AMSER Case of the Month June 2023

A 61F presents with weakness in her right upper and right lower extremity

Jasper Acer, MS-4

Lake Erie College of Osteopathic Medicine

Robert Lewis, DO, PGY-2

Allegheny Health Network

Prashanth Sompalli, MD

Allegheny Health Network

Matthew Hartman, MD

Allegheny Health Network

Patient Presentation

- HPI: Patient presented to an outpatient clinic with right hand numbness and weakness in November 2022.
  - Outpatient CXR showed large rounded opacity in the right mid to lower lung, concerning for a mass or consolidation.
  - Outpatient CT chest and neck showed large right lung mass involving the right upper lobe and middle lobe, with extensive mediastinal, cervical and right supraclavicular adenopathy.
  - Outpatient CT head showed 3.4 cm intra-axial mass in the left frontal lobe with surrounding edema.
  - Initially refused follow-up, but developed worsening weakness in the right arm and new involvement of the right leg and presented to the ED.
- Pertinent Labs: None

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 1: Noninvasive initial clinical staging of non-small-cell lung carcinoma

Procedure	Appropriateness Category	Relative Radiation Level
CT chest with IV contrast	Usually Appropriate	☢☢☢
FDG-PET/CT skull base to mid-thigh	Usually Appropriate	☢☢☢☢
MRI head without and with IV contrast	Usually Appropriate	O
CT chest without IV contrast	Usually Appropriate	☢☢☢
CT abdomen and pelvis with IV contrast	May Be Appropriate	☢☢☢
CT head with IV contrast	May Be Appropriate	☢☢☢
CT head without and with IV contrast	May Be Appropriate	☢☢☢
MRI abdomen without and with IV contrast	May Be Appropriate	O
MRI chest without and with IV contrast	May Be Appropriate	O
MRI head without IV contrast	May Be Appropriate	O
Bone scan whole body	May Be Appropriate	☢☢☢
CT abdomen and pelvis without and with IV contrast	May Be Appropriate	☢☢☢☢
CT abdomen and pelvis without IV contrast	May Be Appropriate	☢☢☢
MRI abdomen without IV contrast	May Be Appropriate	O
CT head without IV contrast	Usually Not Appropriate	☢☢☢
MRI chest without IV contrast	Usually Not Appropriate	O
CT chest without and with IV contrast	Usually Not Appropriate	☢☢☢
Radiography chest	Usually Not Appropriate	☢

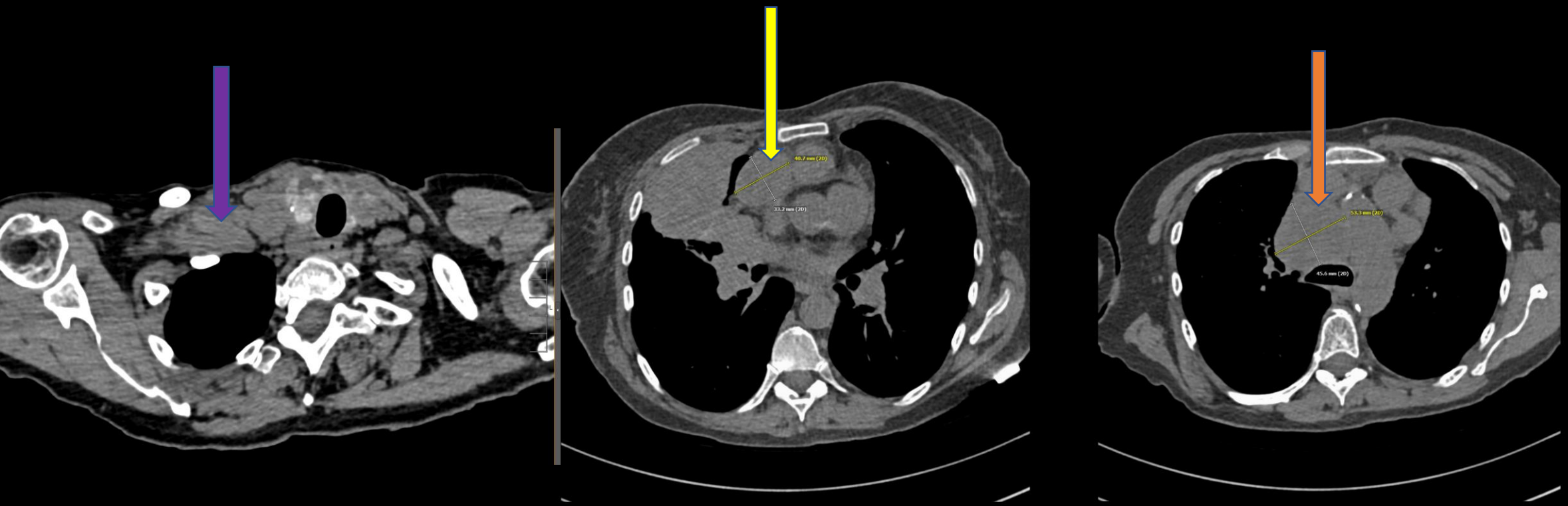
These imaging modalities were ordered by the Hospital physician

