Metastatic Brain Tumors

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Metastatic Brain Tumors

- The most common brain tumors seen clinically
- 70% are multiple on MRI at the time of onset of neurologic symptoms (CT – 50%)
- 11% of solitary brain lesions in a pt with a history of cancer, will not be metastases. So biopsy is a must in those pts
- Median survival with maximum treatment 8 mths (like GBM)

Metastatic Brain Tumors

- 15-30 % of cancer pts develop cerebral mets
- In pts with no H/O cancer, cerebral mets was the presenting symptom in 15%. Half of these had abnormal CXR
- In 9% cerebral mets was the only detectable site of spread

Increasing incidence of cerebral mets

<u>May be explained by:</u>

- Increasing survival of Ca pts
- Advances in diagnosis (CT, MRI)
- Many Chemotherapy agents don’t cross BBB
- Some Chemotherapy agents weaken BBB

Route of metastatic spread

- Usually hematogenous
- Sometimes local extension

Sources of cerebral mets in adults

Primary	%
Lung Ca	44 %
Breast	10 %
Kidney (renal cell Ca)	7 %
GI	6 %
Melanoma	3 %
Undetermined	10 %

Sources of cerebral mets in Peds

- Neuroblastoma
- Rhabdomyosarcoma
- Wilm’s tumor

Locations of cerebral mets

- 80% of solitary mets located in cerebral hemispheres
- 16% of solitary mets located in cerebellum
- The most common posterior fossa lesion in adults is mets.
- Mets tend to arise at grey/white-matter interface

Lung Ca as primary

- Most common source
- Mets are usually multiple
- The primary may be too small to be detected

Lung Ca as primary

SCLC (small cell lung carcinoma):

- Young, Smokers
- Proximal airways
- 20% of lung Ca but more likely to produce cerebral mets
- Radiosensitive
- Treatment of the primary (Chemo+/- XRT)

Lung Ca as primary

NSCLC (non-small cell lung carcinoma):

- lower grades of the primary should be resected {provided no distal mets (proved by PET), excluding single brain mets}

Lung Ca as primary

Brain mets + lung lesion!

What to do?

- Biopsy the lung lesion to rule out SCLC before performing craniotomy

Signs & Symptoms

- The same as primary brain tumors

Evaluation

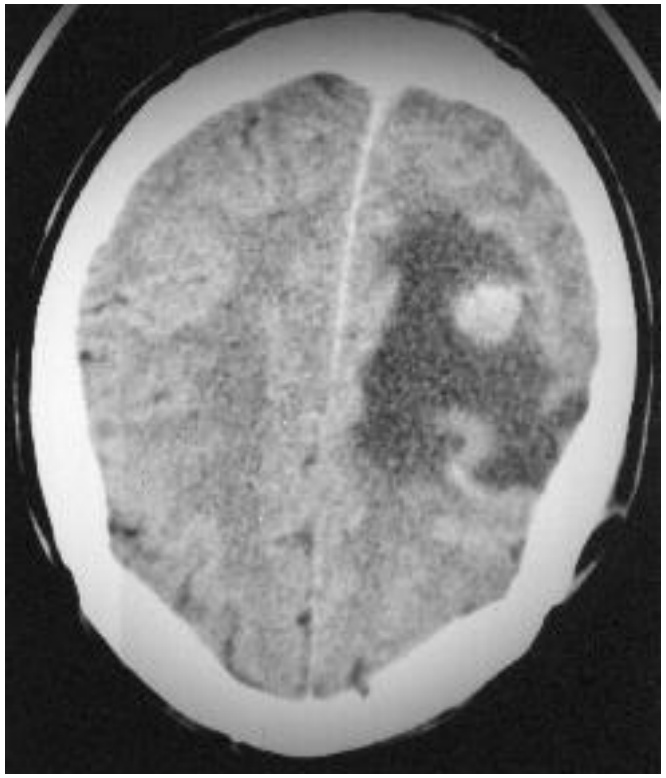
- Imaging studies (CT, MRI)
- Metastatic work up
- LP is contraindicated if there is a cerebral mass, but useful in carcinomatous meningitis

Mets on CT

- Round, well circumscribed lesion
- At the grey-white junction
- Significant white matter edema (fingers of edema)
- Usually enhance (solid or ring enhancement)

