

# Neurosurgical Management of Brain Tumours

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# General

- Most common tumours are metastatic
  - 10x more common than primary
- Incidence of primary neoplasms is 20 per 100000 per year
  - liberal imaging      longer life span
  - apparent increase
  - “prevalence” may be multiples higher

# Risk Factors

- Many implicated factors
- Objective data weak for
  - mobile phones
  - high tension wires/radio towers
  - diet and other nutritional

# Risk Factors

- Radiation
  - definite for meningiomas
    - eg post acne Treatment
  - lesser evidence in gliomas

# Presentation

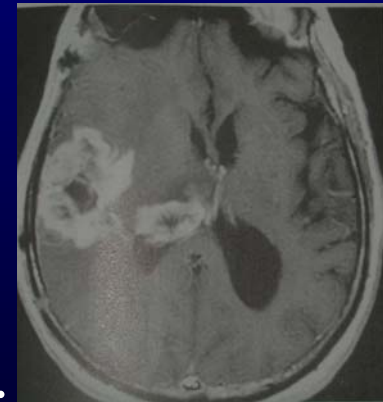
- Raised intracranial pressure
  - Morning HA associated with nausea and vomiting
  - Drowsiness,coma
- Headache
  - Common ,inconsistent symptom
  - May lead to discovery of incidental lesion

# Presentation

- Seizures
  - Common presentation of low grade tumours
  - good predictor of pathology

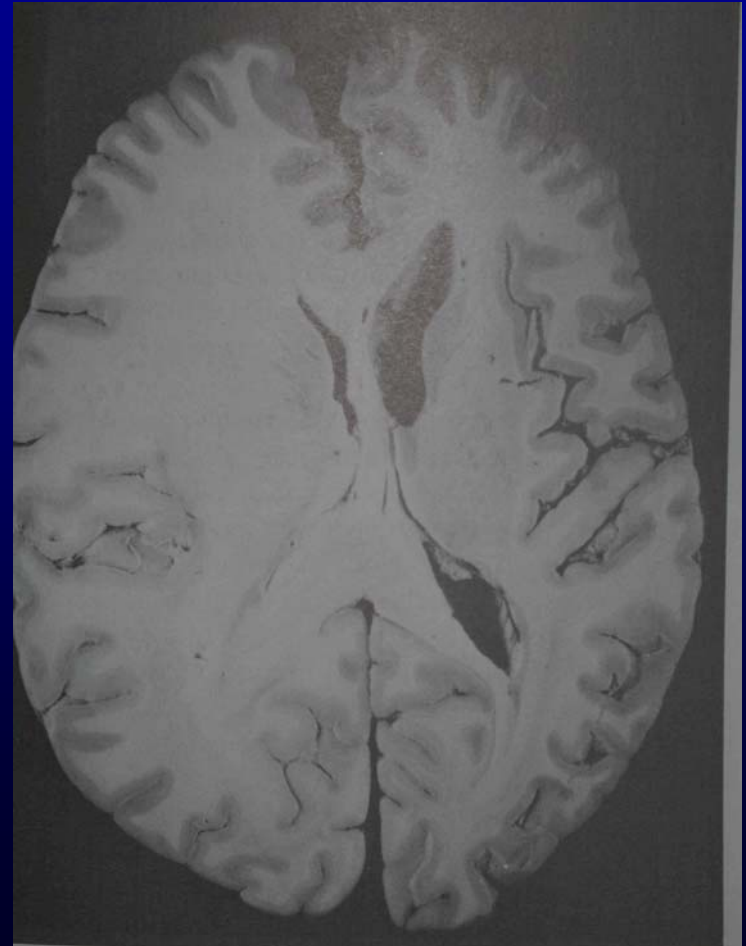
# Investigation

- CT scan
  - Most people have this test first
    - good for demonstrating calcification/haemorrhage
    - easy,cheap,available screen
- MRI
  - Best single test
- Angiogram
  - sometimes used, can allow embolisation