Findings Prior to ED Presentation (unlabeled)

Findings Prior to ED Presentation (unlabeled)

Findings Prior to ED Presentation (labeled)

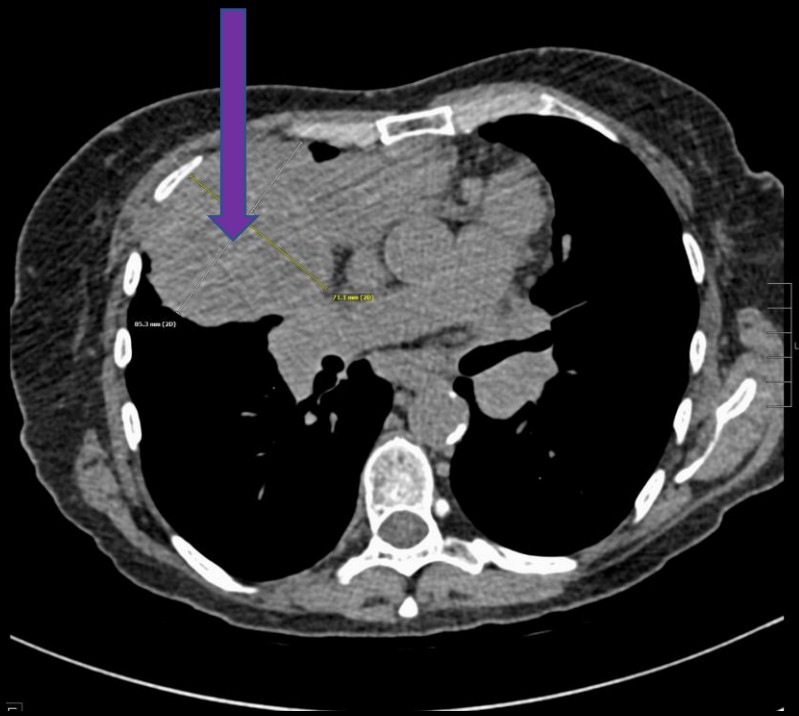
Axial non-contrast CT Chest



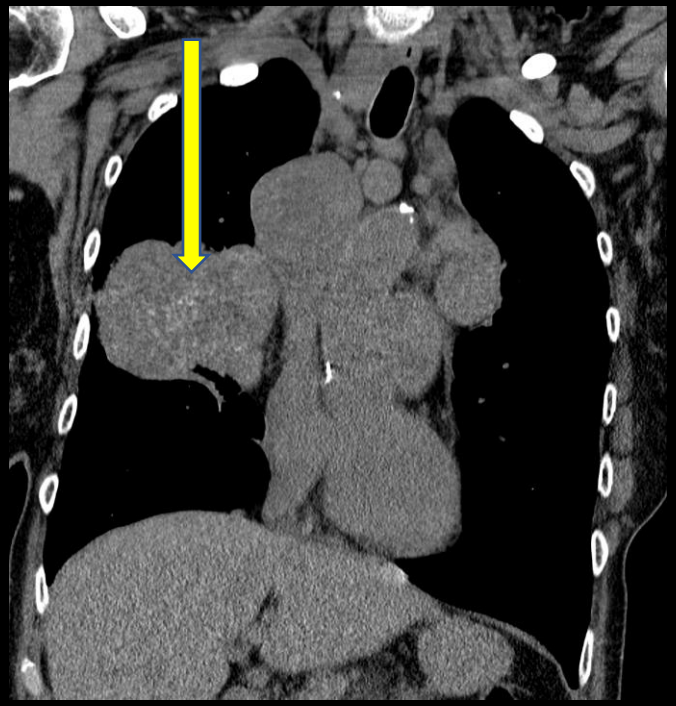
Extensive adenopathy is present in the lower right neck and right supraclavicular stations (purple arrow), as well as throughout the anterior and middle mediastinum (yellow arrow). Lower right paratracheal lymph node measures 4.8 cm in short axis (orange arrow).

