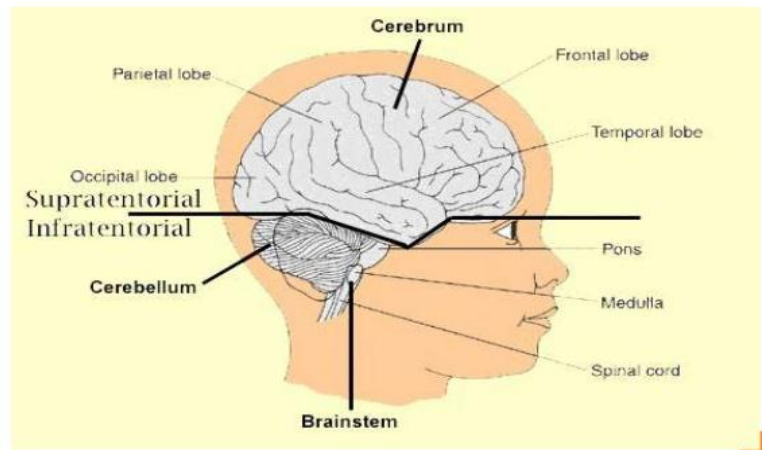
- steroids useful for vasogenic cerebral edema (decrease edema around tumours and decrease mass effect/ICP)
- pharmacological treatment for pituitary tumours

2. surgical

- excisional: total, partial, decompressive, palliative
- shunt if CSF flow is blocked

3. radiotherapy - external, brachytherapy, stereotactic radiosurgery (Gamma-knife, Linear Accelerator)

4. chemotherapy - alkylating agents



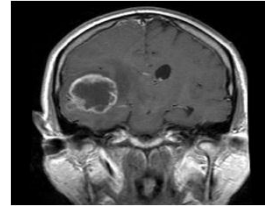
Metastatic Tumours

mainly from lung, breast, GI, kidney, melanoma

solitary tumour: surgical excision and whole brain radiation

Astrocytoma

The most common primary brain tumour (45-50%)



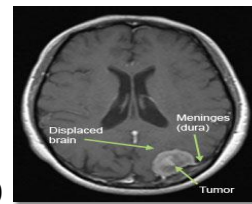
1. low grade (grades I-II) with slower growing, peak age 40 years, median survival 2-4 years
2. high grade (grades III-IV, glioblastoma multiforme) fast growing, peak age 55 years, median survival < 2 years, surgery not curative, aim to prolong “quality” life, radiotherapy prolongs survival)
3. “cystic cerebellar” astrocytoma (pediatric population, infratentorial, potentially curable)

Meningioma

mostly benign (1% malignant), slow-growing

,non-infiltrative. The common locations: parasagittal and falx convexity, sphenoid ridge.

It is mostly curable if complete resection possible (5 year survival > 90%)

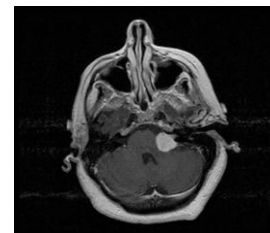


Vestibular Schwannoma (“Acoustic Neuroma”)

progressive unilateral deafness = acoustic neuroma until proven otherwise. It arises from vestibular component of CN VIII at cerebello-pontine angle (CPA). Usually presented with signs of compression of CPA structures

- CN V: facial numbness, loss of corneal reflex
- CN VII: facial weakness (uncommon pre-operatively)
- CN VIII: unilateral sensorineural deafness, tinnitus, vertigo
- cerebellum: ataxia, nystagmus

Generally it is curable by resection, sometimes palliative treatment with gamma-knife radiotherapy



Pituitary Adenomas

1. The usual presentation is due to its mass effects

- H/A
 - bitemporal hemianopsia (compression of optic chiasm)
 - CN III, IV, V1, V2, VI palsy (compression of cavernous sinus)
2. endocrine effects
- hyperprolactinemia
 - Cushing disease
 - acromegaly
 - infertility, amenorrhea, galactorrhea, impotence
 - panhypopituitarism (hypothyroidism)



3. apoplexy and CSF rhinorrhea (rare presenting signs of pituitary tumour)

The diagnosis endocrine function tests; MRI

Treatment is

1. medical with

- bromocriptine/dopamine agonists for prolactinoma
- endocrine replacement therapy
- somatostatin analogue (octreotide) +/- bromocriptine for acromegaly

2. surgery (+/- radiation)

B. PUS

Brain Abscess

Etiology

1. local spread (adjacent infection)

- otitis media, mastoiditis, sinusitis
- osteomyelitis
- dental abscess

2. hematogenous spread

- adults: lung abscess, bronchiectasis, empyema
- children: cyanotic heart disease with R to L shunt (blood is shunted away from lungs preventing filtration of bacteria)
- immunosuppression (AIDS - toxoplasmosis)

3. dural disruption

- surgery, trauma
- congenital defect, e.g. dermal sinus

Pathogens

- *Streptococci* (most common), often anaerobic or microaerophilic
- *Staphylococci* (penetrating injury)
- Gram negatives, anaerobes

Diagnosis

- focal neurological signs and symptoms
- mass effect, increased ICP and sequelae
- seizures
- +/- signs of systemic infection (mild fever, leukocytosis)
- blood cultures rarely helpful, LP not helpful and contraindicated
- CT scan

Management

- multiple aspiration of abscess and/or excision, and send for C&S
- antibiotics
- empirically: penicillin and metronidazole (cover *Streptococci* and anaerobes) +/- ceftriaxone

(cover Gram negatives)

- after sensitivity results return, revise antibiotics
- treat primary site

Other Causes of Pus...

1. subdural empyema (from sinusitis, mastoiditis - rare, 20% mortality)
2. meningitis, encephalitis, AIDS toxoplasmosis
3. osteomyelitis of skull (Pott's puffy tumour), usually seen with sinusitis
4. granuloma (TB, sarcoid)

C. BLOOD

Hematoma/hemorrhage

1. epidural, subdural hematoma
2. intracerebral, intraventricular hemorrhage, SAH

Vascular Abnormality

aneurysm, AVM

Clinical Features

1. sudden onset severe headache: “worst headache of my life”
2. vomiting, nausea (increased ICP)
3. meningismus (neck stiffness, photophobia, positive Kernig’s and Brudzinski’s sign)
4. decreased level of consciousness, transient or prolonged
5. focal deficits: cranial nerve palsy (e.g. III, IV), hemiparesis
6. ocular hemorrhage in 11-33% (due to sudden increase in ICP)
7. occasionally exertional (straining, intercourse)

Diagnosis (see Figure 7)

differential diagnosis: migraine, tension H/A, meningitis, stroke, flu

1. CT without contrast
2. Lumbar puncture (LP)
 - contraindications
 - known or suspected intracranial mass
 - non-communicating (obstructive) HCP
 - unconscious, focal deficit, papilledema
 - coagulopathy (platelets < 50, anticoagulants, etc...)
 - infection at site desired for LP (e.g. epidural abscess)
3. Cerebral angiography

Management

1. bed rest, elevate head (30 degrees), minimal external stimulation
2. control HTN, avoid hypotension since CBF autoregulation impaired by SAH
3. prophylactic anticonvulsant: short course of Dilantin (2 weeks)
4. neuroprotective agent: nimodipine
5. early surgery to prevent rebleed or to evacuate haematoma
6. intraventricular catheter if acute HCP present
7. “Triple H” therapy for vasospasm: hypertension, hypervolemia, hemodilution
8. angioplasty for refractory vasospasm