Cerebral Mets – CT



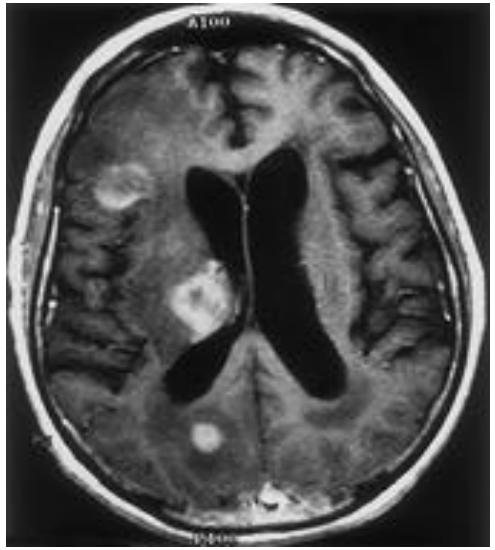


Mets on MRI

- MRI is more sensitive than CT in detection of
  - Multiple lesions
  - Posterior fossa lesions

- Multiple projections help surgical planning

Cerebral Mets – MRI



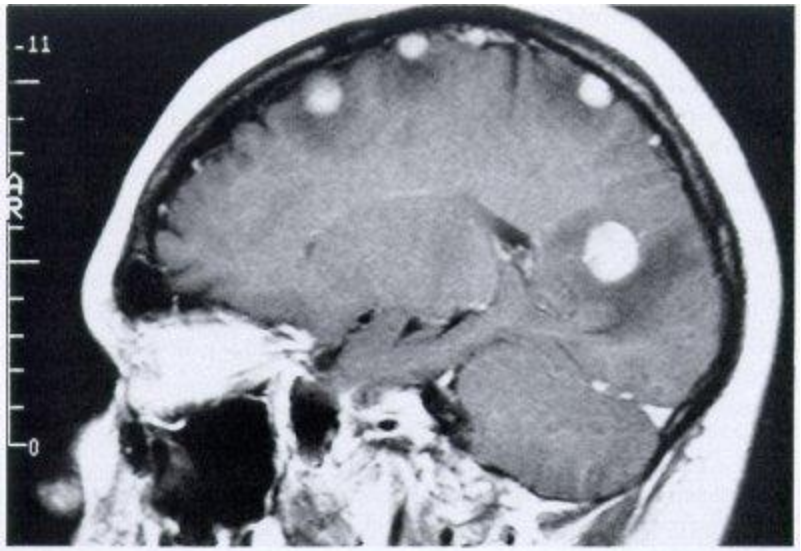
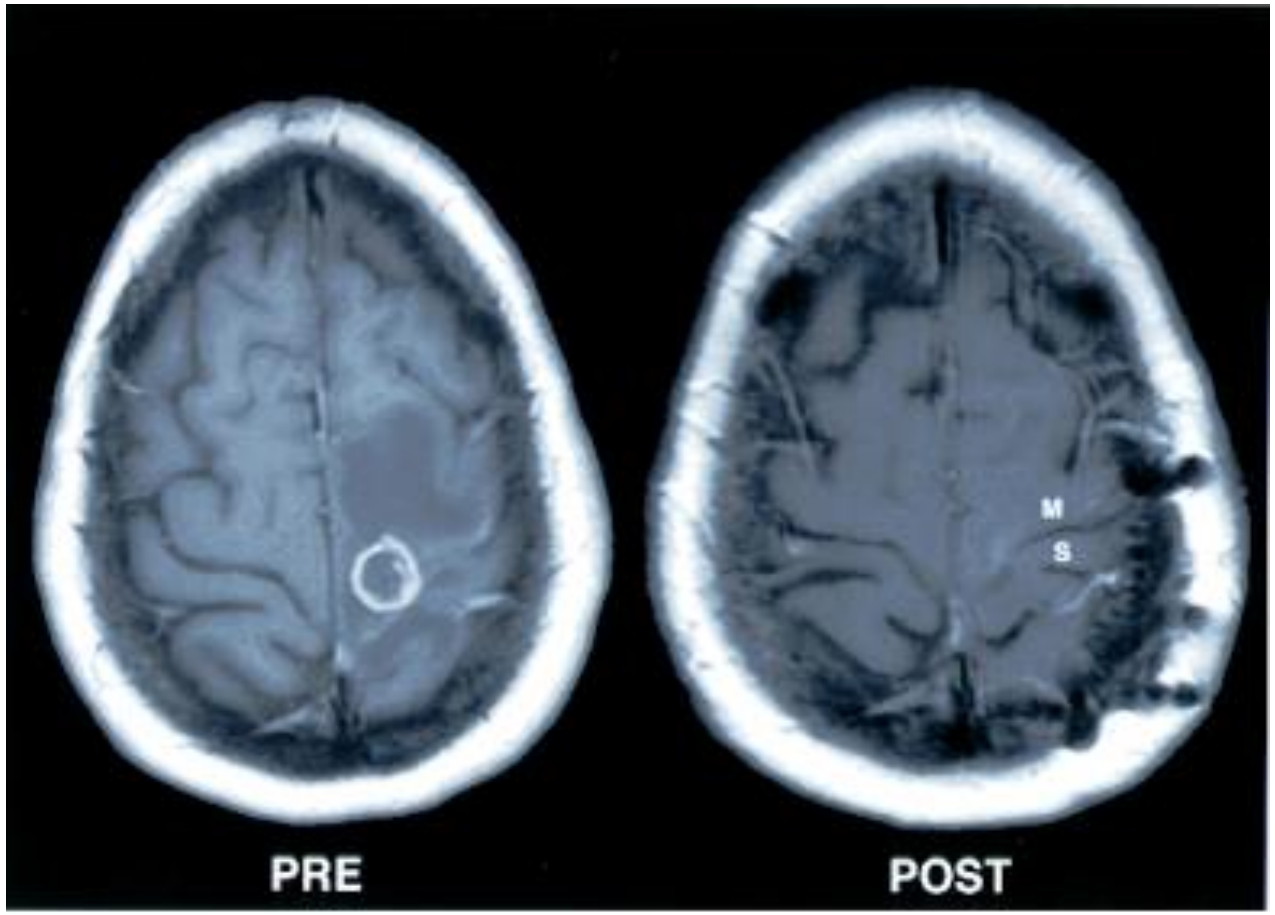
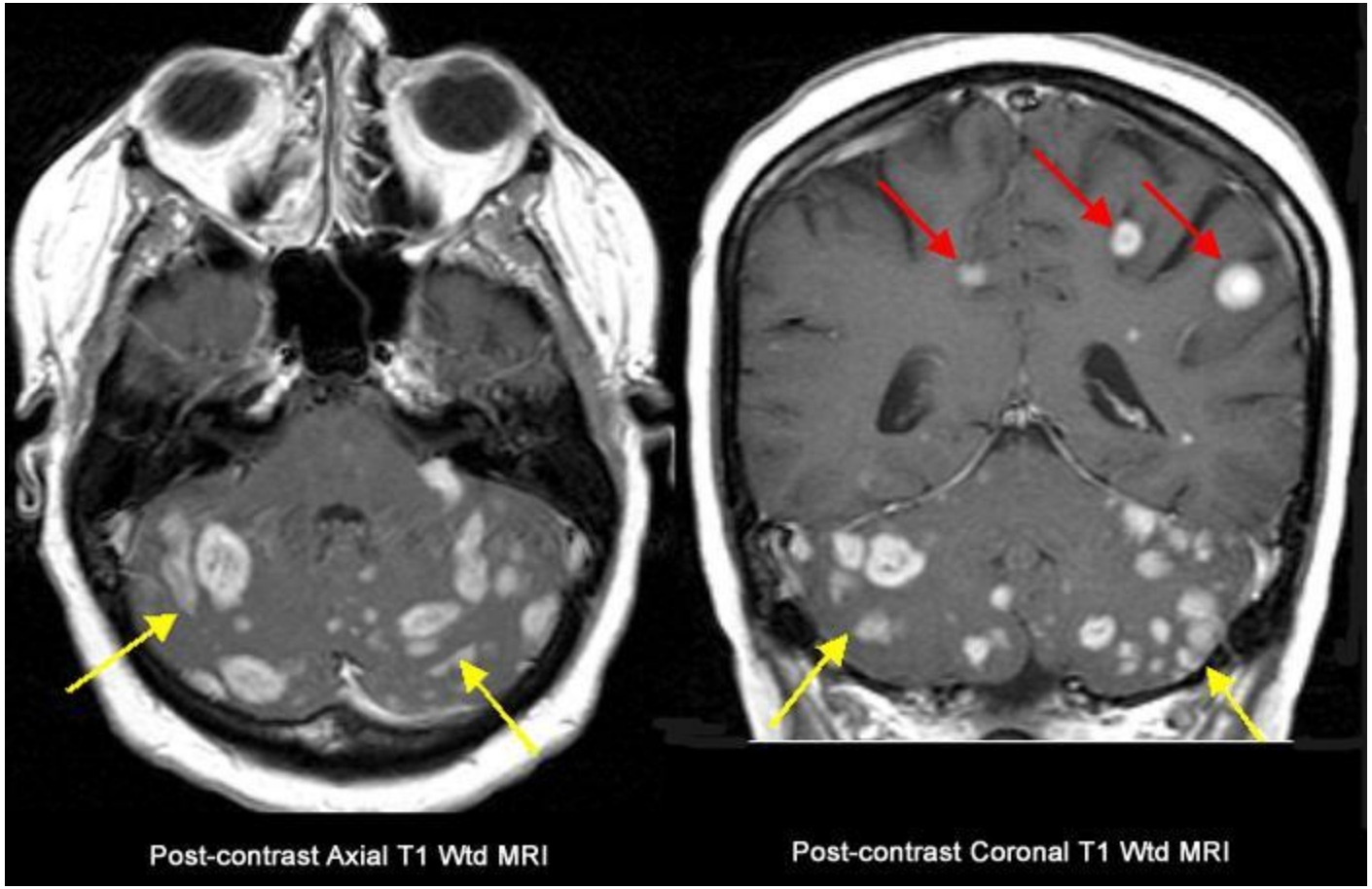