Findings Prior to ED Presentation (labeled)

Axial CT chest non-contrast



Coronal CT chest non-contrast

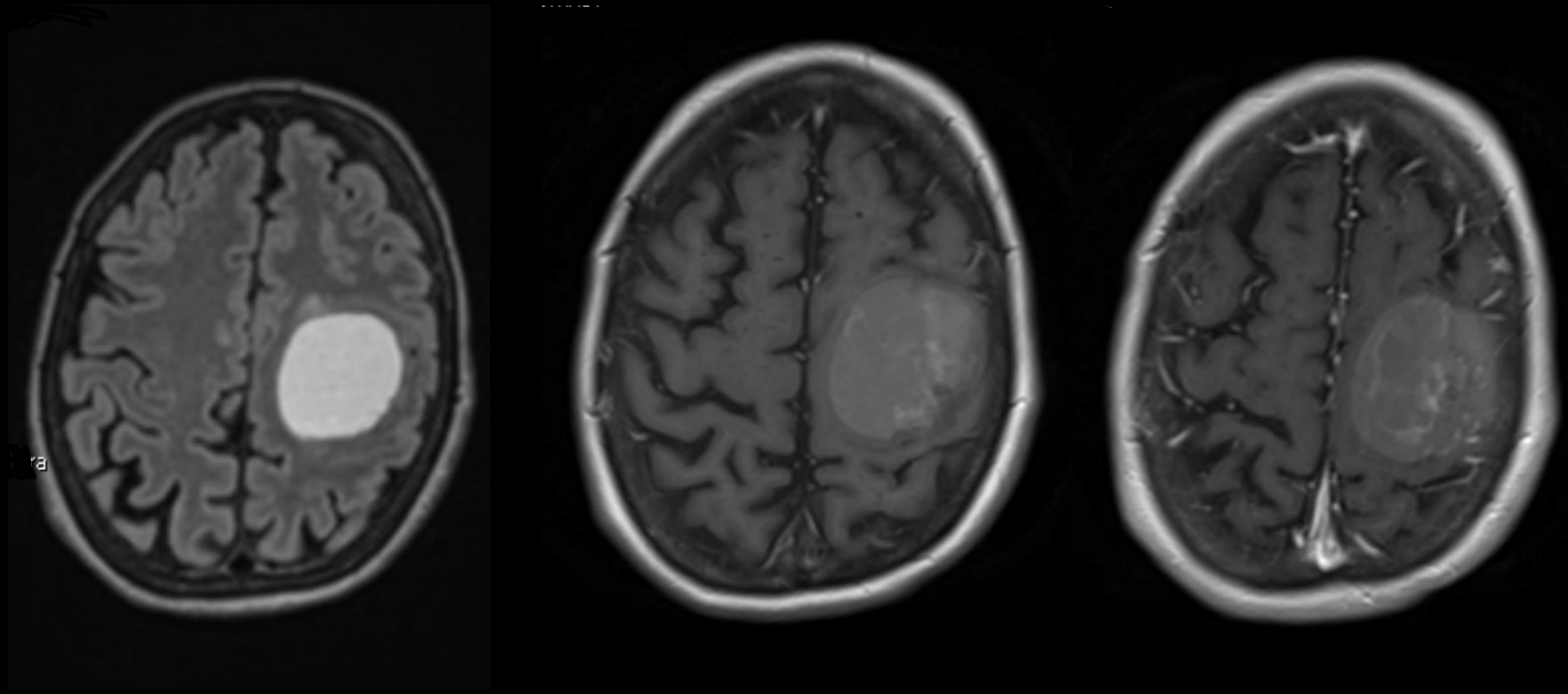


There is a heterogenous and partially calcified mass involving both the right upper lobe anterior segment as well as the right middle lobe, which appears to span the minor fissure. The mass measure 8.0 cm x 8.5 cm on axial image (purple and yelwlow arrow).

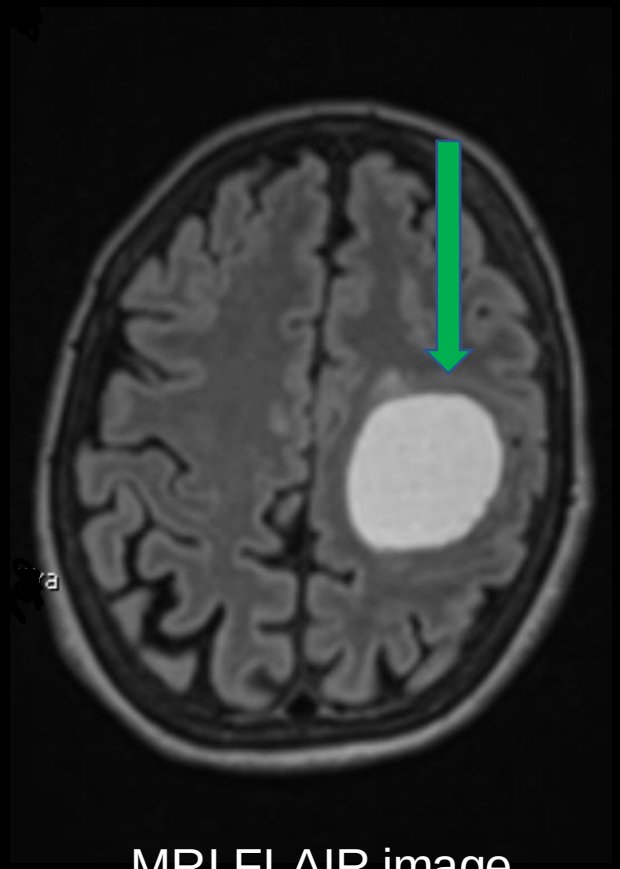
Axial CT head non-contrast

3.4cm intra-axial mass (green arrow) in the left frontal lobe. Associated local mass effect with sulcal effacement.

Findings After ED Presentation (unlabeled)

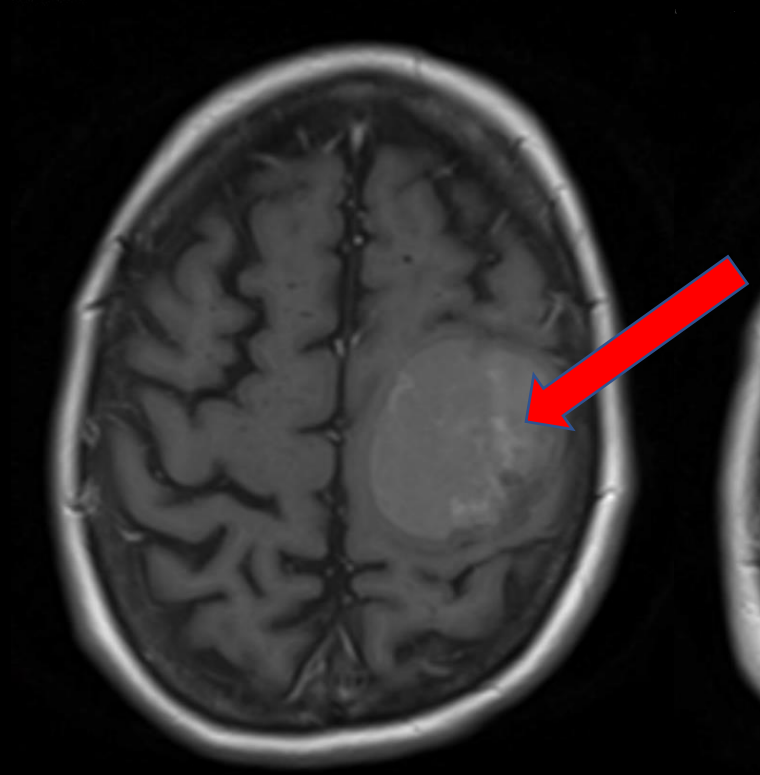


Findings After ED presentation: (labeled)



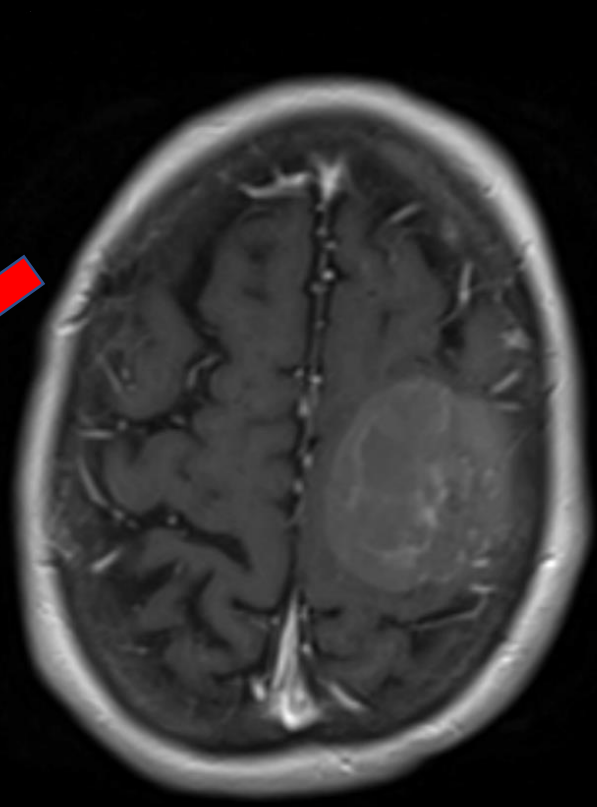
MRI FLAIR image

4.7 cm left frontal intra-axial mass resulting in mass effect, without midline shift. Mild edema (green arrow)



MRI T1 weighted

Areas of intrinsic T1 shortening within the mass compatible with hemorrhage (red arrow).



MRI T1 Post contrast

Minimal enhancement post contrast.

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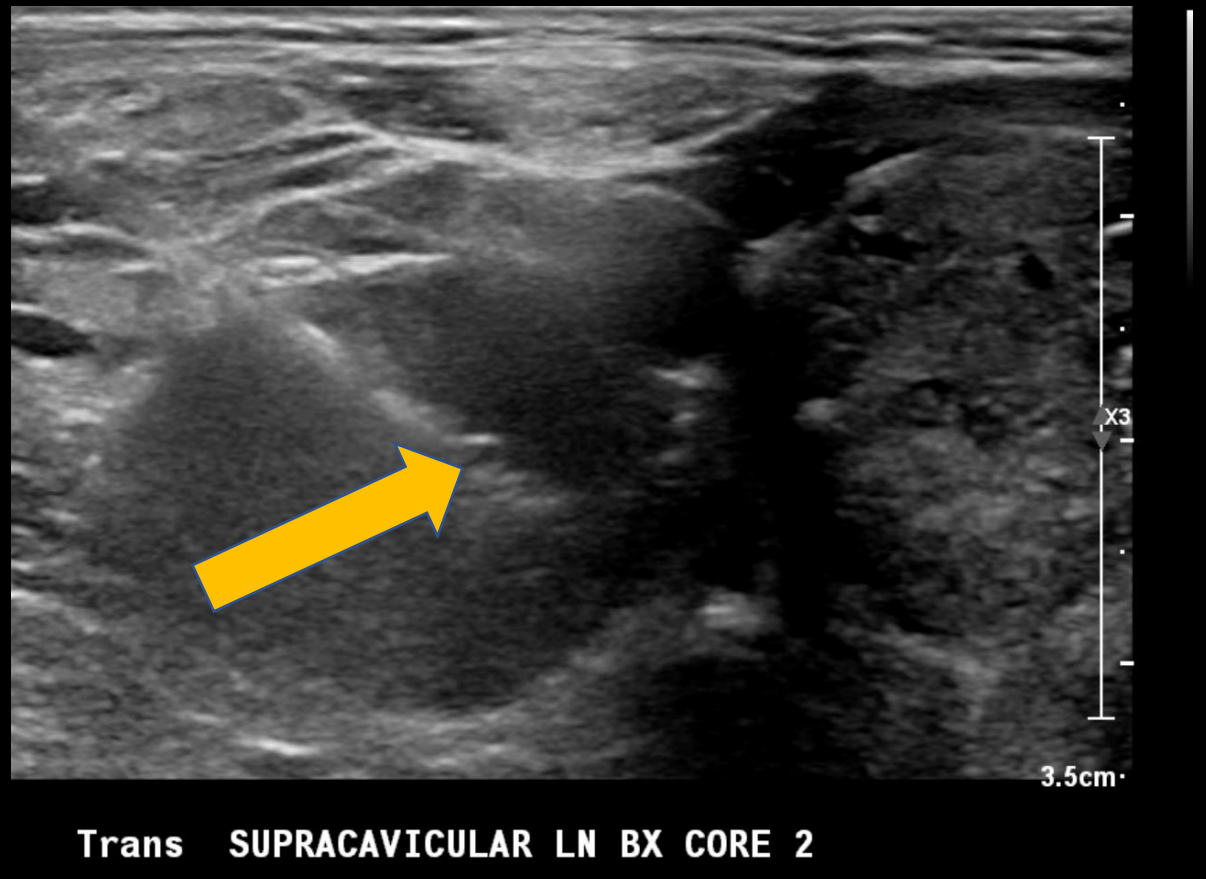
US Core needle biopsy of supraclavicular Lymph node performed

Orange arrow: Needle



Final Dx:

Metastatic Non-Small Cell Lung Cancer

Pathology

- Immunohistochemistry Results
  - Showed positive TTF-1 and CK7
    - Four immunohistochemical stains routinely used for distinguishing primary lung ADC from primary lung Squamous Carcinoma
      - Thyroid transcription factor-1 (TTF-1), p63, cytokeratins (CK) 5/6, and CK 7
  - Negative p40
    - p40 aids in the diagnosis of Squamous Cell Carcinoma

Case Discussion-Intracranial Metastases

- Demographics
  - Age
    - Incidence increases with age
      - Rare in children (skull/dura more common site than intra-axial)
      - Peak prevalence in patients >65 years
  - Epidemiology
    - 100,000-500,000 diagnosed with CNS metastases annually
    - Metastases account for 50% of cerebral tumors
    - 25% of cancer patients have CNS metastasis on autopsy
    - 30-40% of patients with Non-small cell lung cancer present with metastases
- Clinical Presentation
  - Neurological
    - Headache, confusion, obtundation
    - Seizure
    - Ataxia
    - Nausea and vomiting
    - Vision problems, papilledema
  - 10% are asymptomatic

Case Discussion-Intracranial Metastases

- Predisposing factors in patients with NSCLC
  - younger age, non-squamous histology, tumor size, tumor grade, and node-positive disease were clinical factors associated with brain metastasis
- Common brain metastases
  - Lung, breast, melanoma: more common
    - NSCLC is most common
  - Kidney, colon, rectum, thyroid cancer

Case Discussion- Intracranial Metastases

- Imaging
  - CXR revealed large rounded opacity in the right mid to lower lung.
  - Outpatient CT chest and neck showed large right lung mass involving the right upper lobe and middle lobe, with extensive mediastinal, cervical and right supraclavicular adenopathy.
  - MRI in hospital showed 4.7 cm left frontal intra-axial mass resulting in mass effect, mild surrounding edema without midline shift. Areas of the mass compatible with hemorrhage.
  - Ultrasound biopsy of the supraclavicular adenopathy and pathology resulted adenocarcinoma of likely lung origin.

Case Discussion

- Treatment
  - Medical management:
    - Corticosteroids: diminish effects of edema
    - Anticonvulsants: seizure prophylaxis
    - Hyperosmolar agents: decrease intracranial pressure
  - Whole-brain external brain radiotherapy
    - Prolong survival and improve neurological function
  - