

Brain and Spine Tumors

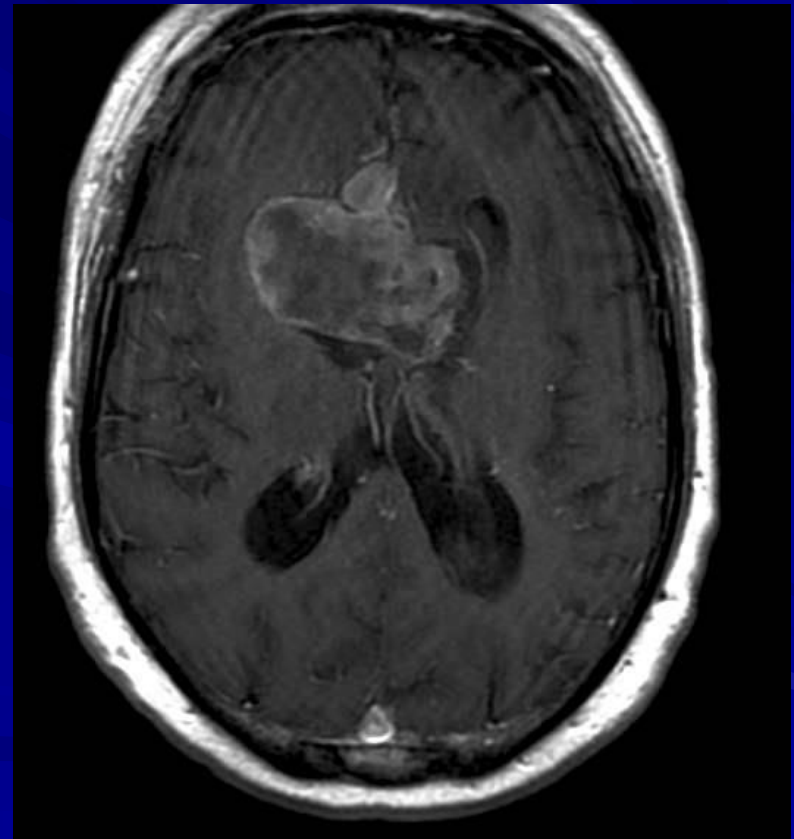
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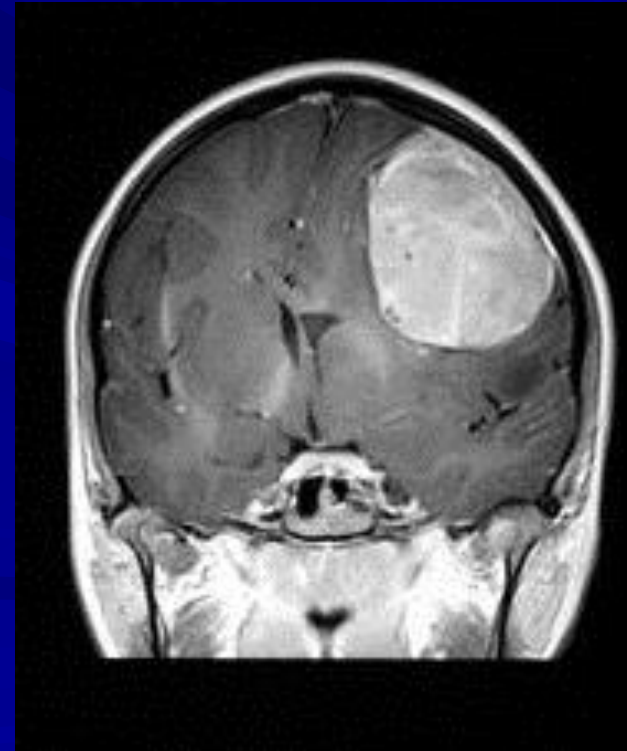
Brain Tumors

- Brain Tumor Basics
- Types of Tumors
- Cases

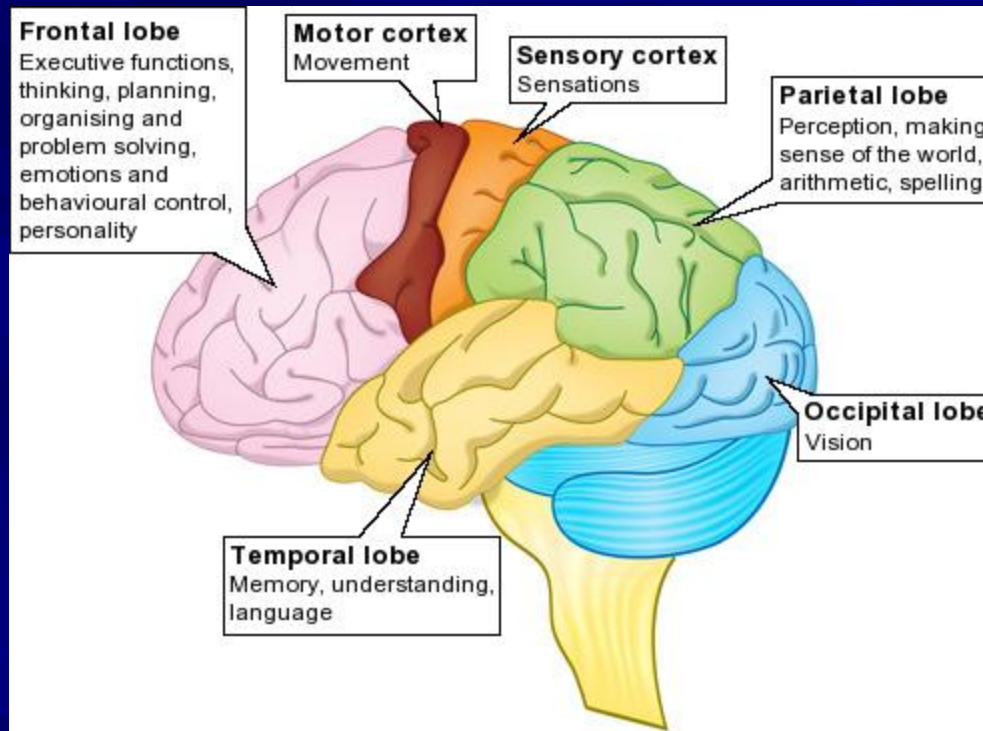


Brain Tumors

- Skull is a fixed space
- Symptoms develop due to compression of normal brain

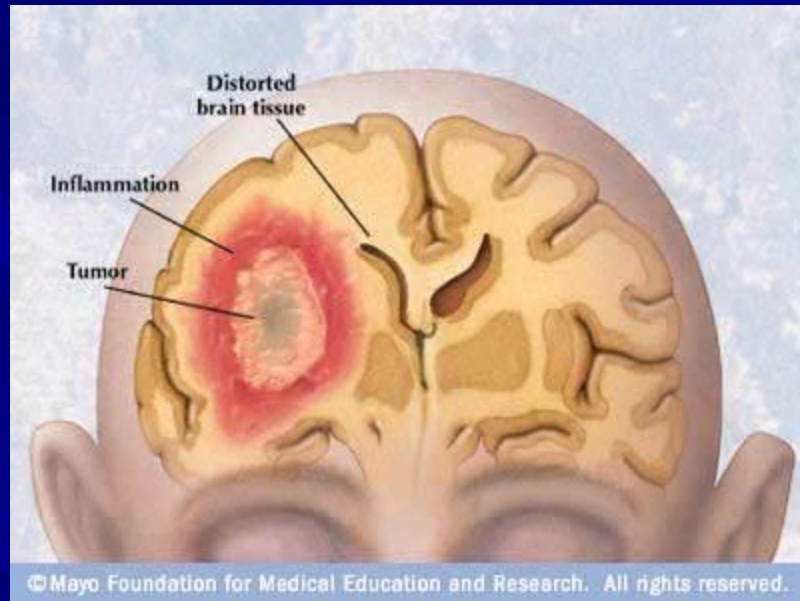


Brain Tumors



Brain Tumors

- Inflammation/Edema occurs in the surrounding normal brain

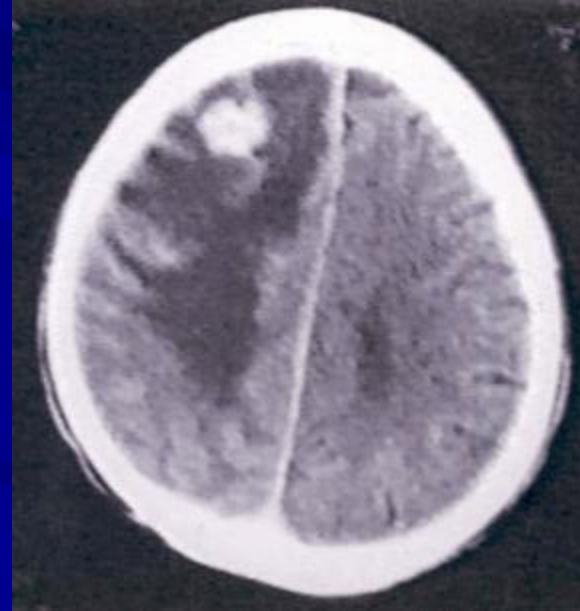


Brain Tumors

- Tumors cause edema and irritation of normal brain
- Breakdown of BBB
- Corticosteroids for edema
- Anti-epileptics to prevent seizures

Corticosteroids

- Dexamethasone traditionally used
- Reduces vasogenic edema
- GI prophylaxis



Steroids

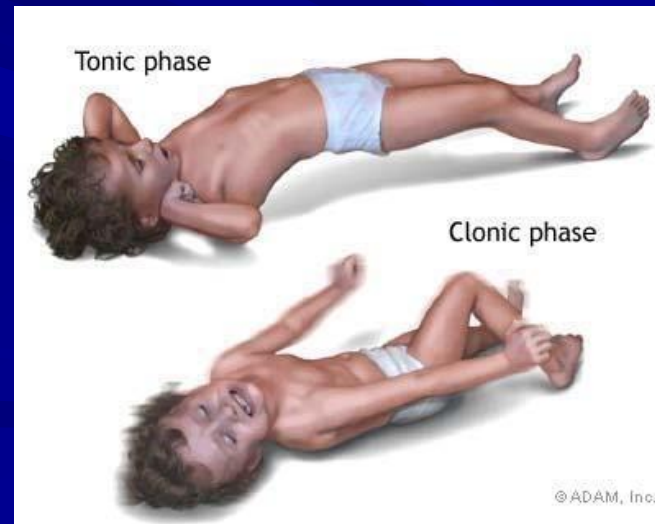
Multiple side effects:

- Diabetes
- Myopathy
- Infection
- LE edema
- Weight gain
- Wound issues



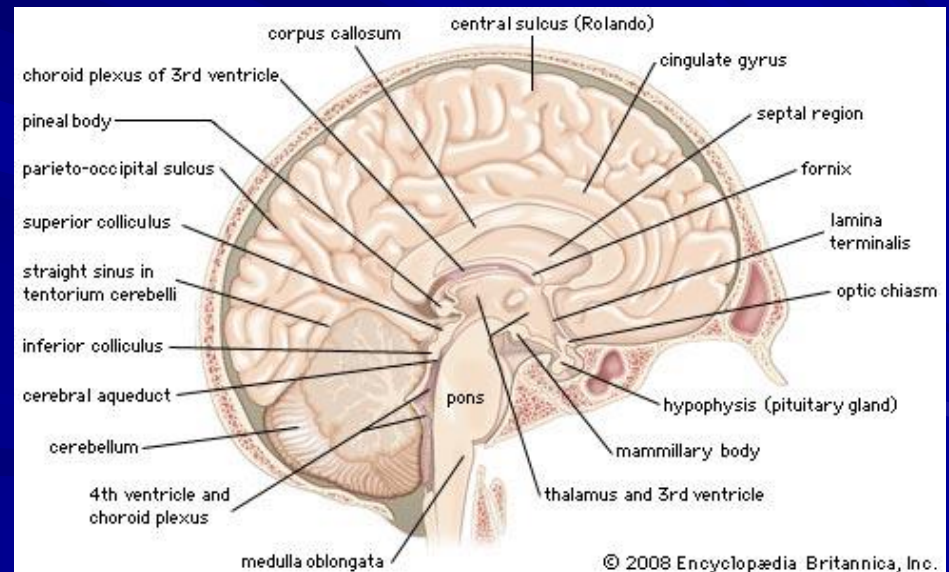
Anti-Epileptic Drugs

- Used for cortical lesions
- Not required for cerebellar lesions
- Dilantin – requires monitoring
- Keppra



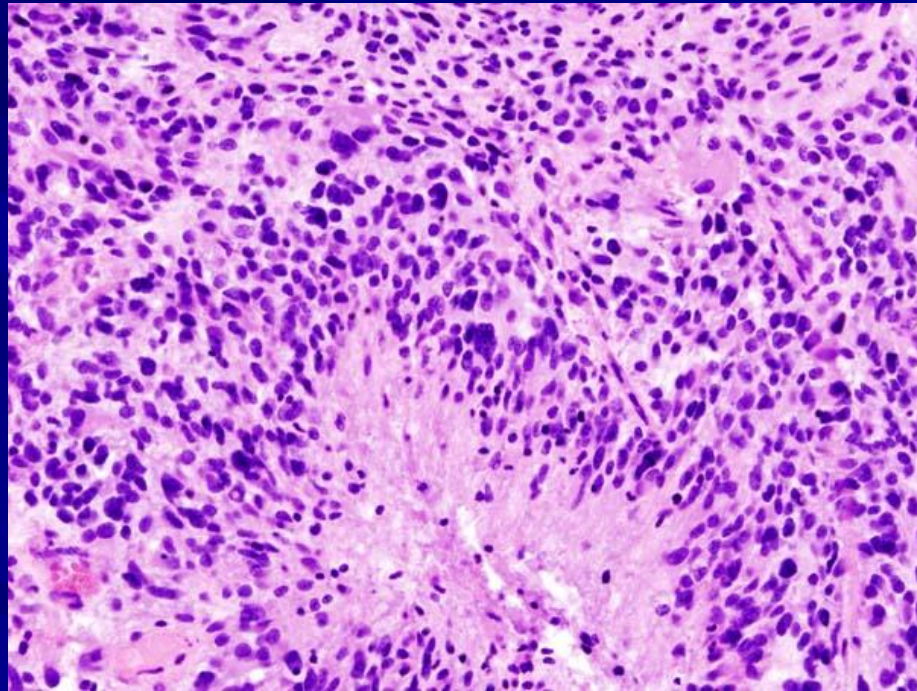
Tumor Types

- Gliomas
- Meningiomas
- Metastatic Tumors
- Pituitary Tumors



Gliomas

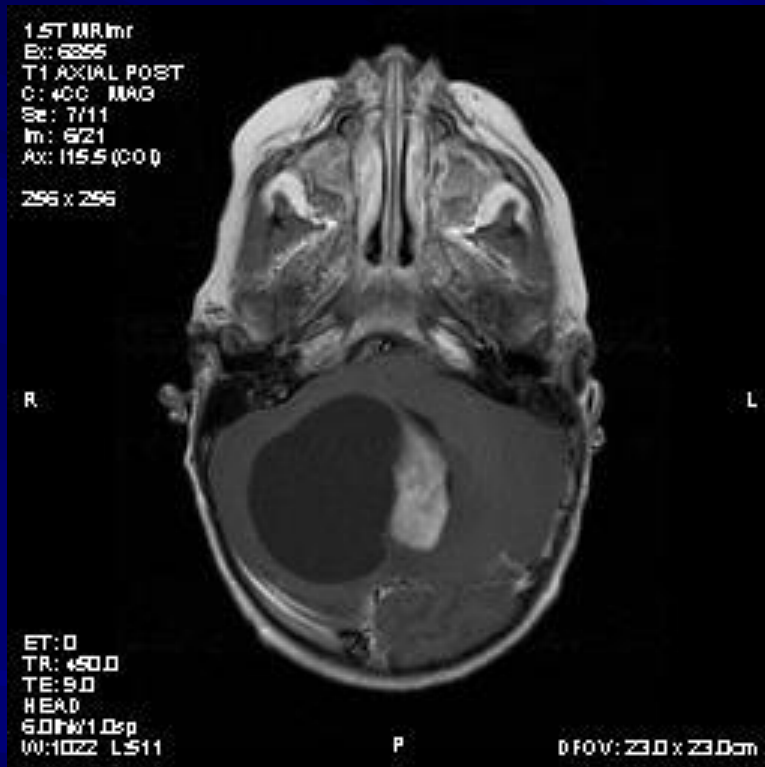
- Arise from native cells within the brain



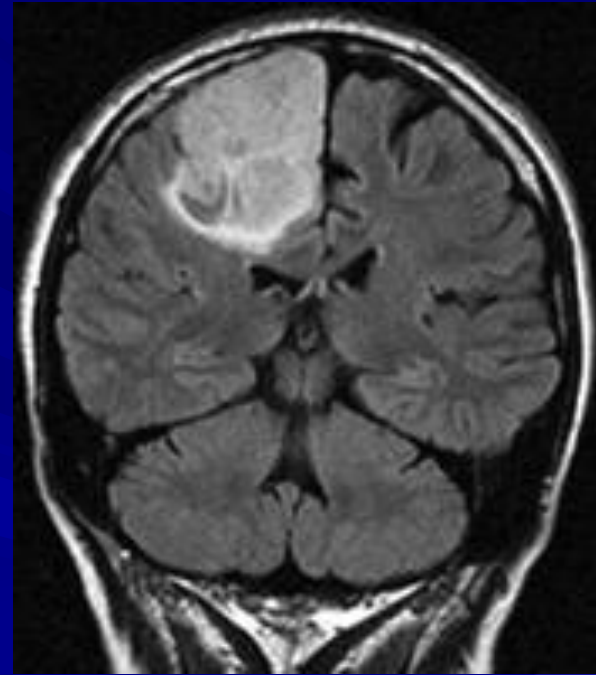
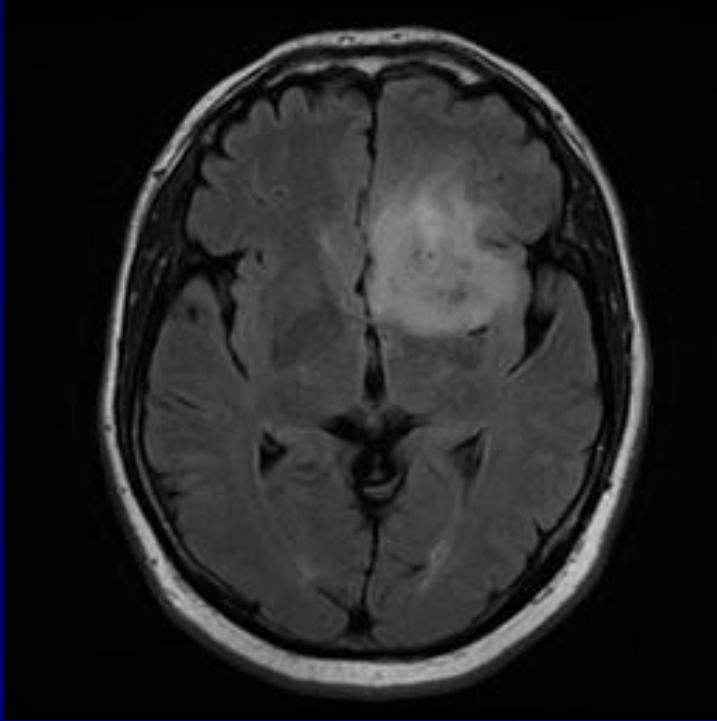
Gliomas

- WHO I – Pilocytic Astrocytoma
- WHO II – Fibrillary Astrocytoma
- WHO III – Anaplastic Astrocytoma
- WHO IV – Glioblastoma Multiforme

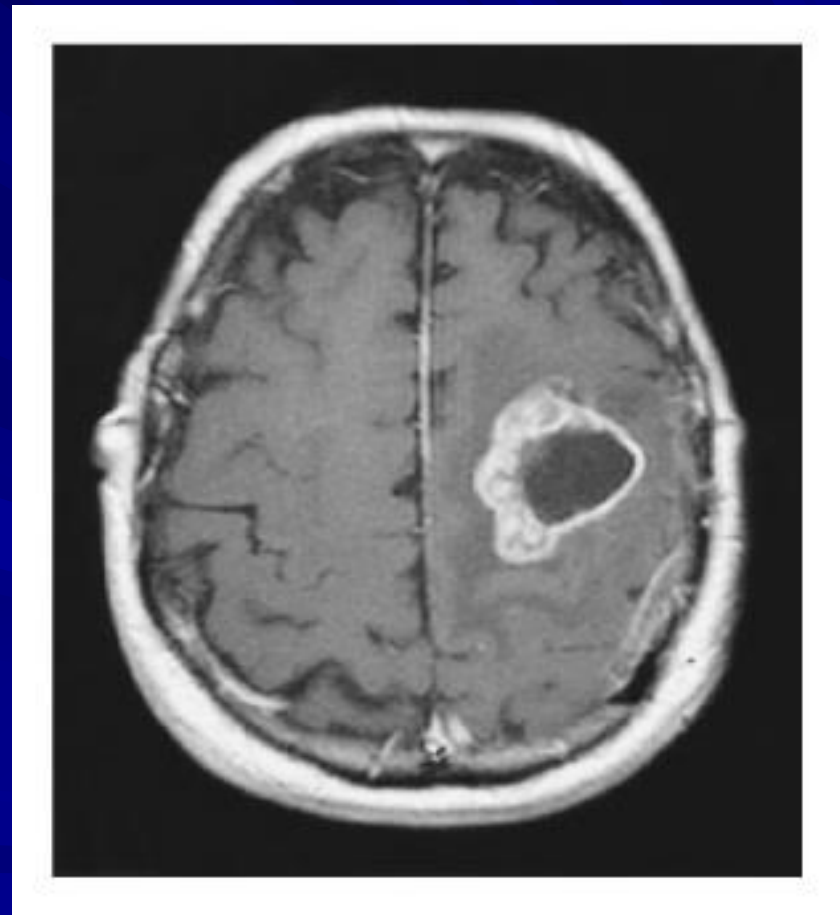
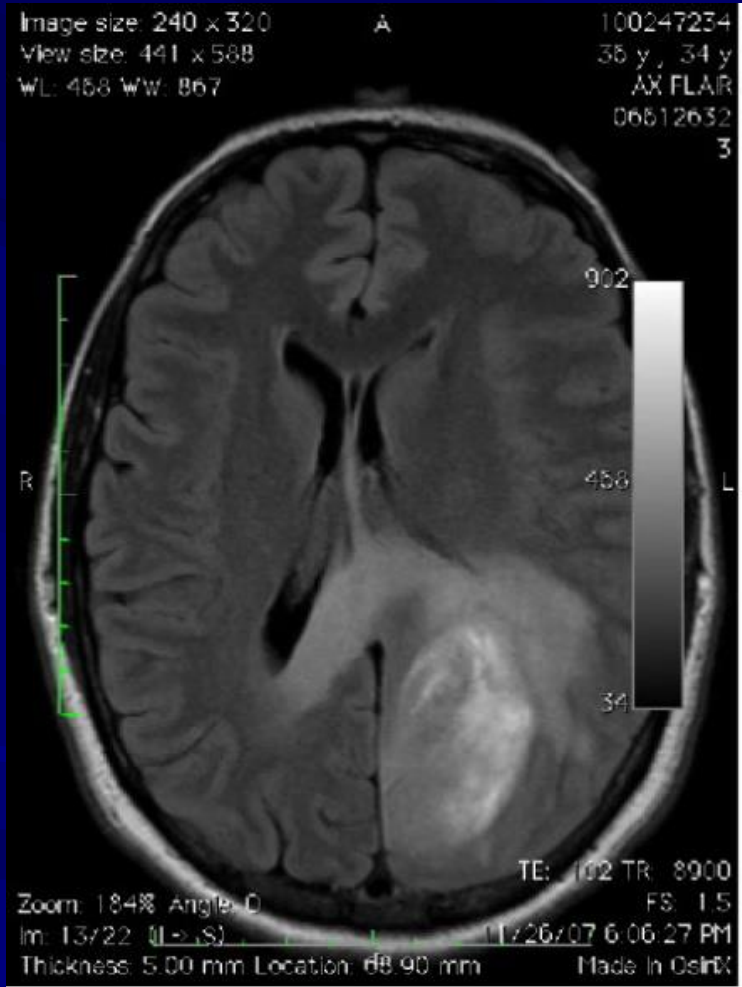
Gliomas – WHO I



Gliomas – WHO II & III



WHO IV - GBM



Glioblastoma Multiforme

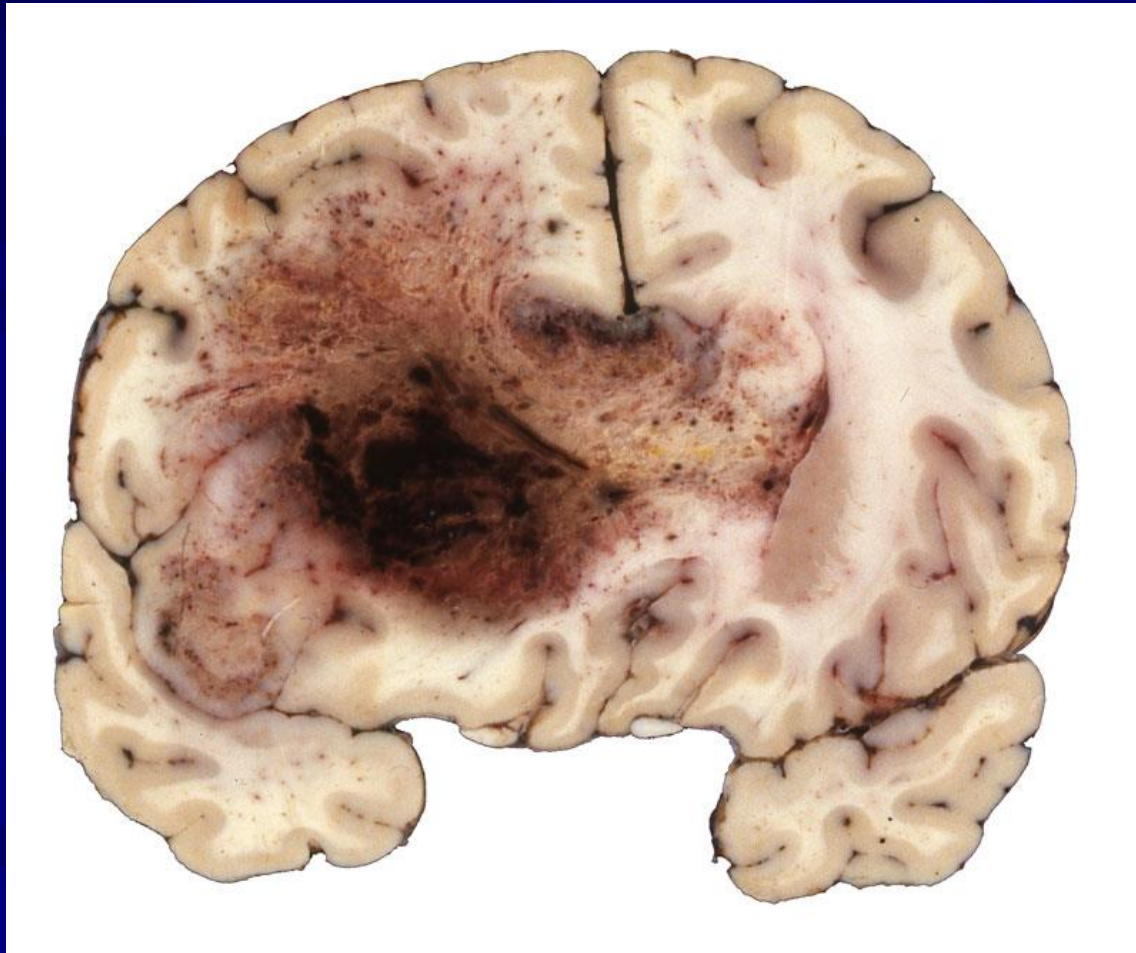
- Most common primary brain tumor in adults
- Incidence 3 per 100,000
- Average survival from diagnosis ~ 13 months
- Young age, High Karnofsky score associated with increased survival

Glioblastoma

- Start steroids and anti-epileptics

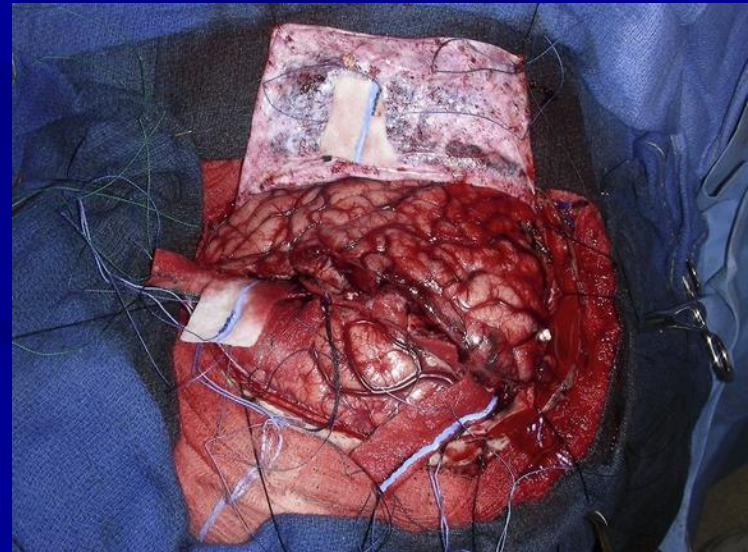


Glioblastoma

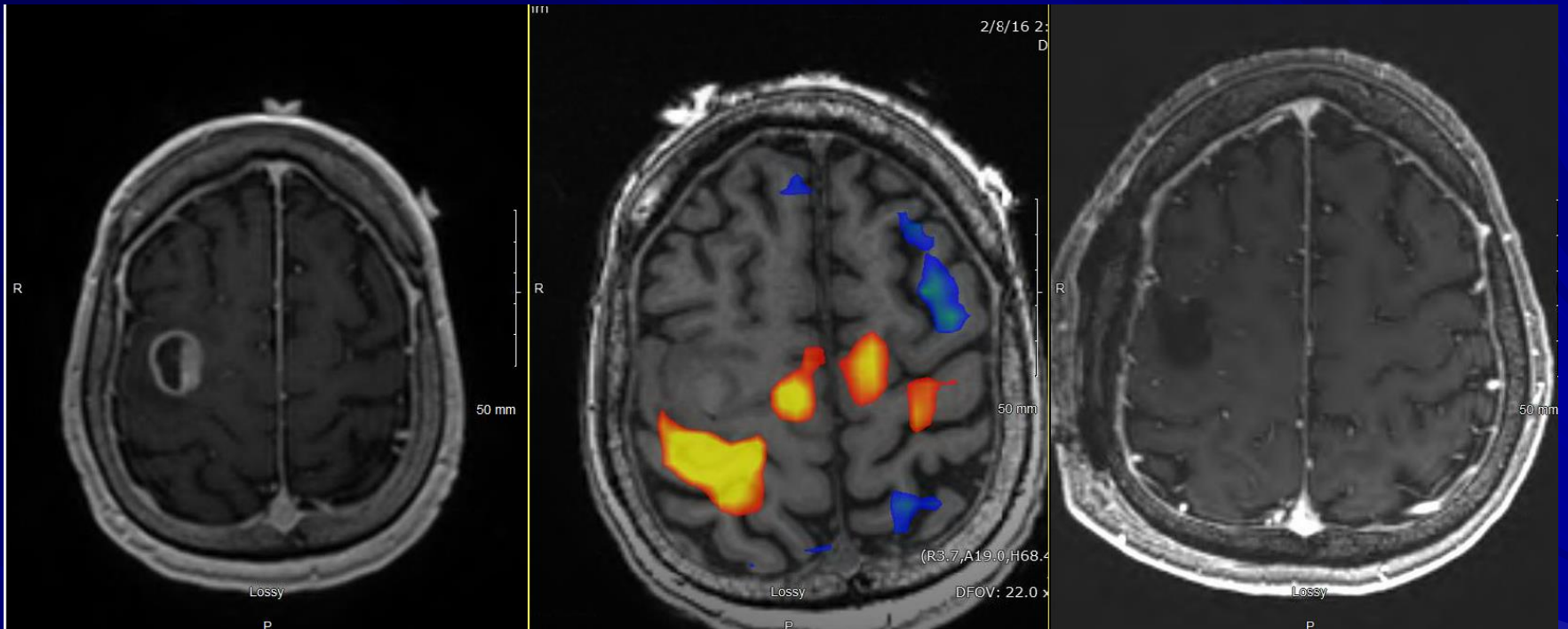


Gliomas - Treatment

- Surgery
- Biopsy
- External Beam XRT
- Chemotherapy (Temodar)

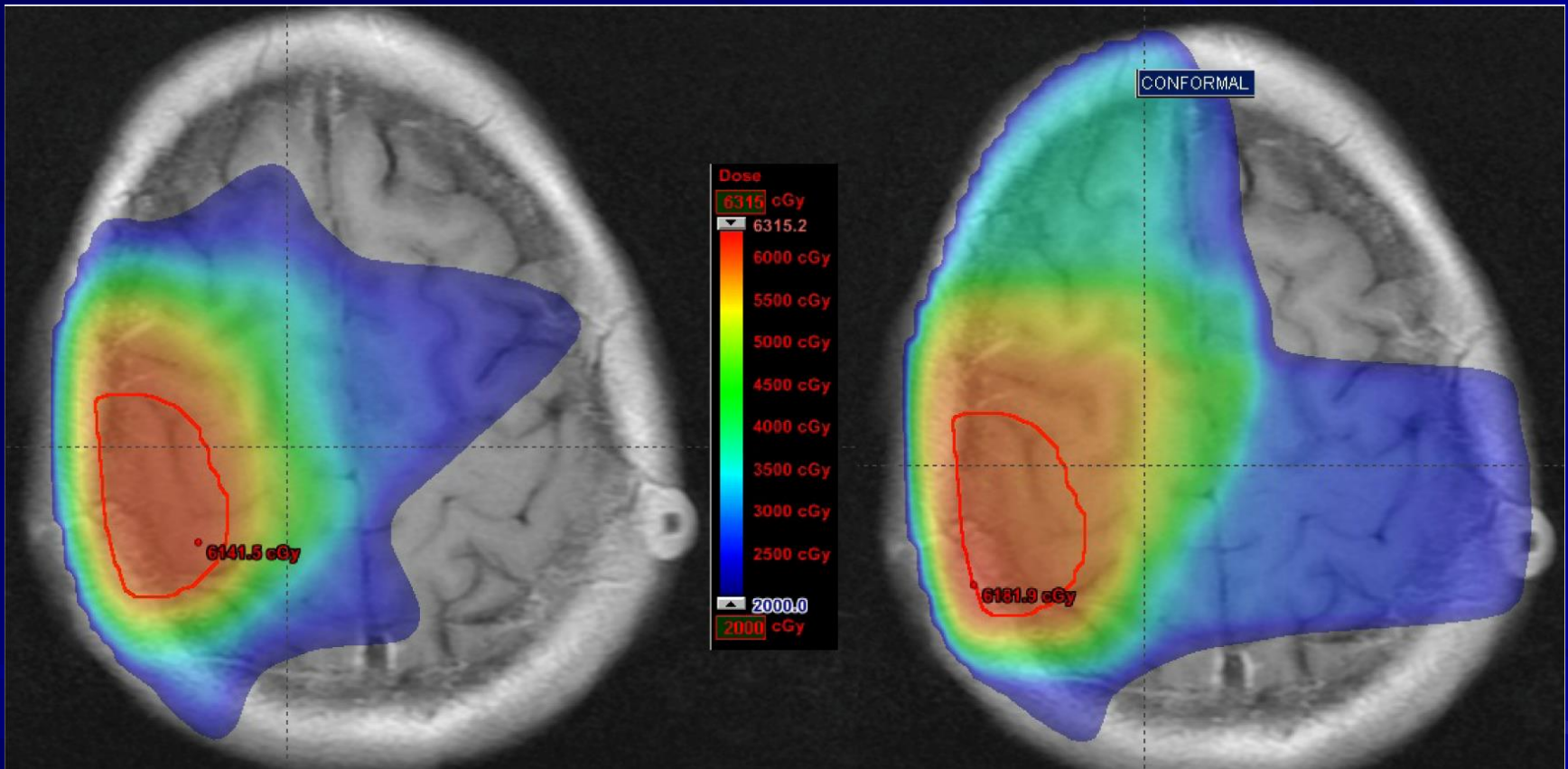


Glioblastoma



Survival Related to Extent of Resection

Glioblastoma



Typical IMRT course is Monday-Friday for 6 weeks.

Glioblastoma – Standard Therapy

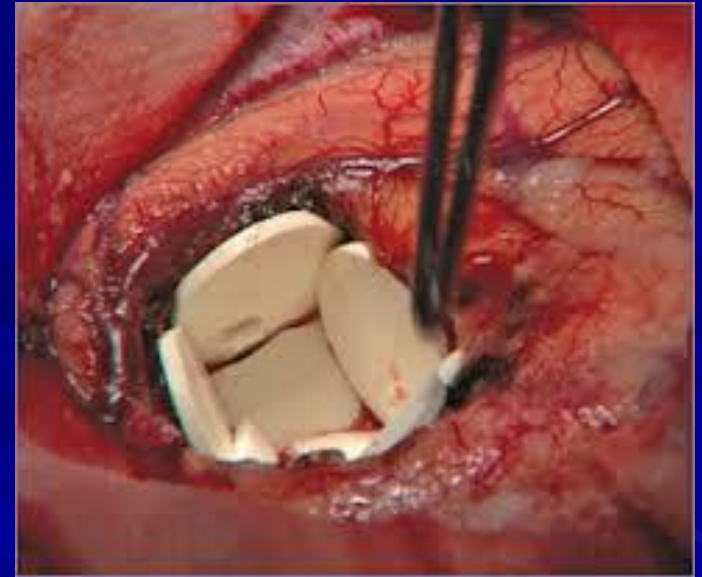
- Diagnosis
- Surgery if resectable
- RT and Oral Chemotherapy (Temazolamide)

Glioblastoma

- Monitor for recurrence
- If recurrence, assess for possible re-resection
- May add additional chemotherapy

GBM – Additional Therapies

- Gliadel wafers can be inserted



GBM – Additional Therapies

■ Vaccines

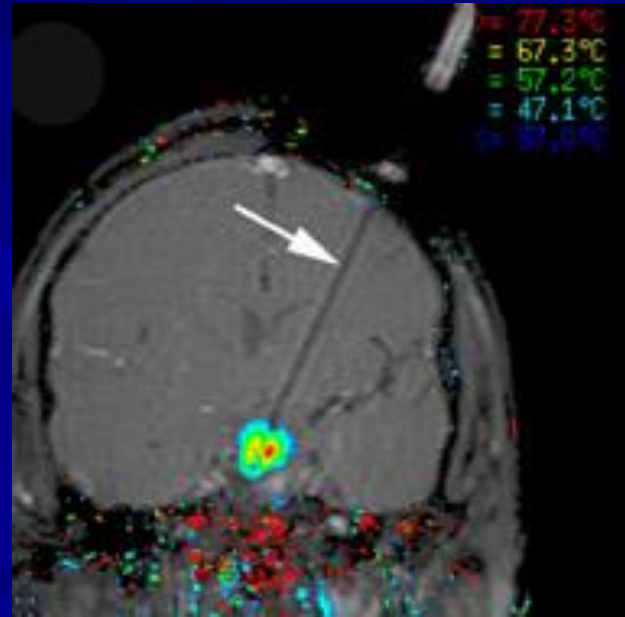
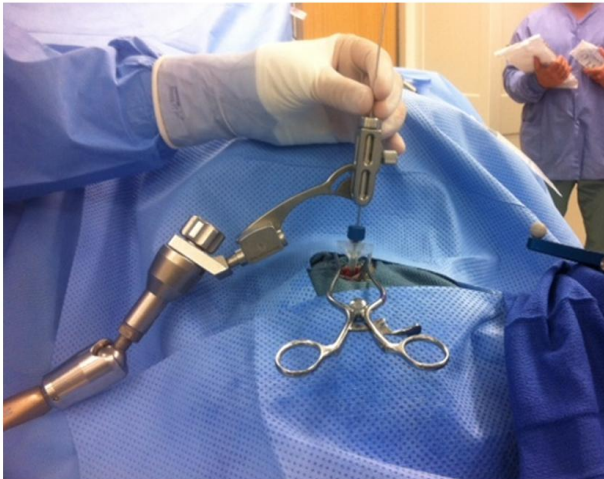


GBM – Additional Therapies



GBM – Additional Therapies

Laser-Interstitial Thermal Therapy (LITT)

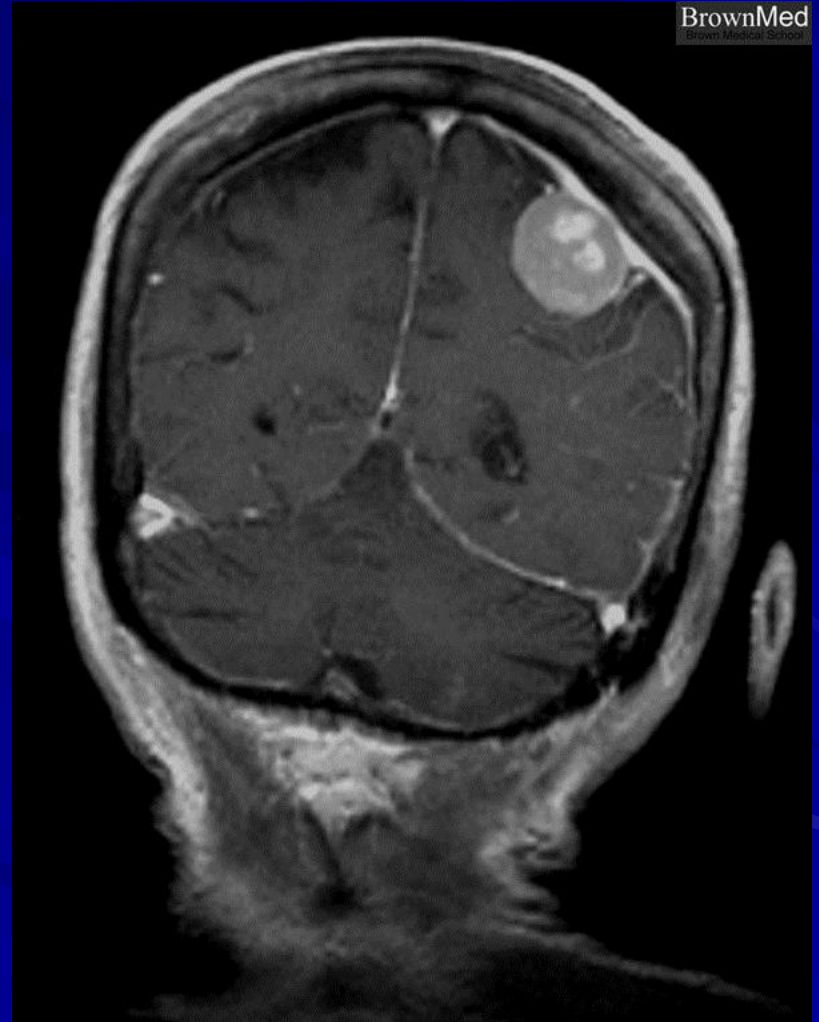


GBM – Additional Therapies

Stereotactic Radiosurgery



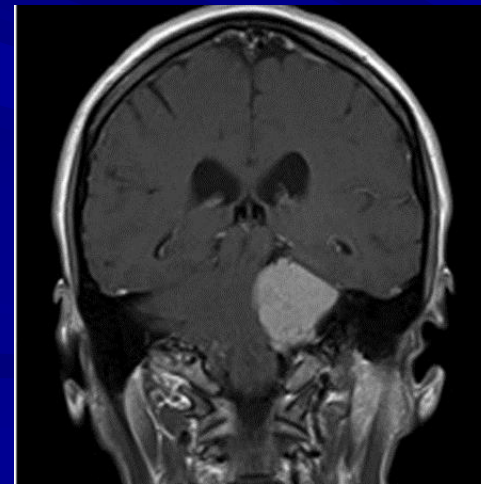
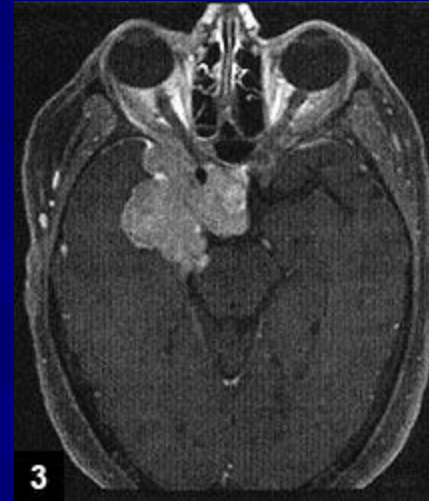
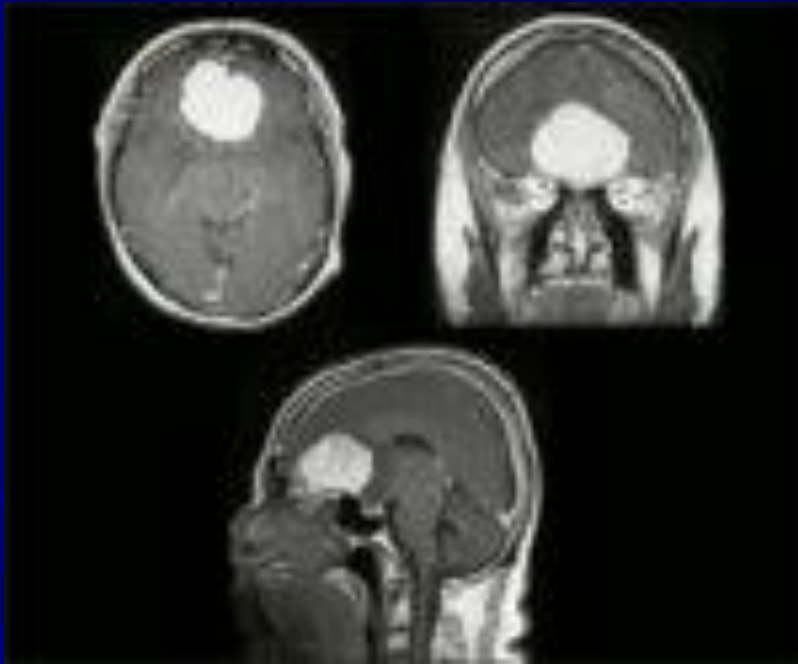
Meningiomas



Meningiomas

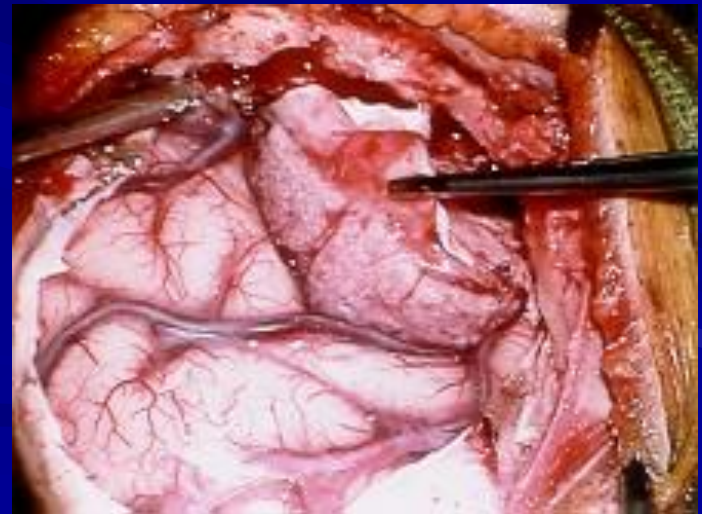
- Develop from arachnoid cap cells
- More common in females
- Most are WHO I
- WHO II, III, IV “malignant meningiomas”