FIGURE 3: Gadolinium-enhanced MRI scan demonstrating multiple brain metastases. Note the edema surrounding each lesion.

Cerebral Mets – MRI



Cerebral Mets – MRI



Metastatic work up

- Means: search for the primary site & stage (other distant mets)
- Usually done when a brain mets is suspected on imaging (before biopsy)
- May provide alternative site for biopsy
- May change the treatment plan

Metastatic work up
Should include:

- CXR
- CT: chest, abdomen, pelvis
- Stool for occult blood
- Radionuclide bone scan
- Mammogram in women
- PSA in men
- PET (detect small malignancies)

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- PET (detect small malignancies)

Don’t Forget clinical examination!

Metastatic work up
When it is negative..

The pathology of the brain lesion might help:

- Small cell Ca: mostly from the lung. Stains + for neuroendocrine stains

- Adenocarcinoma: mostly from lung, but can also come from colon & breast

Treatment

- Mainly palliative

- If chemotherapy or radiotherapy is to be given biopsy of the brain lesion should be done first

Prognostic factors

Class	Description	Median survival (months)
1	•KPS ≥ 70 •Age < 65 yrs •No systemic disease	7
2	Not class 1 or 3 (most pts)	4
3	KPS < 70	2

Medical Management

- Anticonvulsants
- Corticosteroids
- H2 Antagonists

Management Plans

Clinical Situation	Management
Unknown primary	Biopsy (stereotactic or excisional), further treatment depends on the result
• Uncontrolled widespread systemic disease, or • KPS < 70	• Biopsy + WBRT, or • No treatment

Management Plans

Clinical Situation			Management
Stable systemic disease & KPS ≥ 70	Solitary met	Symptomatic, large or accessible	Excision + WBRT
		Asymptomatic, small or inaccessible	SRS + WBRT
	Multiple mets	One of them large & symptomatic	Excision of it + WBRT
		≤ 3 lesions & all can be removed	Surgery + WBRT
		≤ 3 lesions & all can not be removed	WBRT or SRS + WBRT
		> 3 lesions & no mass effect	WBRT

Whole brain radiotherapy (WBRT)

Total dose of 30 Gy

Given in 10 fractions

Given over 2 weeks

- 3x5x2

Stereotactic radiosurgery (SRS)