# Glial Tumours

- Astrocytomas
- Oligodendrogliomas
- Mixed oligoastrocytomas



# Astrocytomas

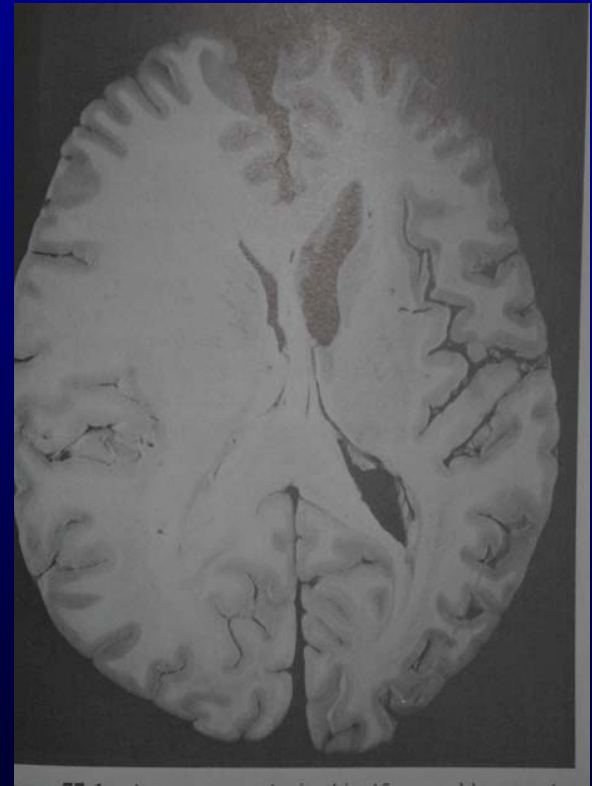
- Grading
- 3 or 4 tier systems
- Most commonly use 4 tier system based on St Anne-Mayo criteria

# Astrocytomas

- Grade 1
  - pilocytic
  - usually found in children
  - may be cured by resection
  - generally resistant to adjuvant therapy

# Astrocytomas

- Grade 2
  - tend to be in younger age group
  - usually present with seizure
  - Rarely have neurological deficit



# Astrocytomas

- Grade 2
  - usually little surrounding brain reaction
  - PET may indicate lower metabolism
  - Management controversial

# Astrocytomas

- Grade 2
  - Most will progress to high grade lesions
  - No good evidence that radiotherapy or chemotherapy alters survival. Believers Vs Non-believers
  - ?decreasing tumour load may decrease risk of progression

# Astrocytomas

- Grade 2
  - Must weigh benefits of intervention Vs risks
  - Biopsy alone carries 2-3% risk of major complication
    - higher risk in higher grade, more vascular lesions
    - Higher risk if deep, enhancing
  - “Resectability” often determinant of best form of treatment

# Astrocytomas

- Sampling error
  - Potential for error with biopsy
  - Often heterogeneous
    - A single lesion may contain tumour of different grades at different locations
    - The true grade of a tumour is determined by the highest grade

# Astrocytomas

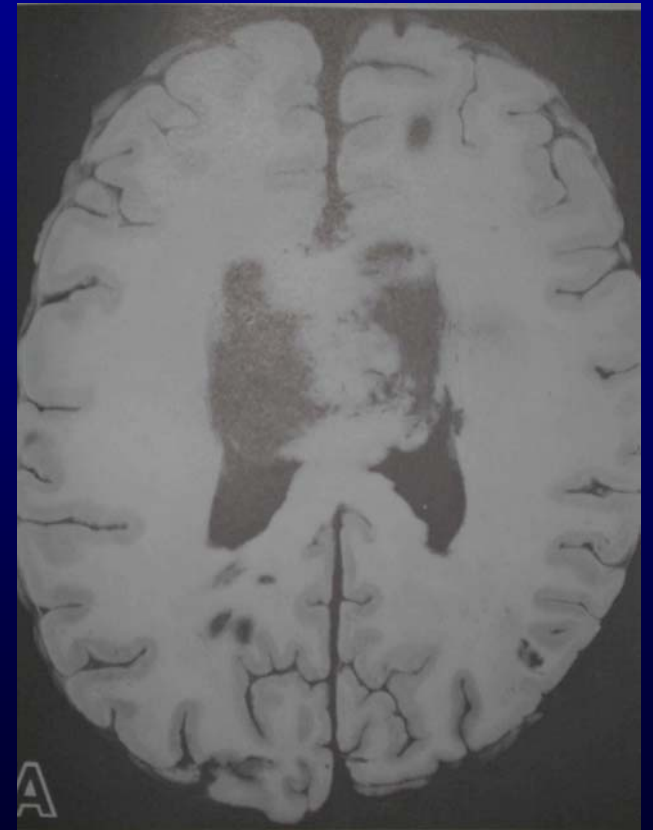
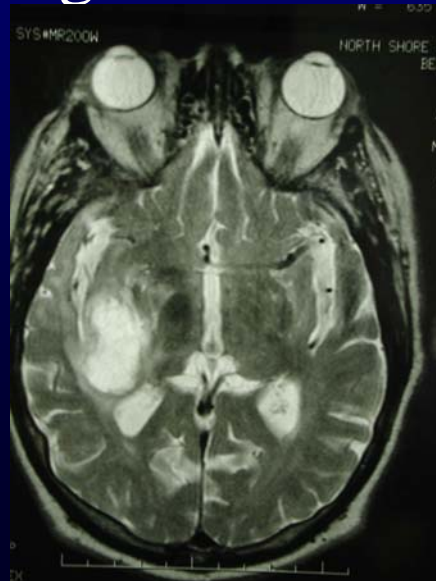
- Grade 2
  - Radiotherapy
    - may have significant side-effects
    - May be late onset
  - Unpredictable
  - Median survival five years
  - Long term survivors are frequent

# Astrocytomas

- Grades 3 and 4
- Otherwise known as anaplastic astrocytomas and glioblastoma multiforme
- Most common
- Occur later in life

# Astrocytomas

- Grade 3 and 4
  - usually take up dye on imaging
  - typically central lucency
  - Often surrounding brain swelling



# Astrocytomas

- Grade 3 and 4 Treatment
  - Radiation mainstay of treatment
    - Radiosurgery ill-defined role
    - Brachithery probably no benefit
  - Surgery likely beneficial to decrease tumour load
    - Somewhat controversial
    - Self-selected cases

# Astrocytomas

- Chemotherapy
  - modest improvement in certain cases
  - No doubt area of greatest potential for improvements in outcome
  - Currently far less toxic-eg. Temadol, than previous BCNU/CCNU
  - Gliadel
  - Avastin

# Astrocytomas

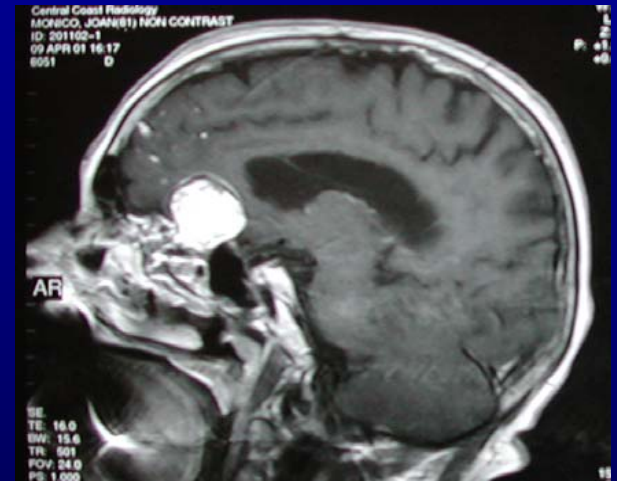
- Recurrence
  - Inaccurate term
    - almost always normal looking brain on scan will harbour tumour cells
  - Recurrence of mass in otherwise well patient may be helped by further surgery
    - those with multifocal or diffuse recurrence not suitable
    - Not unusual for patients to undergo three or more resections

# Oligodendrogliomas

- Generally more sensitive to chemotherapy
- Chromosomal feature 1p, 19q deletions
- Propensity to bleed
- Median survival 10 years
- Generally progress to malignant astrocytoma

# Surgery-options

- Nothing
  - obvious high grade tumour
  - very old/unwell patient
  - patient family wishes
  - low grade tumour in patient who is normal especially if “unresectable”
    - often present incidentally or with seizure



# Surgery-options

- Biopsy
  - pros
    - if diagnosis doubtful
    - resection dangerous
    - generally well tolerated, may be overnight stay only
  - cons
    - sampling error
    - doesn't "treat" tumour
    - 2-3% major complication

# Surgery-options

- Resection
  - Usually carries risk of about 5% major complication
  - treats the lesion
  - large sample to avoid error in diagnosis
  - probably improves outcome

# Pituitary tumours

## Indications for surgery

- Visual loss (mass effect)
- Hypersecretion
  - prolactinomas
  - acromegaly
  - Cushings
- Hyposecretion
  - uncommon with adenomas
  - consider other



# Surgery -stereotaxy

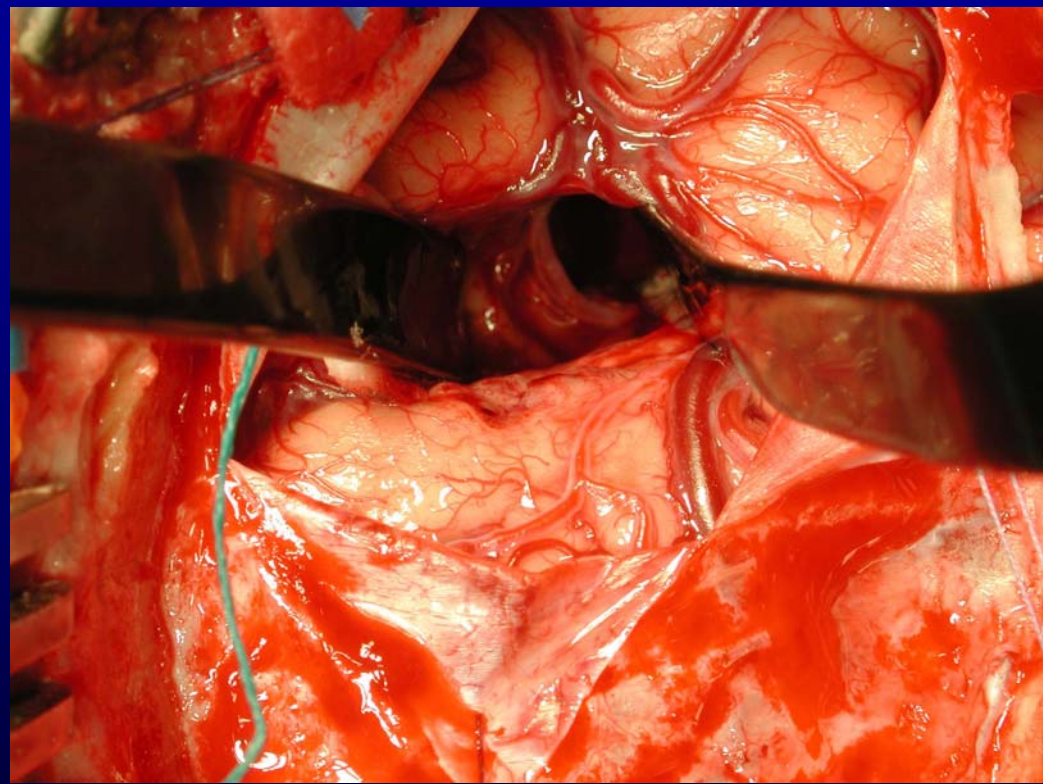
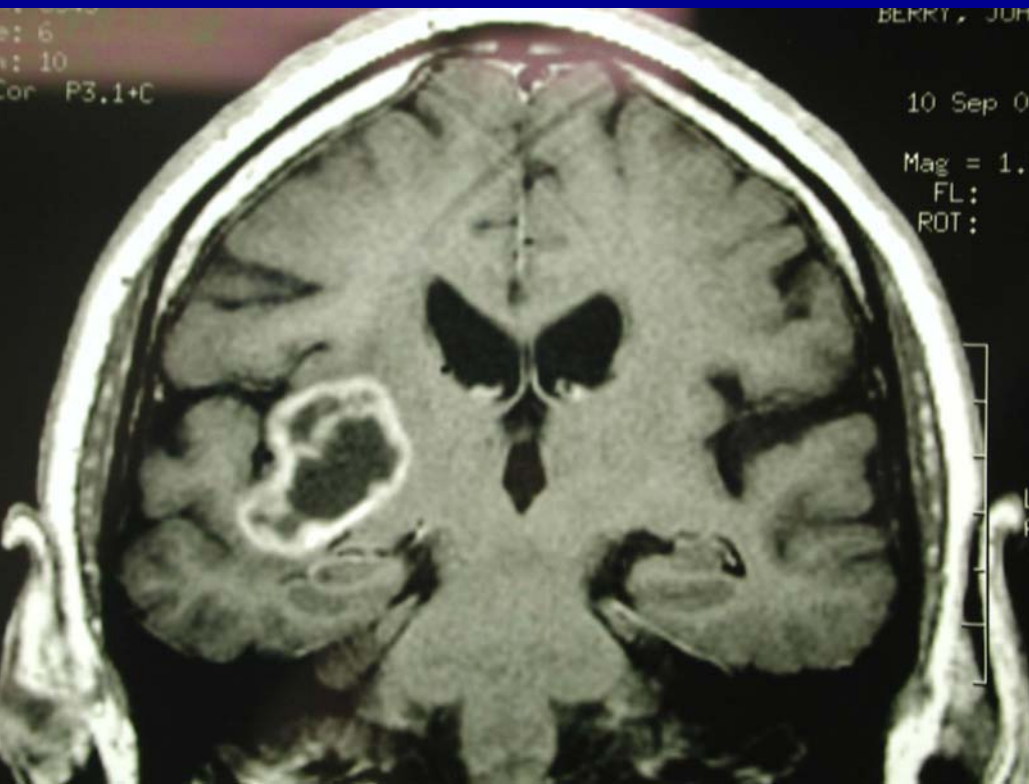
- Allows navigation in virtual 3D space inside the head
- Used in almost all cases



# Surgery- stereotaxy

- Improves outcome
- length of stay
- size of wound





# Surgery-awake

- Who
  - Neurologically well
  - Intrinsic lesion (glial)
  - Eloquent area
  - Co-operative
  - Function over resection

# Surgery-awake

- Not
  - Harmed/unco-operative
  - Seizures
  - Discrete lesion
  - Resection over function

# Metastases

- Surgery very good palliation
- in general for single tumours with fair systemic control
- Certain tumours not uncommon to Cherrypick
  - melanoma, renal, breast
- if done with f/u radiotherapy uncommon to die of local brain recurrence, variable response.

# Perioperative Considerations

- Steroids
  - Used in almost all tumour surgery
  - Caution with Lymphoma
  - Best to start pre-op and continue
  - In general wean over one to two weeks
- Anticonvulsants
  - High risk of seizures in perioperative state for supratentorial surgery

# Conclusion

- Greatest advances in management are likely to be systemic
- Aim of therapy is minimisation of symptoms for as long as possible
- Risk /toxicity of treatment has to be carefully considered
- Generally patients undergoing surgery are out of bed within one day, and home within a week