Meningiomas



Meningiomas - Treatment

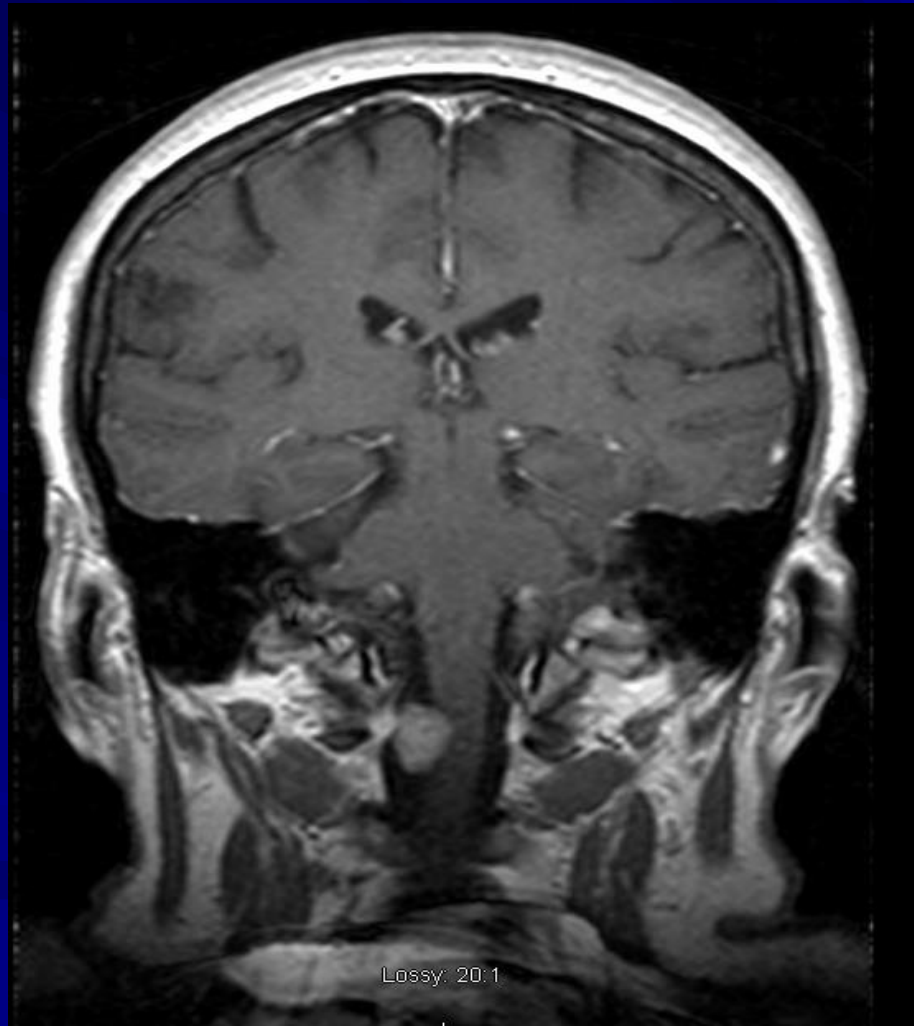
- Anti-epileptics, steroids in some instances
- Observation
- Gamma Knife (<3 cm)
- Open Surgery



Meningiomas

- 62 yo female presented with gait instability
- On PE, had an ataxic gait and lower extremity hyperreflexia

Meningiomas



Meningiomas

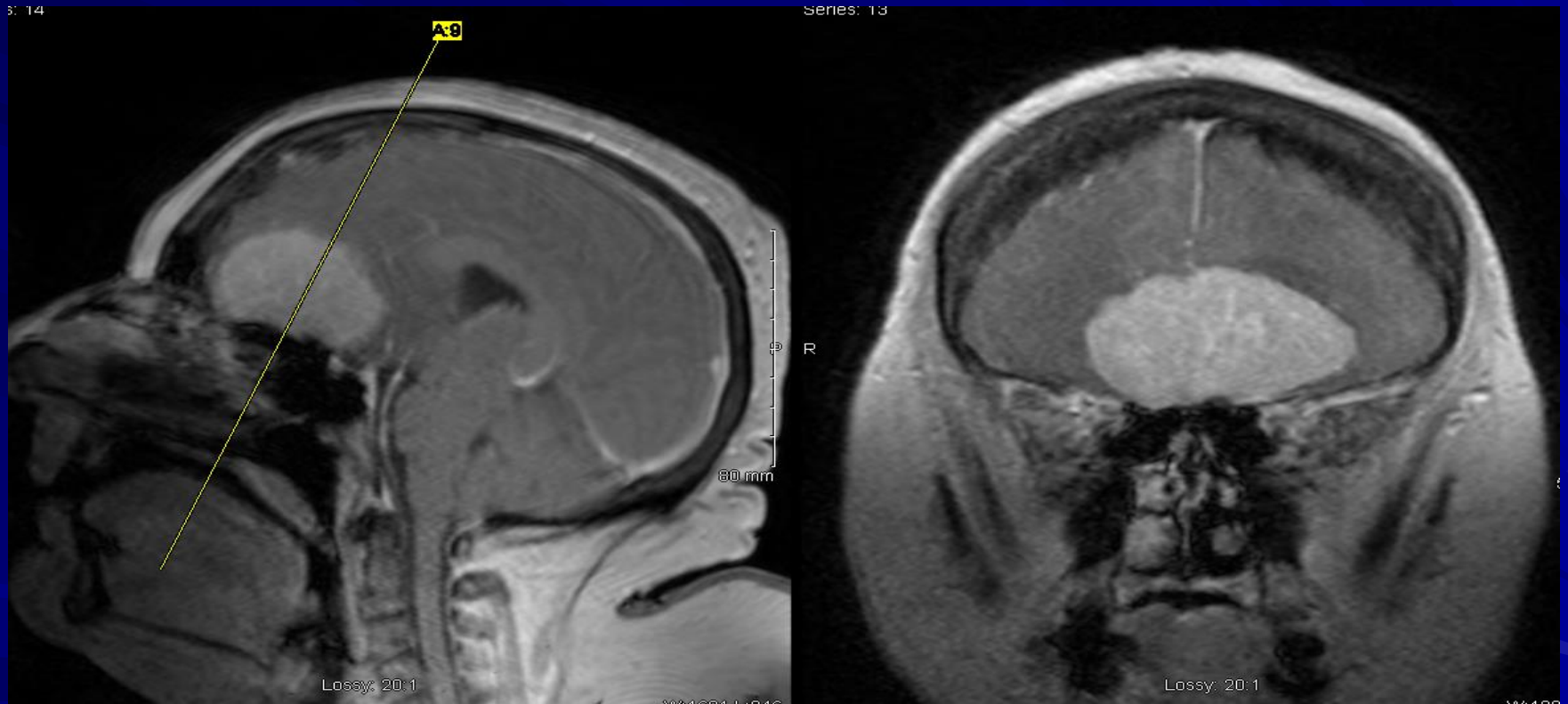
- 60 yo female presents with change of personality
- Over the past 6 months – 1 year, patient has been confused and has poor short-term memory
- Always pleasant, which is unusual
- Diagnosed with “Depression with psychotic features”

Meningiomas

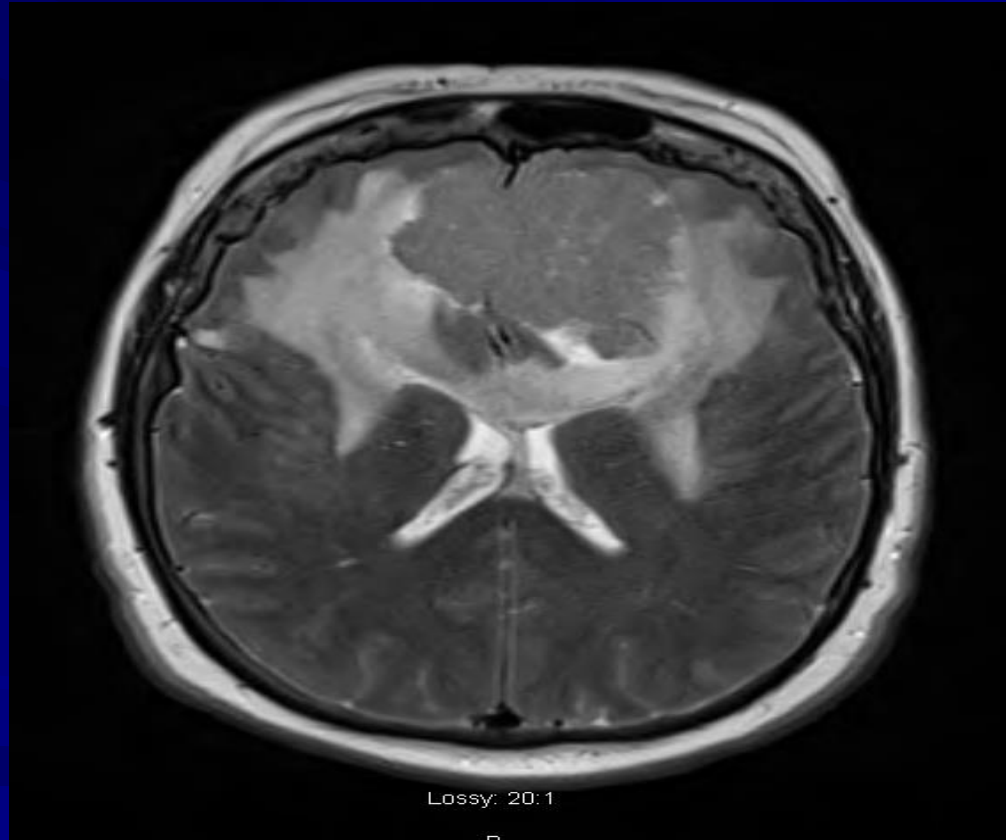
Exam:

- Awake and pleasant
- Obese
- Confused, poor recall
- No sense of smell
- Some difficulty moving legs

Meningiomas



Meningiomas

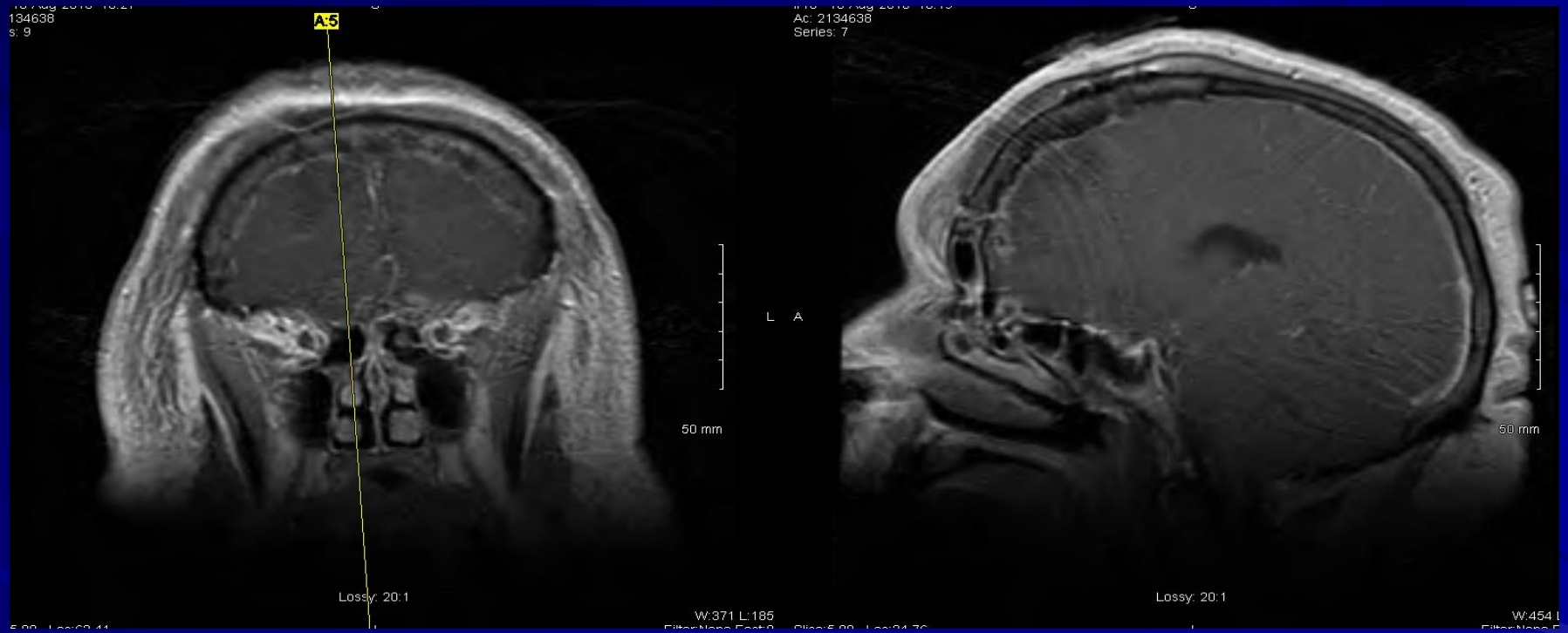


Meningiomas

- Patient started on steroids and anti-epileptics
- Underwent bifrontal craniotomy for tumor removal



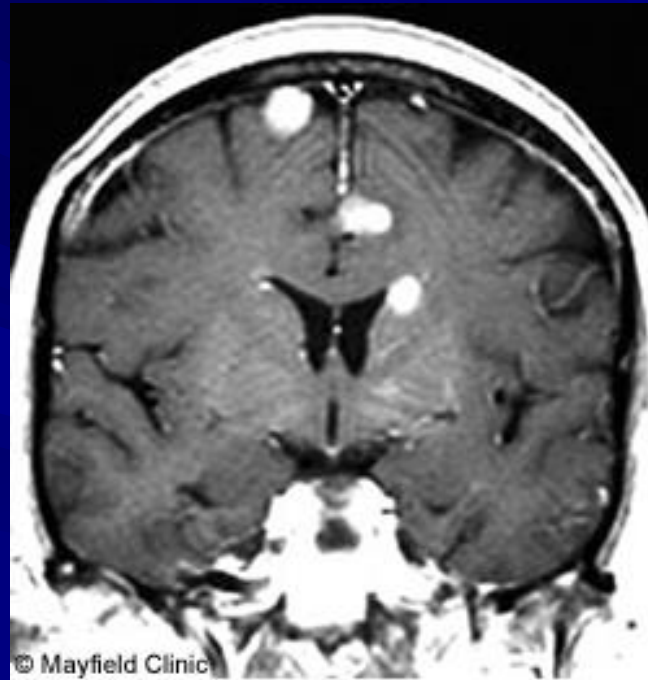
Meningiomas



Meningiomas

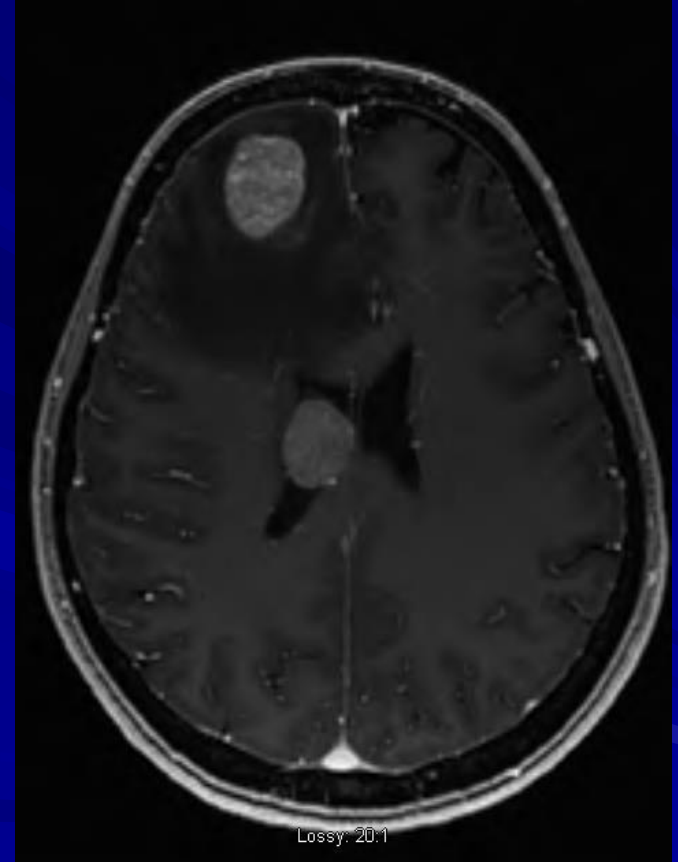
- Patient has had slow recovery over 6 months
- Edema slowly resolving
- Now doing crosswords, but still a short-term memory deficit

Metastatic Tumors



Metastatic Tumors

- Single lesion < 3 cm –
Gamma Knife
- Single lesion > 3 cm –
Open Surgery
- Multiple lesions:
Gamma Knife vs. XRT



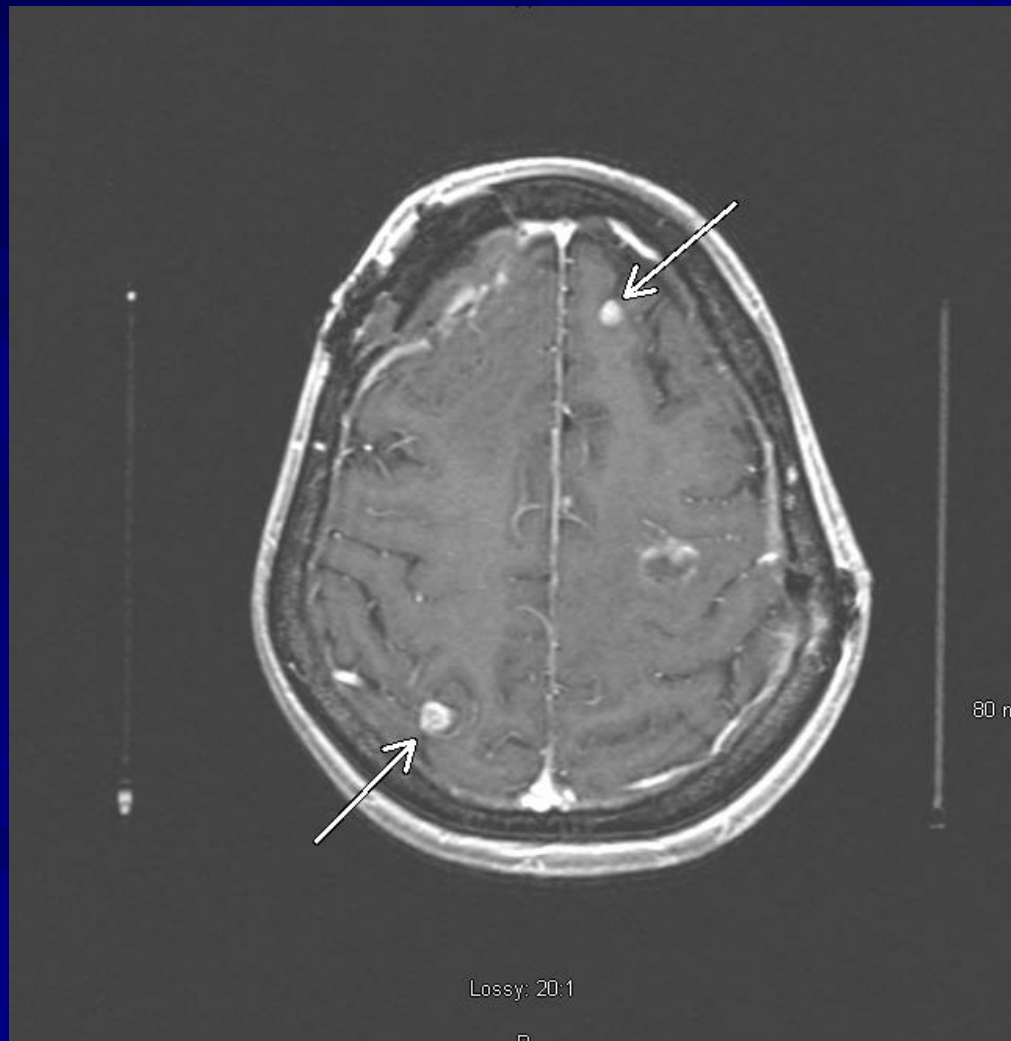
Gamma Knife Radiosurgery



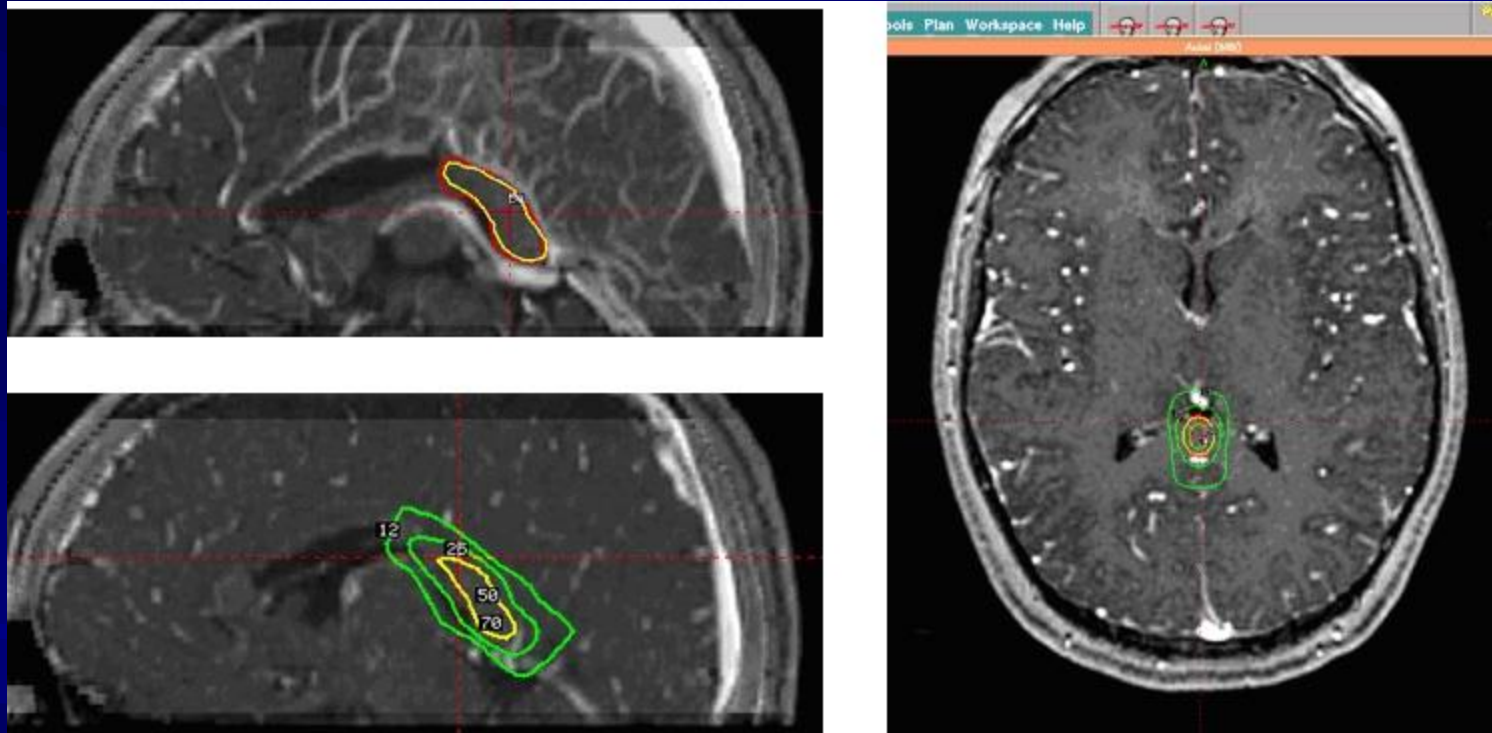
Gamma Knife Radiosurgery



Gamma Knife Radiosurgery



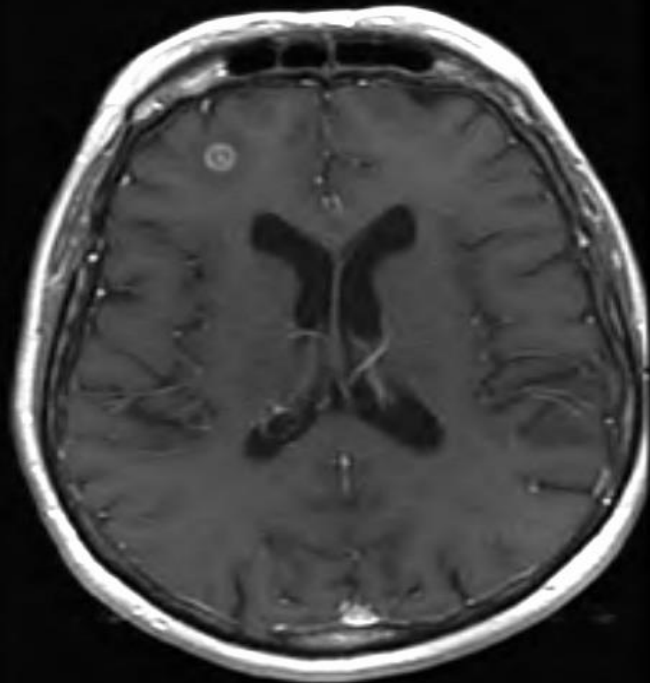
Gamma Knife Radiosurgery



Gamma Knife Radiosurgery

#16 16-Sep-2010 11:43
Ac: 2141329
Series: 9

A



Lossy: 20:1

50 mm

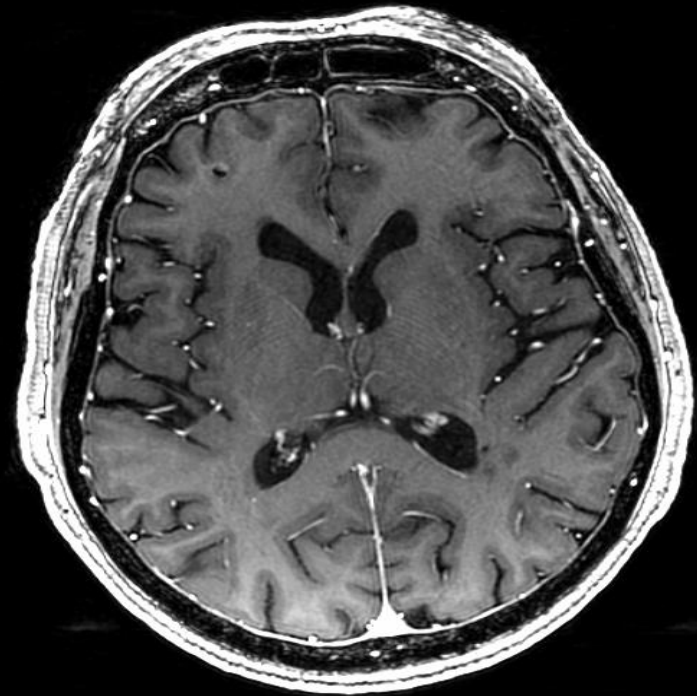
W:232 L:115
Filter:None Fact:0

Slice:5.00 Loc:5.53

P

#84 04-Feb-2011 13:43
Ac: 2176359
Series: 8

A



50 mm

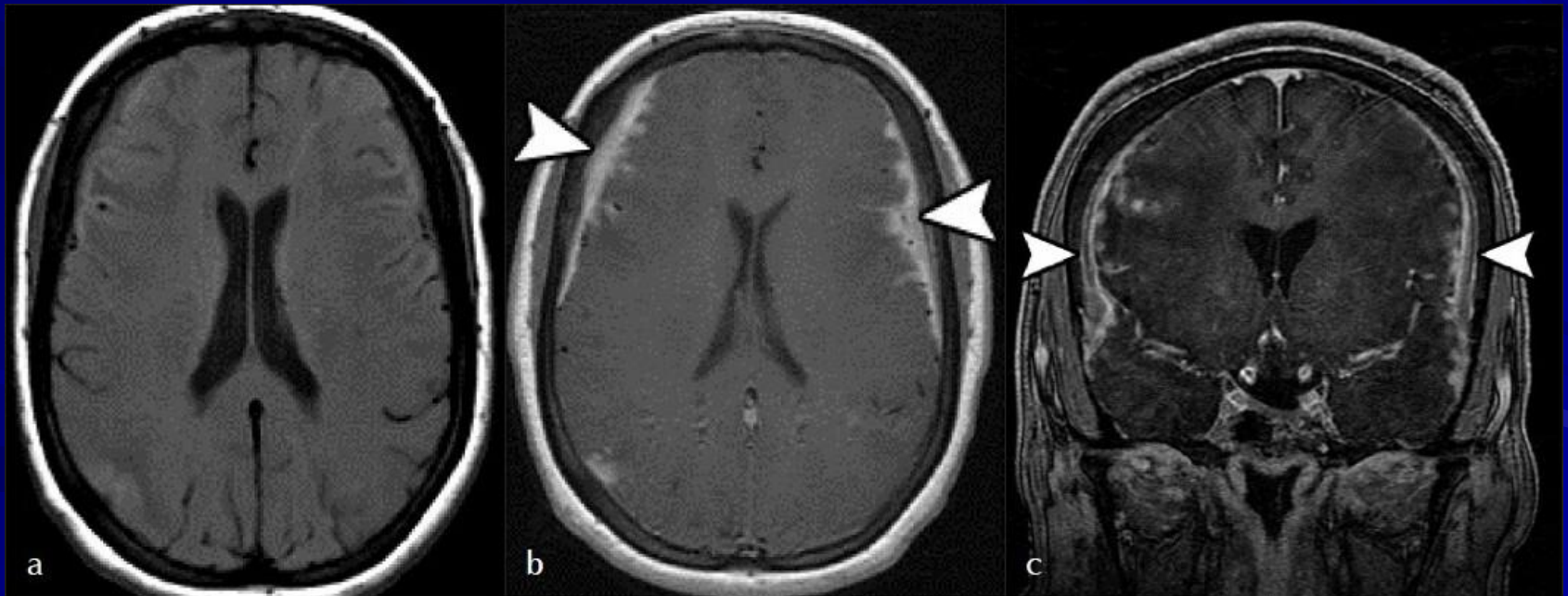
W:4162 L:2325
Filter:None Fact:0

Slice:1.40 Loc:6.22

P

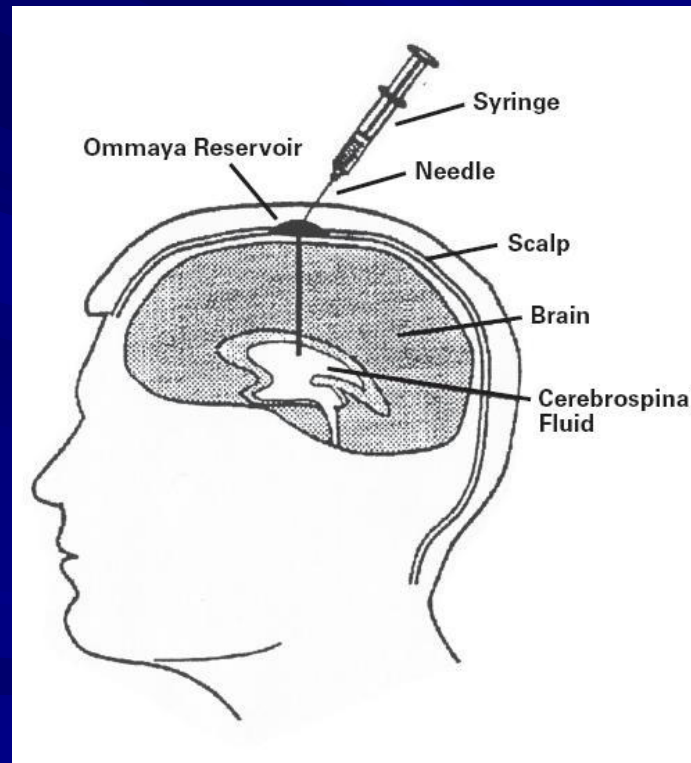
Leptomeningeal Disease

- Poor prognosis
- Patients may develop cranial nerve palsies

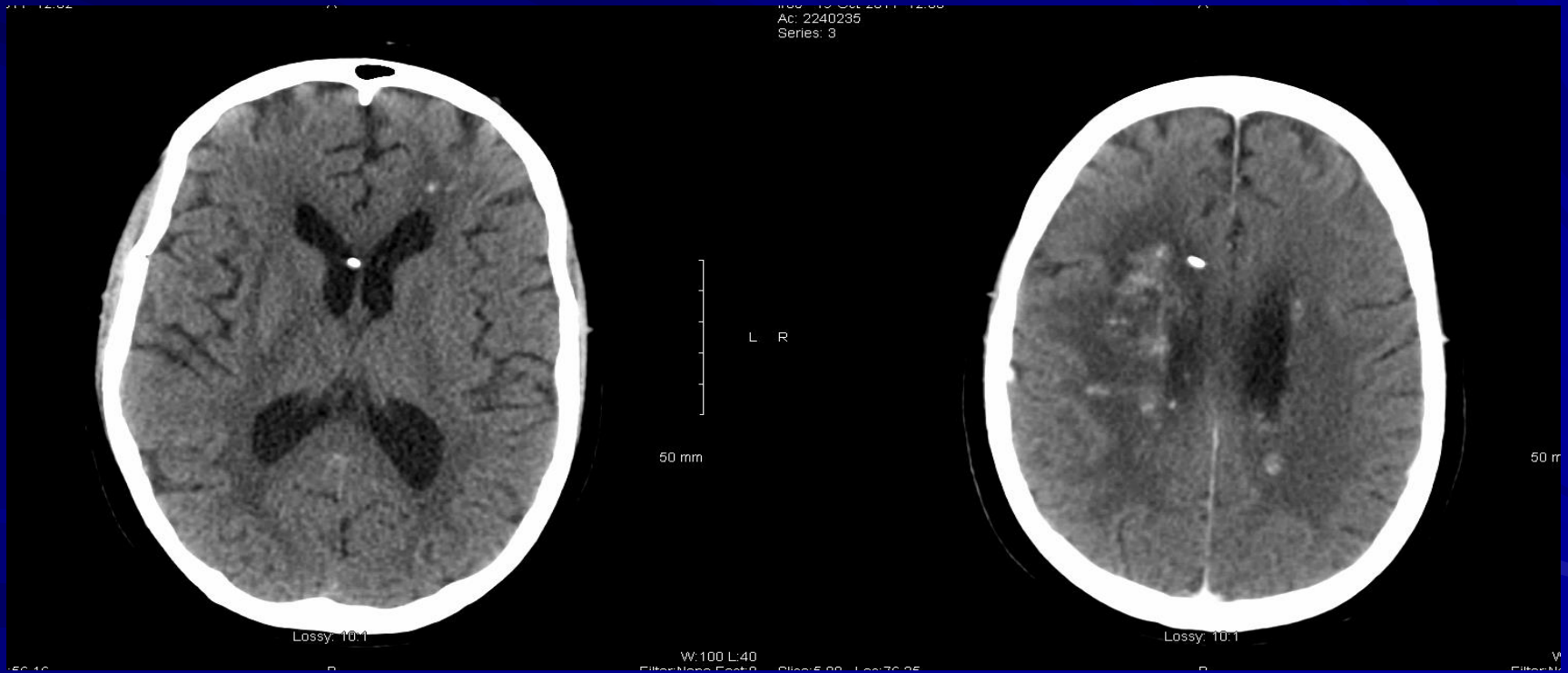


Leptomeningeal Disease

■ Intrathecal chemotherapy



Leptomeningeal Disease

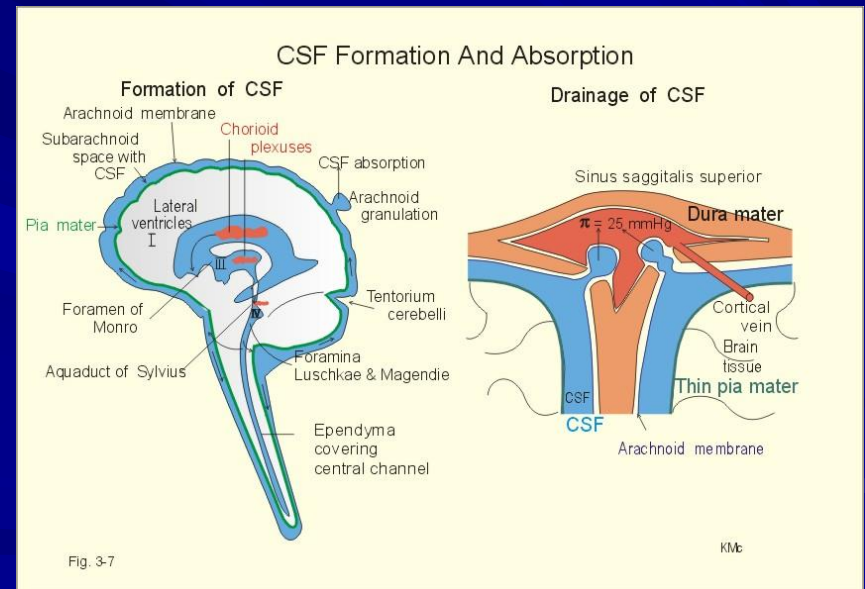
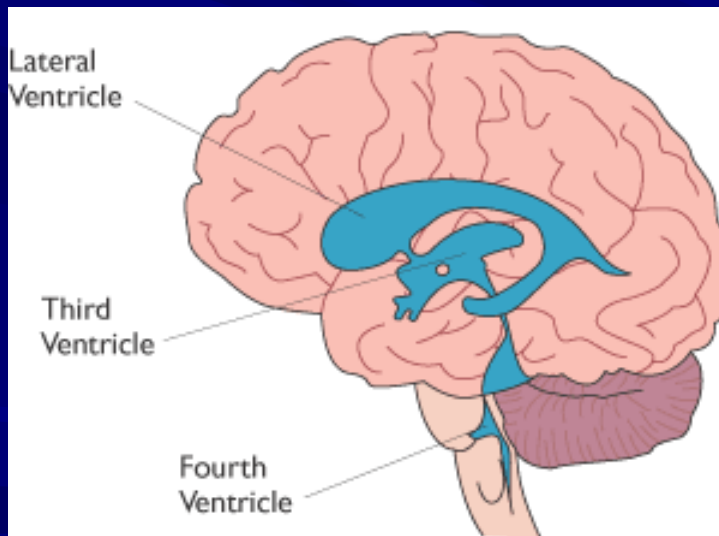


Leptomeningeal Disease



Hydrocephalus

- Cerebrospinal fluid build-up resulting in an increased intracranial pressure



Hydrocephalus

- Patients develop symptoms from increased intracranial pressure
- Headaches, N/V, confusion, lethargy, coma

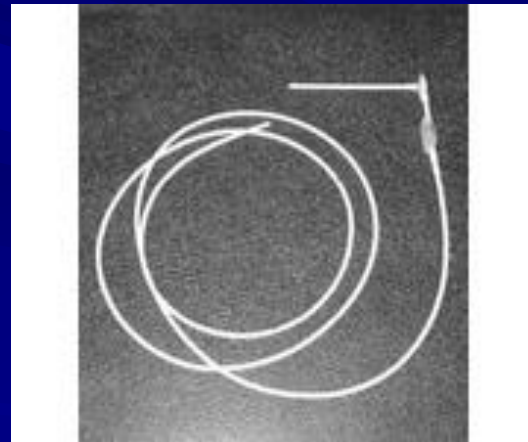
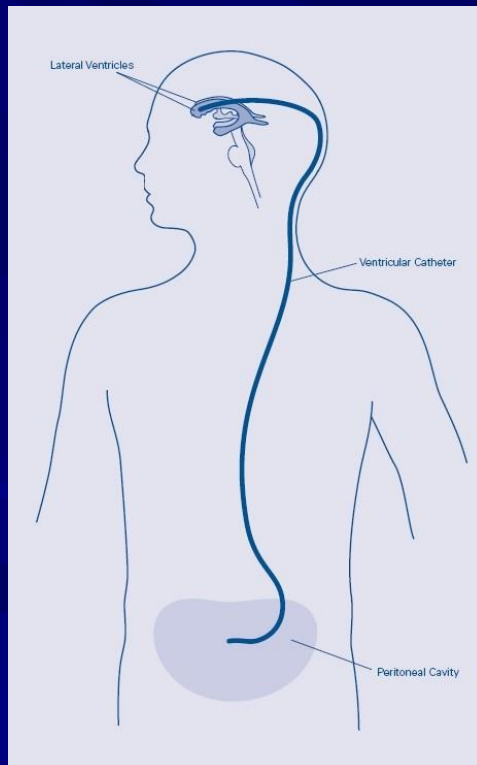
Hydrocephalus

- Can be communicating or obstructive



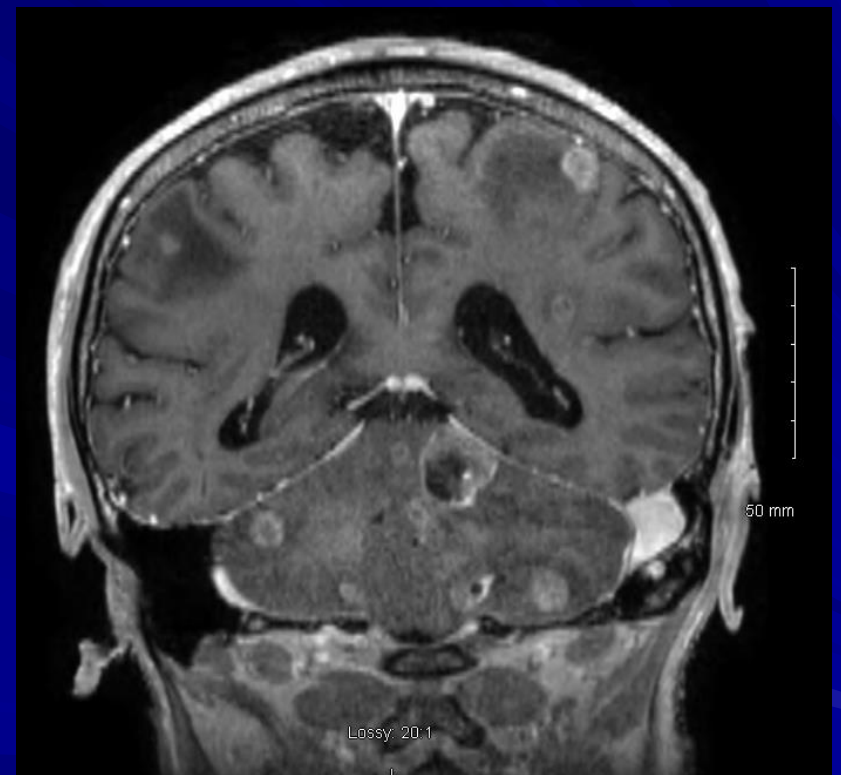
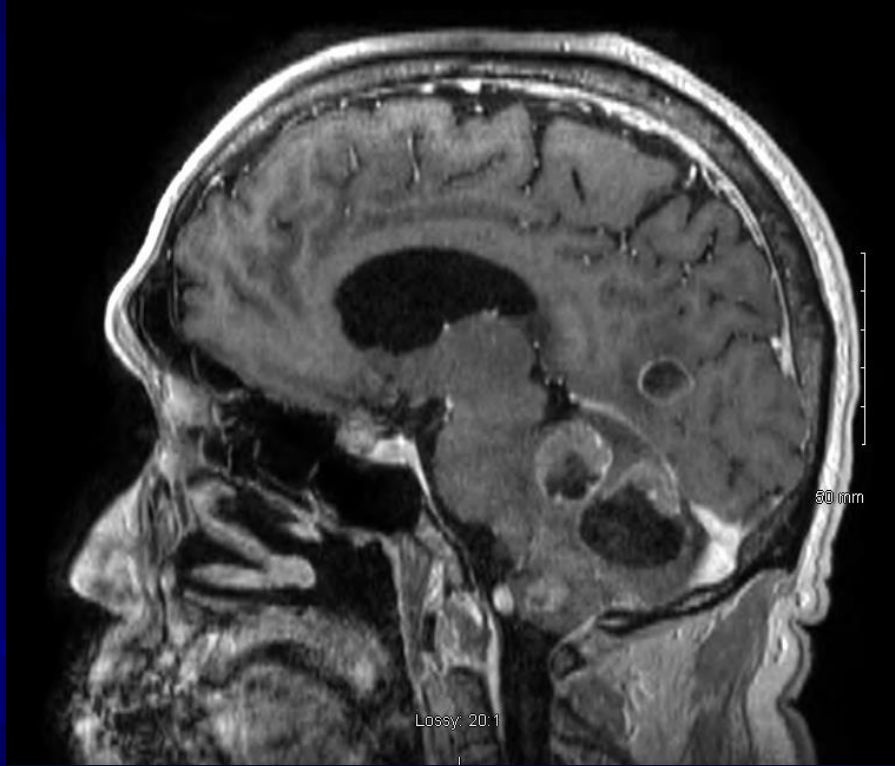
Hydrocephalus

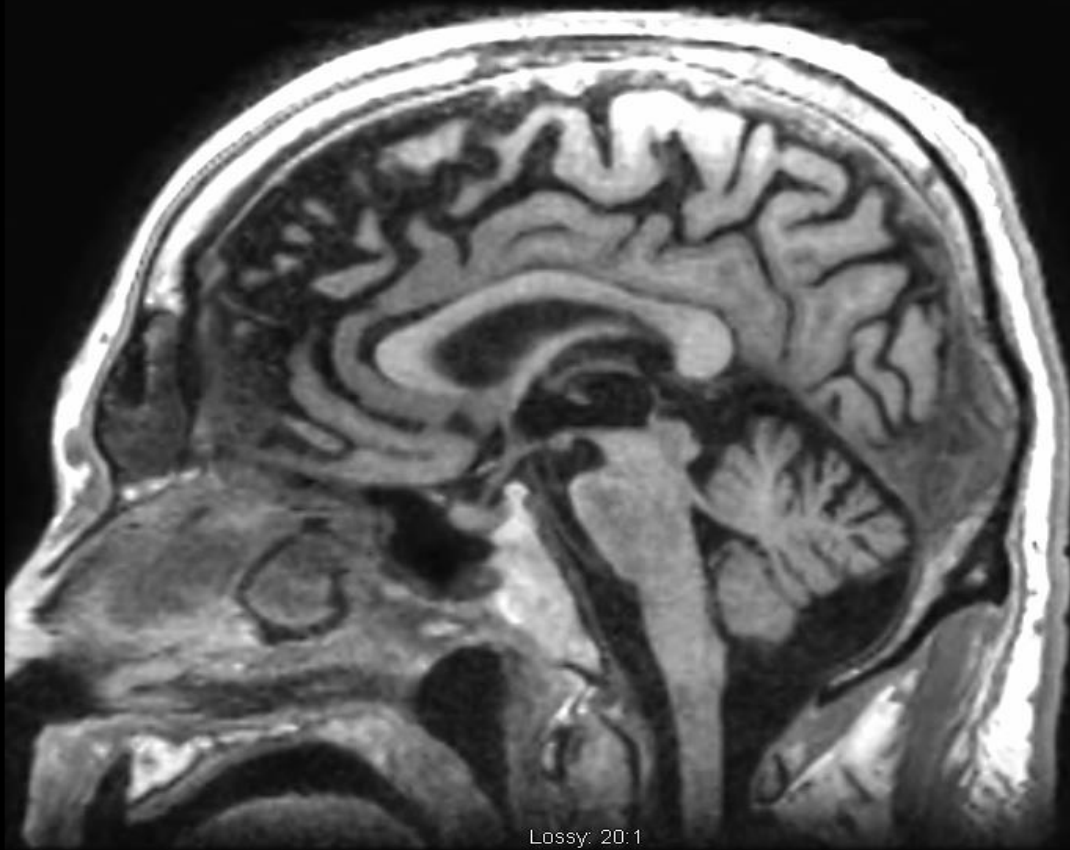
- Treatments include VP Shunt and Endoscopic Third Ventriculostomy (ETV)



Hydrocephalus

- 58 yo man with a history of colon cancer with worsening headaches and confusion
- Patient had just completed external beam radiation tx for multiple brain metastases
- On PE he was confused and sleepy



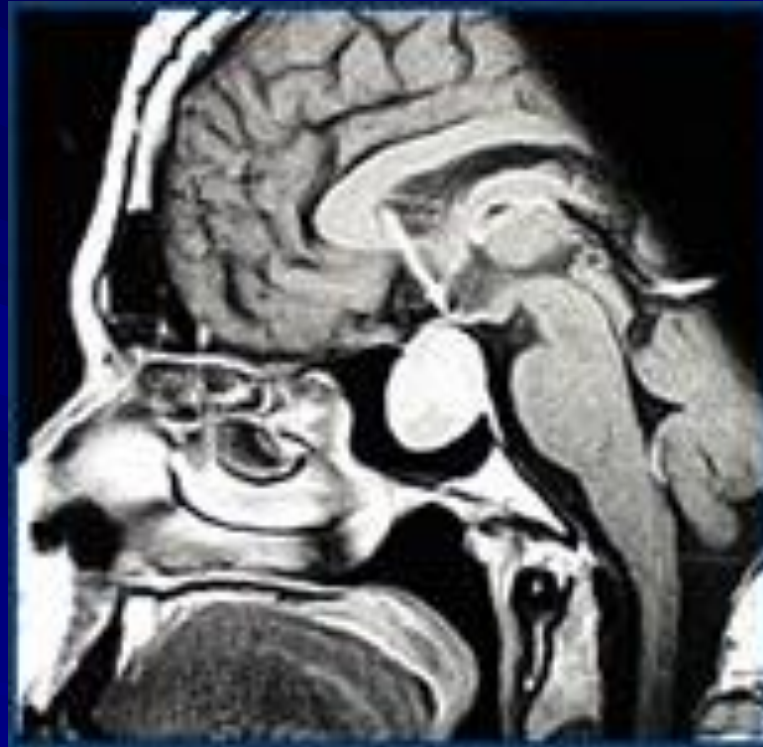


Lossy: 20:1

ETV

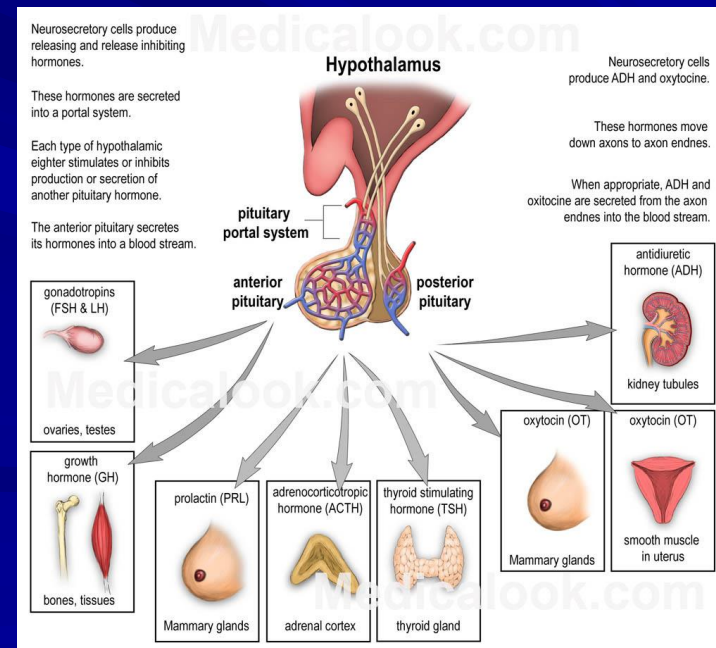
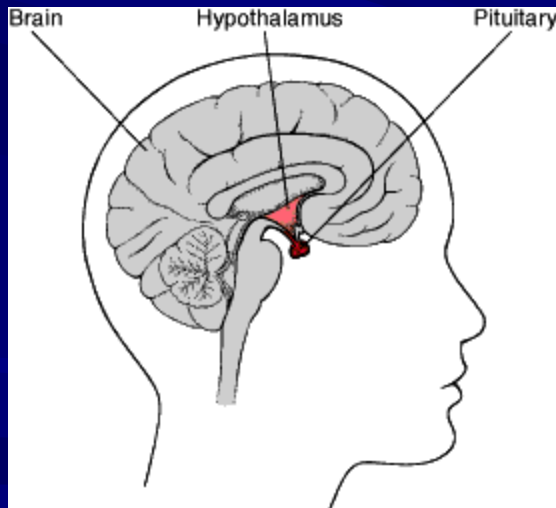


Pituitary Tumors



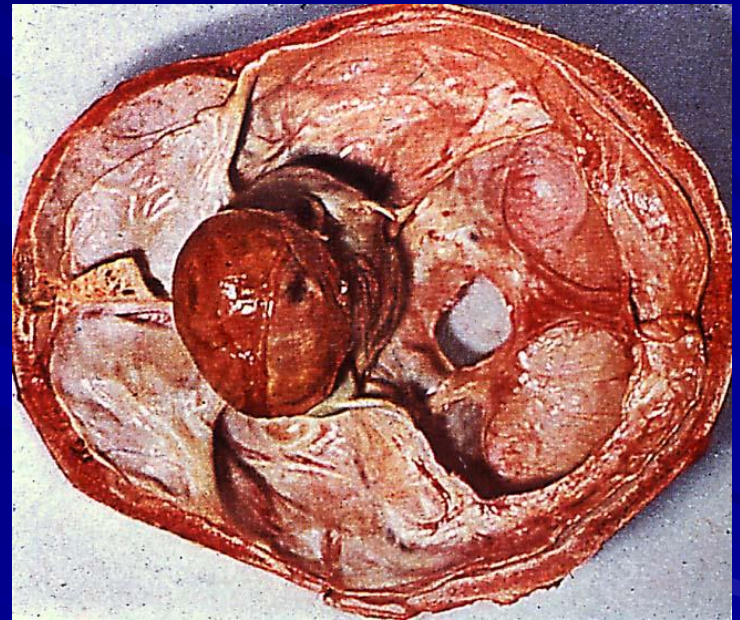
Pituitary Tumors

- Pituitary gland is a marble-sized gland at the base of the brain that controls hormone regulation in the body



Pituitary Tumors

- Most common Pituitary Adenomas (non-secreting)
- Cushing's Disease
- Acromegaly
- Prolactinomas

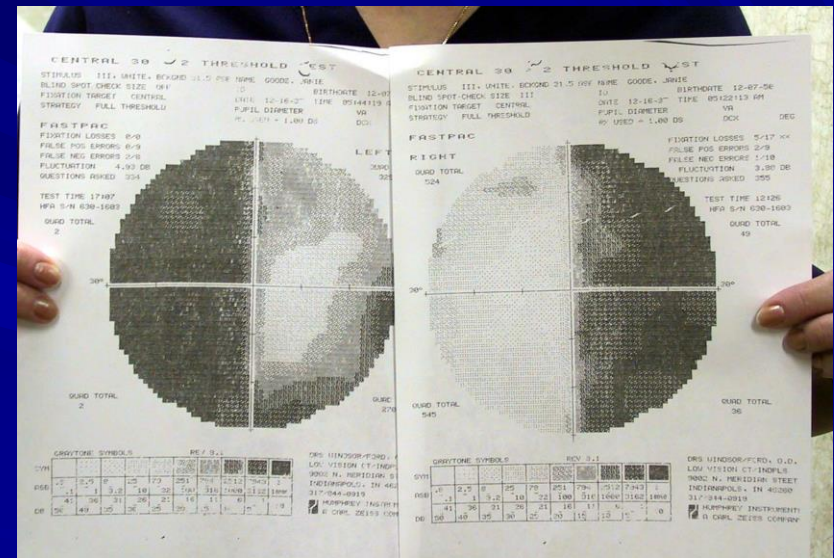
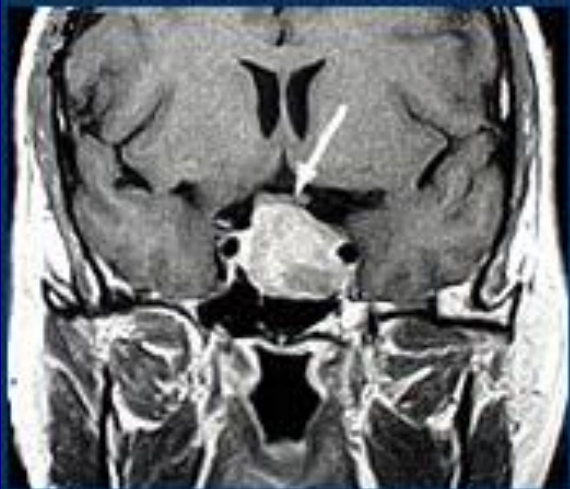


Pituitary Adenoma

- Benign Tumor
- Seen in ~5% of “normal population”
- Microadenoma < 1 cm
- Macroadenoma > 1 cm
- Treat with observation

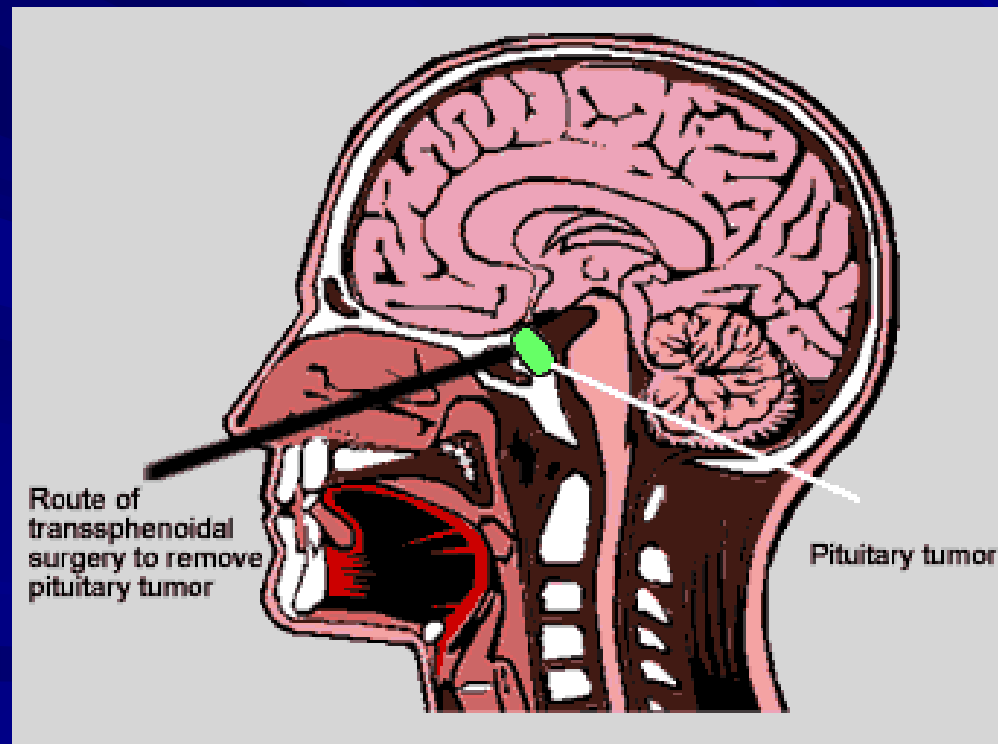
Pituitary Adenoma

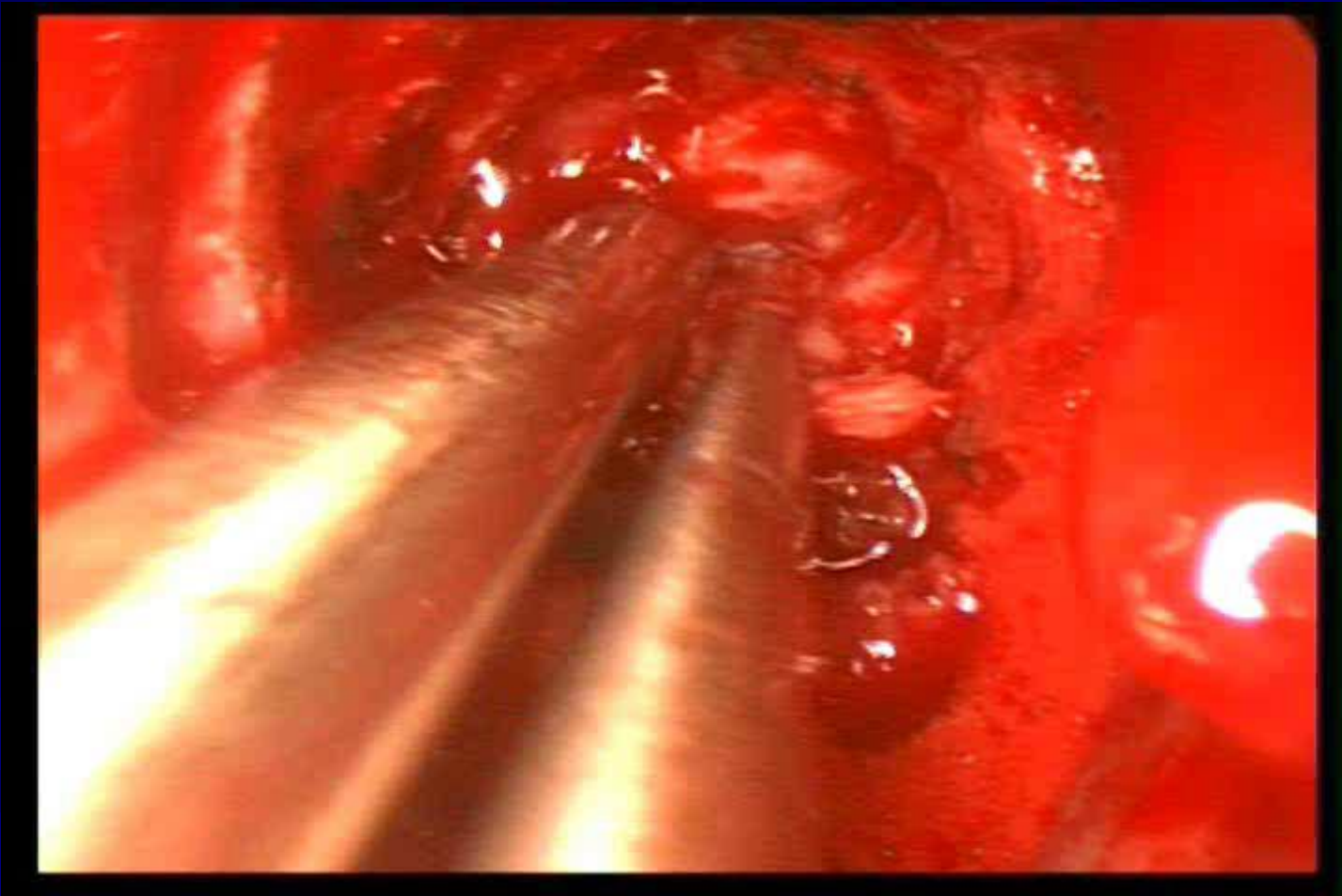
- If it is growing, or putting pressure on surrounding structures should be treated
- Endocrine function
- Visual field testing



Pituitary Adenoma

■ Transsphenoidal Resection



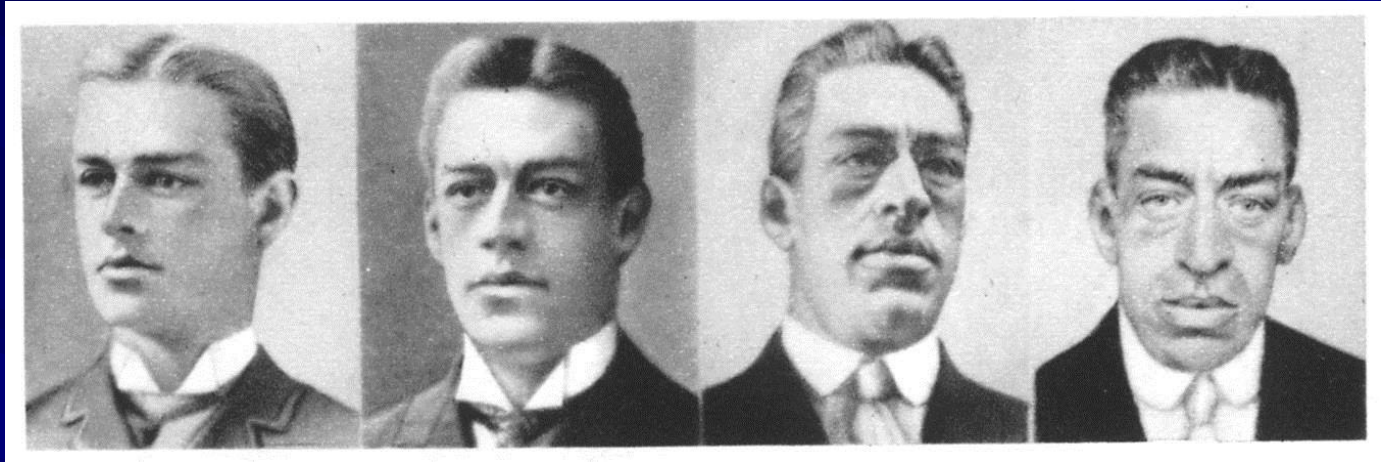


Cushing's Disease

- ACTH-secreting tumor
- Treat with surgical resection



Acromegaly



- Excess growth hormone secretion
- Enlarging hands and feet
- Bilateral carpal tunnel syndrome
- Diabetes mellitus
- Dilated cardiomyopathy

Acromegaly

- Measure IGF-1
- Can try somatostatin analogs
- Oftentimes requires surgical resection



Prolactinoma

- Patient may have nipple discharge
- Elevated Prolactin
- Usually greater than > 200 ng/mL
- Can be treated with Bromocriptine

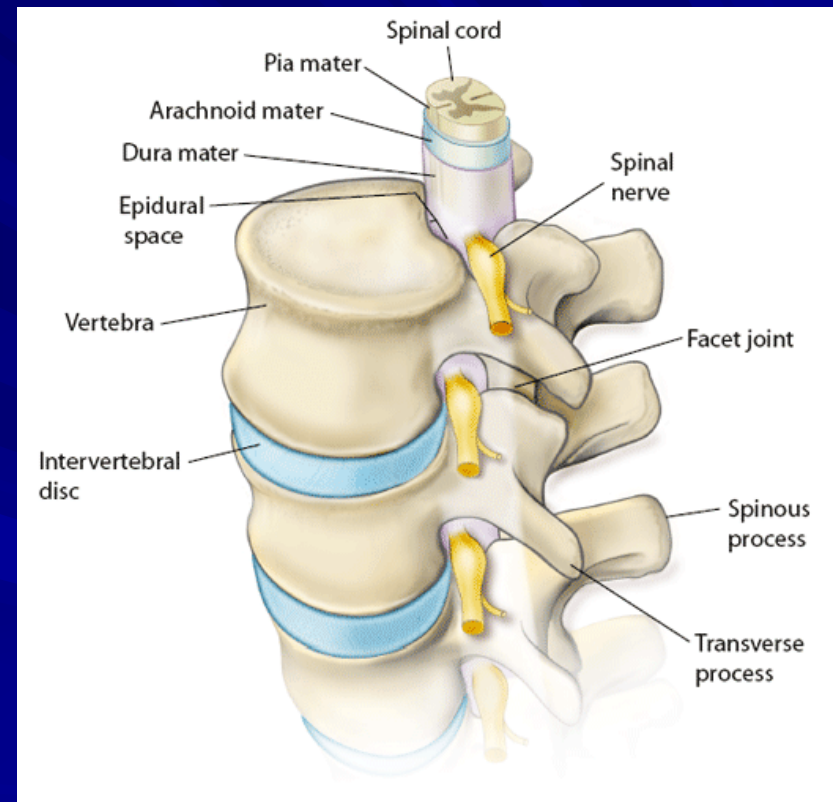


Spinal Metastatic Disease



Spinal metastatic disease

- Most frequent area of spine for metastases is vertebral body
- May present with pain or neurologic deficit



Spinal metastatic disease

Spinal Cord Compression:

- Myelopathy – hyperreflexia, clonus
- Numbness
- Weakness
- Incontinence



Spinal metastatic disease

General Indications for surgery:

- Neurologic deficit
- Spinal Instability

Spinal Metastatic Disease

[Lancet](#), 2005 Aug 20-26;366(9486):643-8.

Direct decompressive surgical resection in the treatment of spinal cord compression caused by metastatic cancer: a randomised trial.

[Patchell RA](#), [Tibbs PA](#), [Regine WF](#), [Payne R](#), [Saris S](#), [Kryscio RJ](#), [Mohiuddin M](#), [Young B](#).

Department of Surgery (Neurosurgery), University of Kentucky Medical Center, Lexington, KY 40536, USA. rpitchell@aol.com

Abstract

BACKGROUND: The standard treatment for spinal cord compression caused by metastatic cancer is corticosteroids and radiotherapy. The role of surgery has not been established. We assessed the efficacy of direct decompressive surgery.

METHODS: In this randomised, multi-institutional, non-blinded trial, we randomly assigned patients with spinal cord compression caused by metastatic cancer to either surgery followed by radiotherapy (n=50) or radiotherapy alone (n=51). Radiotherapy for both treatment groups was given in ten 3 Gy fractions. The primary endpoint was the ability to walk. Secondary endpoints were urinary continence, muscle strength and functional status, the need for corticosteroids and opioid analgesics, and survival time. All analyses were by intention to treat.

FINDINGS: After an interim analysis the study was stopped because the criterion of a predetermined early stopping rule was met. Thus, 123 patients were assessed for eligibility before the study closed and 101 were randomised. Significantly more patients in the surgery group (42/50, 84%) than in the radiotherapy group (29/51, 57%) were able to walk after treatment (odds ratio 6.2 [95% CI 2.0-19.8] p=0.001). Patients treated with surgery also retained the ability to walk significantly longer than did those with radiotherapy alone (median 122 days vs 13 days, p=0.003). 32 patients entered the study unable to walk; significantly more patients in the surgery group regained the ability to walk than patients in the radiation group (10/16 [62%] vs 3/16 [19%], p=0.01). The need for corticosteroids and opioid analgesics was significantly reduced in the surgical group.

INTERPRETATION: Direct decompressive surgery plus postoperative radiotherapy is superior to treatment with radiotherapy alone for patients with spinal cord compression caused by metastatic cancer.

Patchell Study

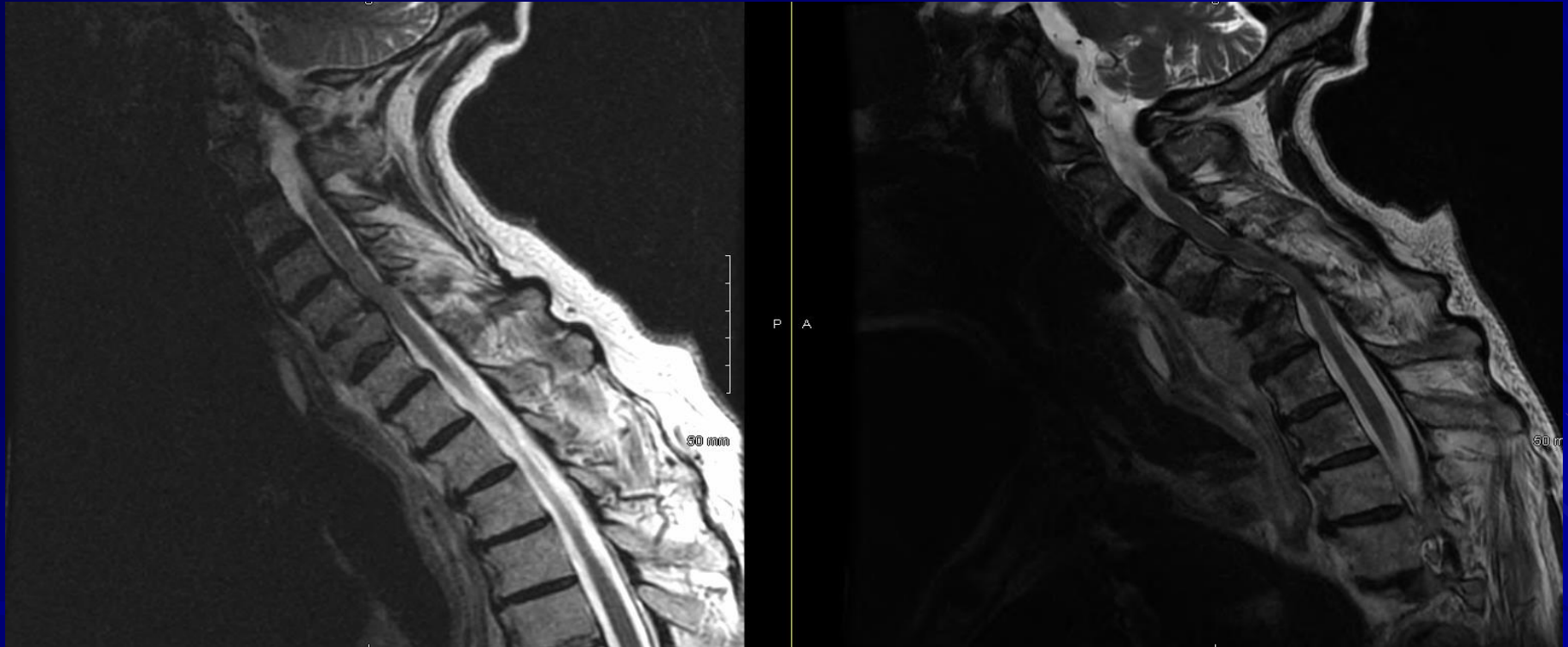
- Non-blinded randomized controlled trial
- Patients with metastatic disease causing spinal cord compression
- Radiation alone (n=51)
- Surgery + Radiation (n=50)
- Primary endpoint ability to ambulate

Patchell Study

Surgical group:

- Improved ambulation
- Improved survival and functional status
- Decreased need for steroids and opioids

Spinal Metastatic Disease



Spinal Metastatic Disease

- <3 months prognosis – Surgery not indicated
- 3-6 months prognosis – Grey zone
- >6 months prognosis – Consider surgery

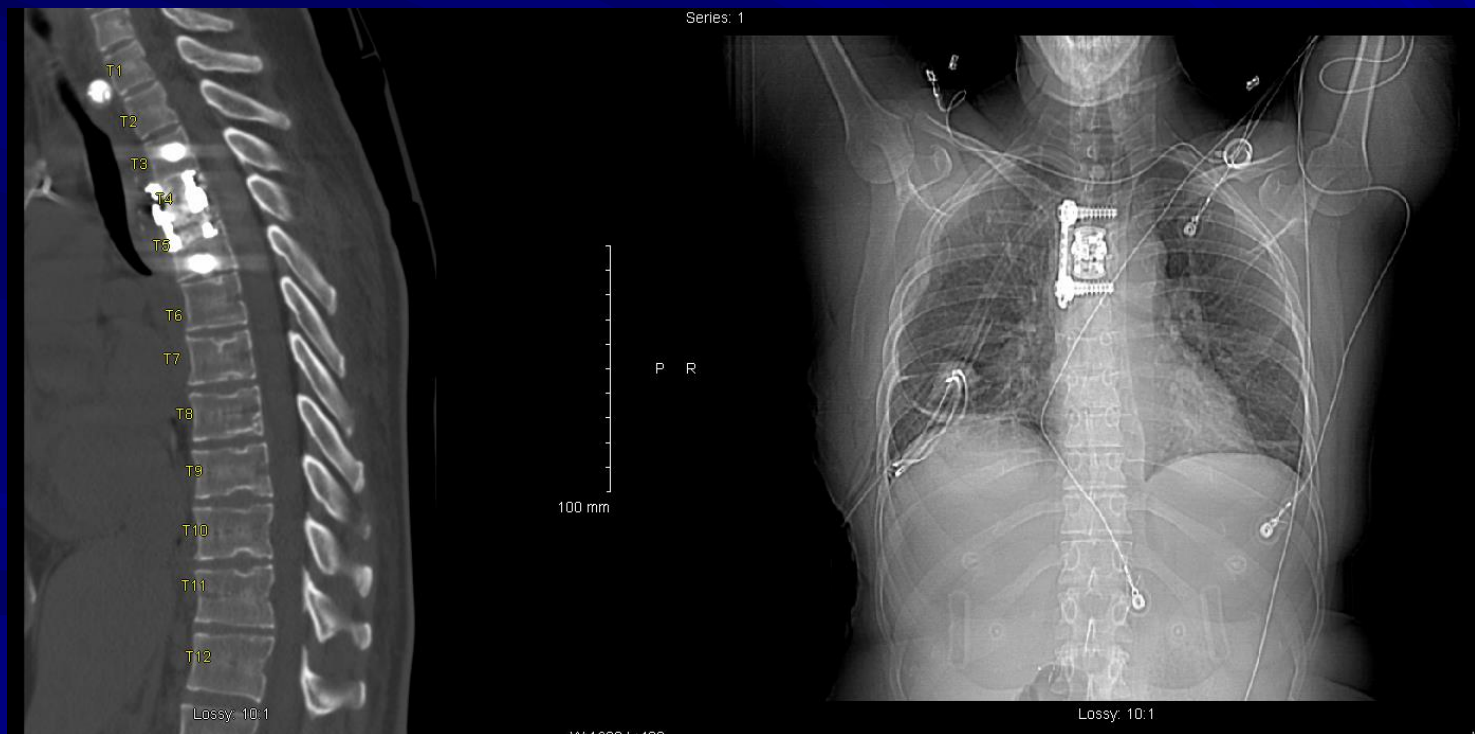


Spine Case

- 42 yo female with colon adenocarcinoma and back pain
- PET scan “hot” in thoracic spine
- Full strength on exam, hyperreflexic



■ Underwent thoracic corpectomy and fusion followed by radiation

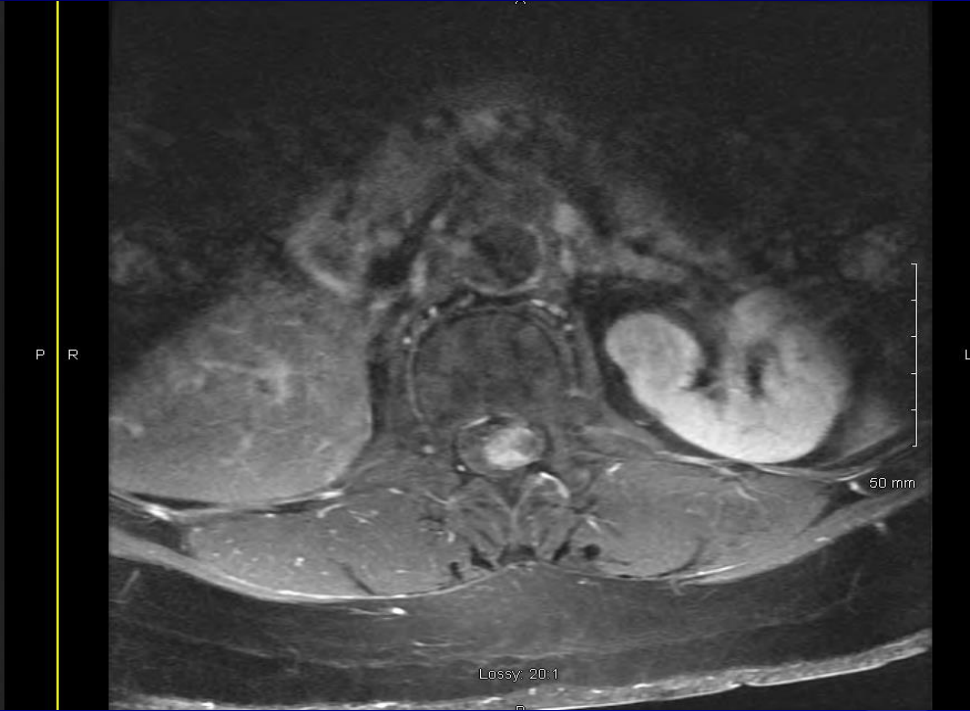


Case

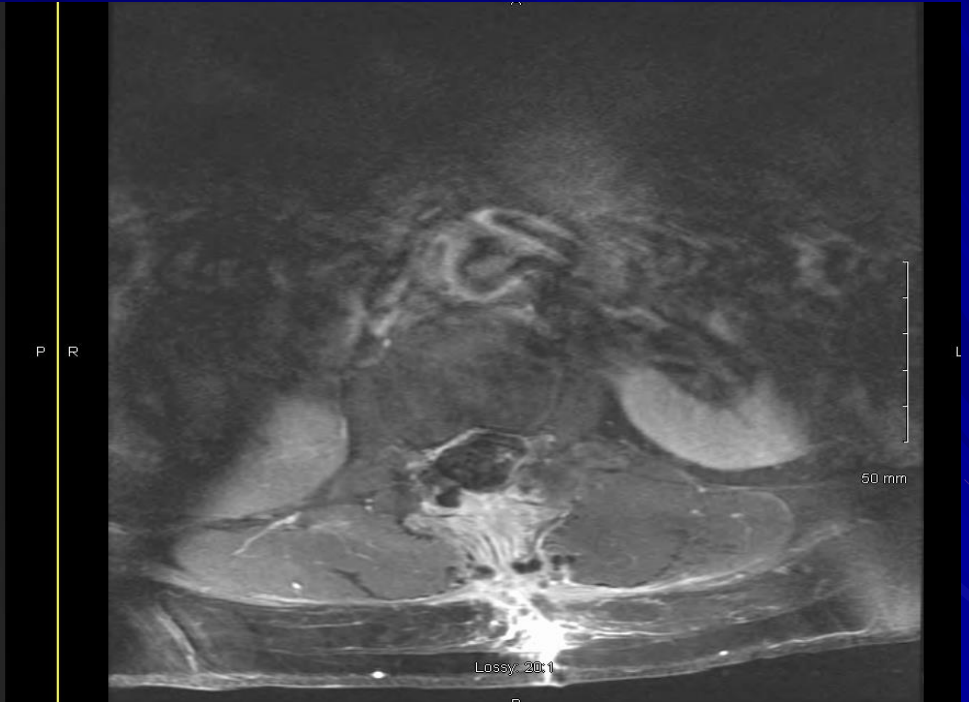
Intradural Intramedullary Metastasis

Intradural Intramedullary Metastasis

- 66 yo Left LE pain and weakness
- Hx of Renal mass removed 2 years ago at OSH without follow-up
- L4 radiculopathy and Left 4/5 dorsiflexion







Summary

- Consider surgery when evaluating patients with spinal metastatic disease
- Patients with a neurologic deficit from spinal compression and > 6 months prognosis are the best candidates

Learning Points

- Dexamethasone Side Effects
- High Grade glioma = GBM
- Standard GBM Therapy
- Meningioma
- Hydrocephalus
- Intrathecal Chemotherapy
- Pituitary Tumor Effects
- Indications for Spine surgery

Thank you!