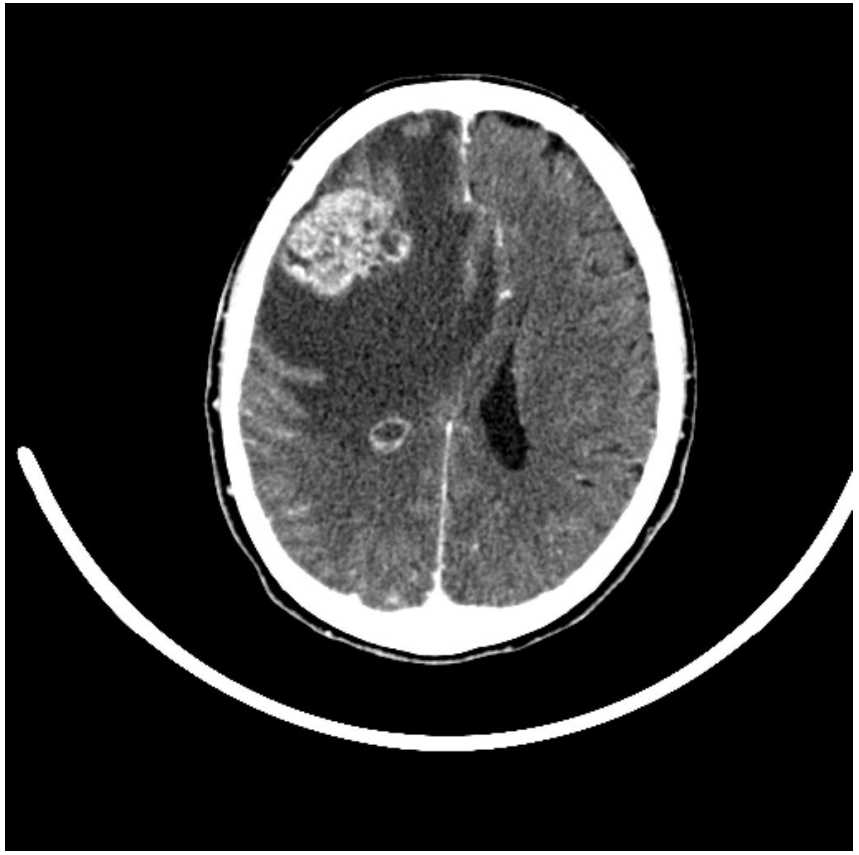
- Comparable to surgery acc. to some studies
- Disadv.: No tissue for histology
- Limitation: can not be used for lesions > 3 cm

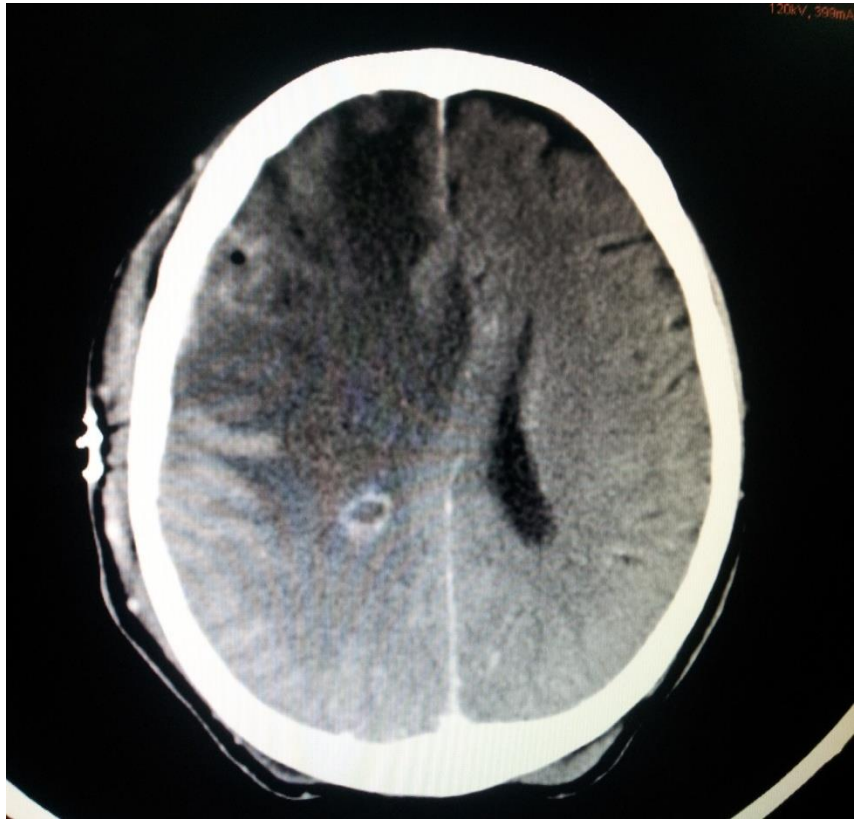
Radiosensitivity of brain mets to WBRT

Radiosensitivity	Tumor
Radiosensitive	SCLC, Germ cell tumors, Lymphoma, Leukemia, Multiple myeloma
Moderately sensitive	Breast
Moderately resistant	Colon, NSCLC
Highly resistant	Thyroid, Renal cell Ca, Malignant melanoma, Sarcoma, Adenocarcinoma

EGH Case 1

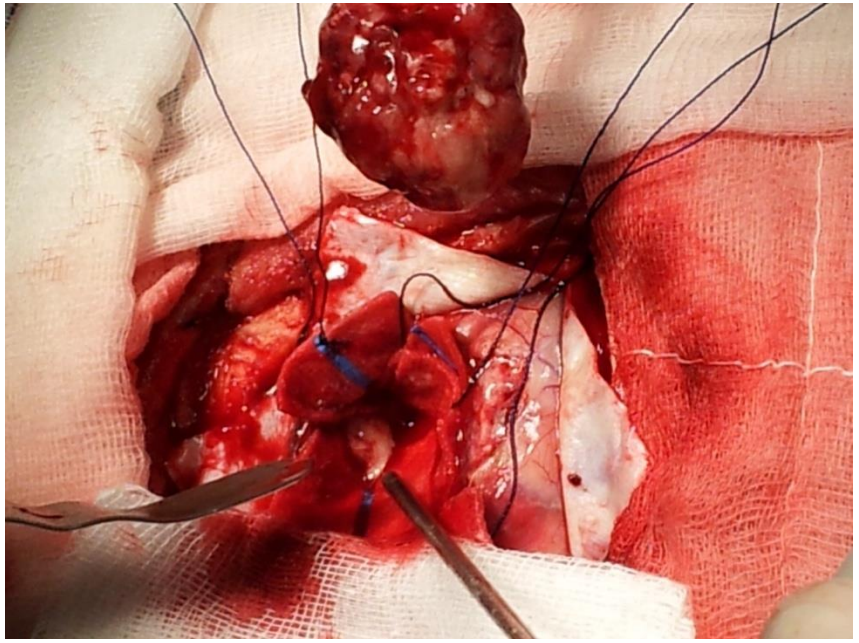
46yrs, M, Rt frontal mts, (Aug 12), Lt hemi
survived 1 yr



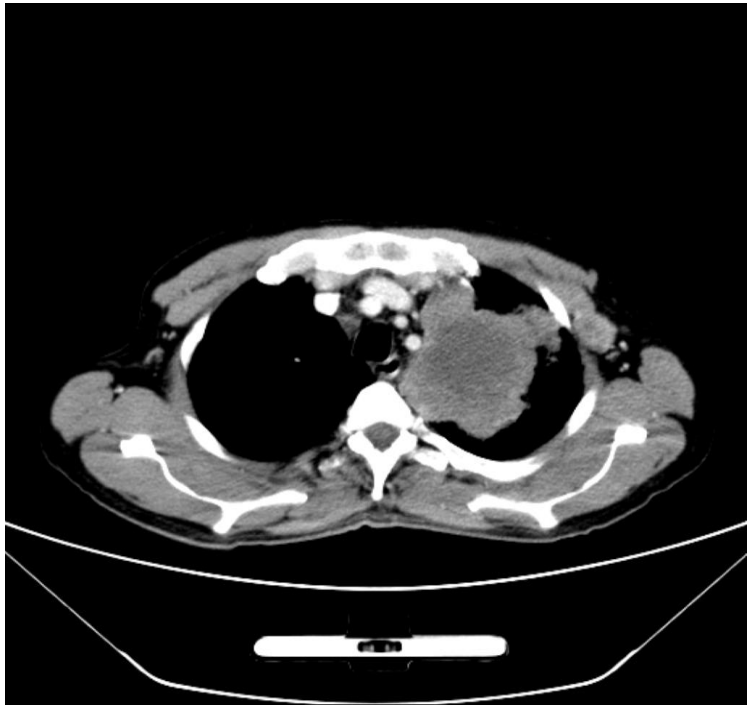


EGH Case 1

Tumor excison



Primary Lt lung Ca



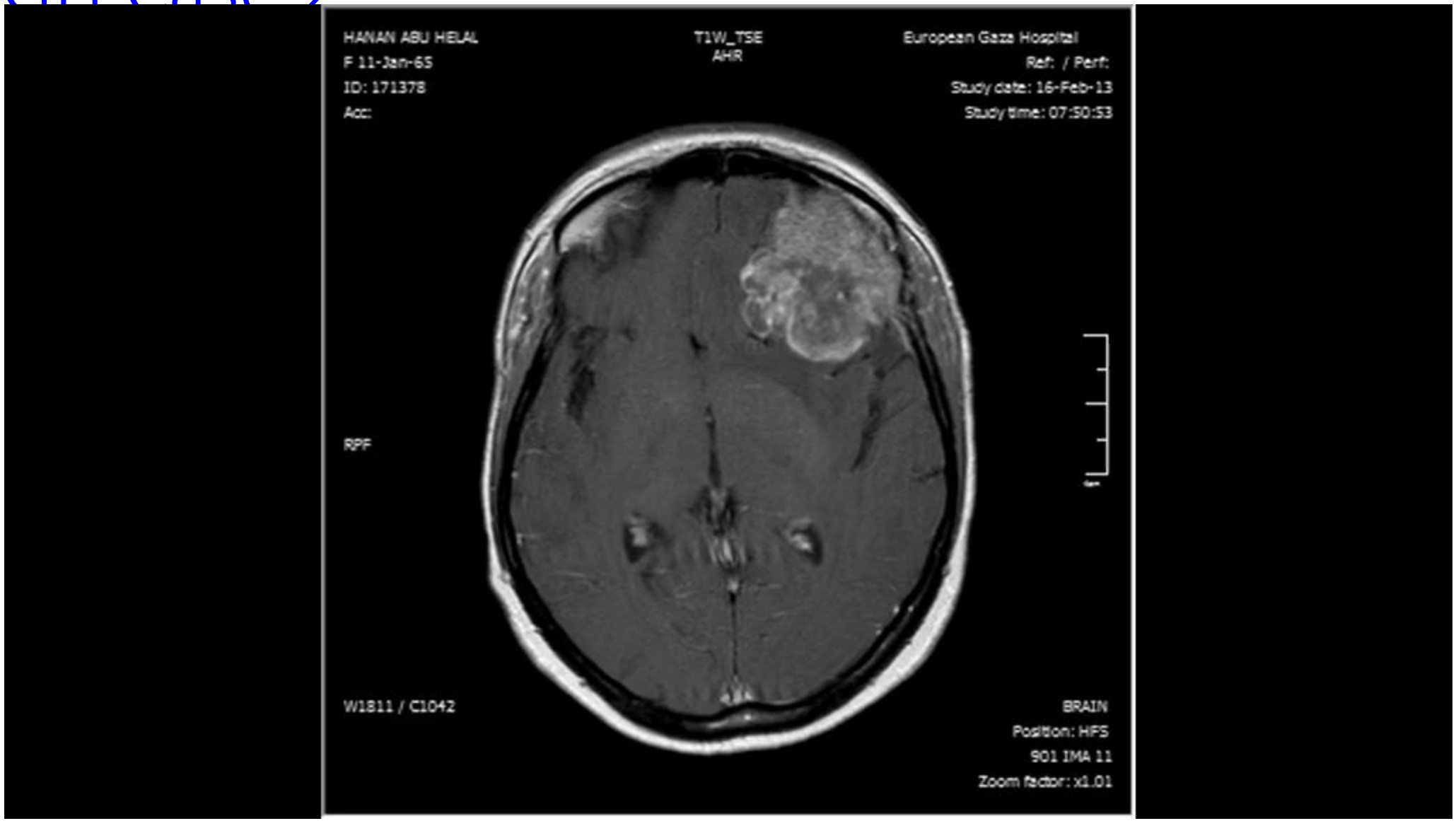
EGH Case 1

3d day postop

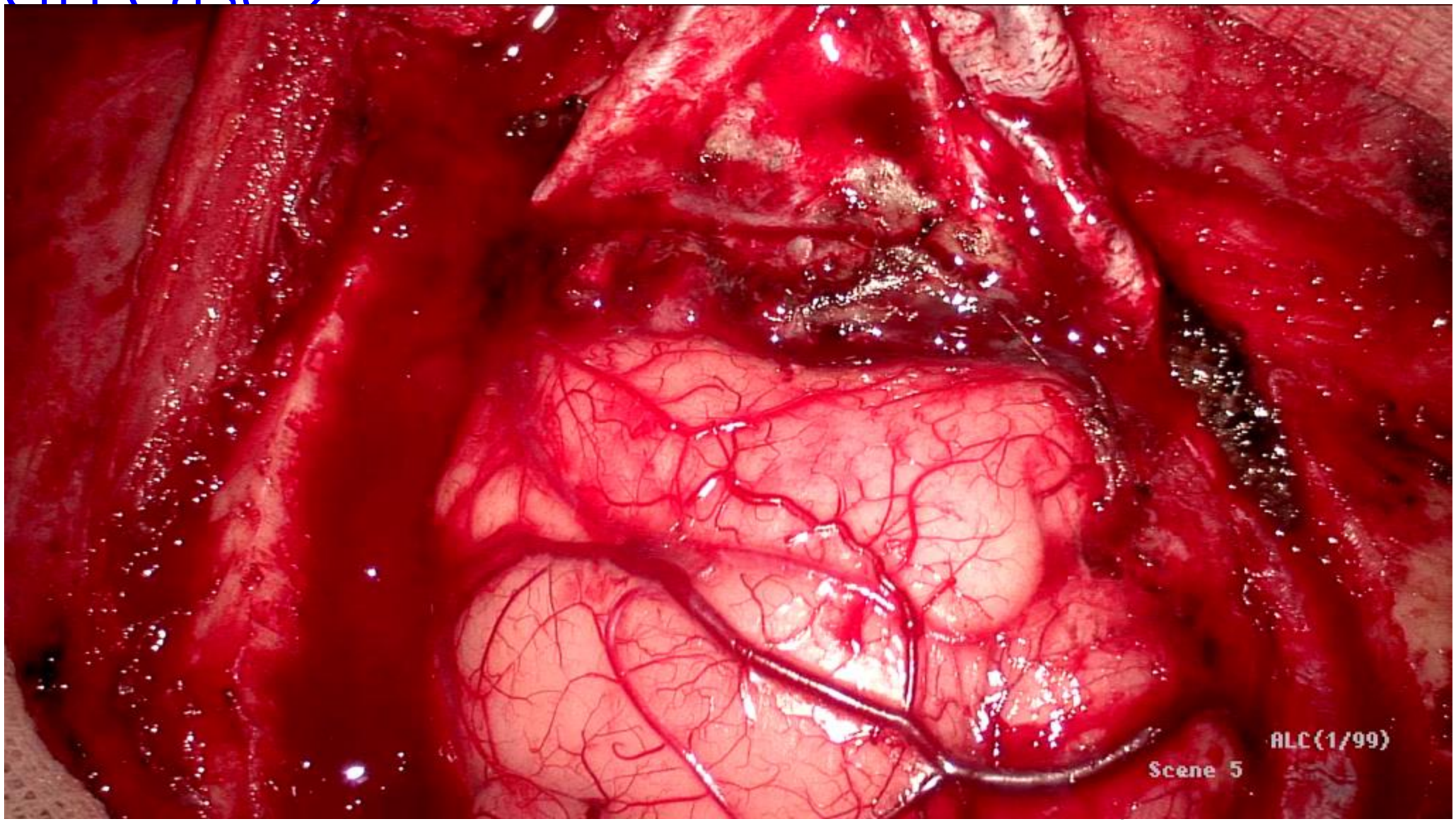




EGH Case 2


HANAN ABU HELAL
F 11-Jan-65
ID: 171378
Acc:
T1W_TSE
AHR
European Gaza Hospital
Ref: / Perf:
Study date: 16-Feb-13
Study time: 07:50:53
RPF
W1811 / C1042
BRAIN
Position: HFS
901 IMA 11
Zoom factor: x1.01

EGH Case 2



Thanks



Any Questions?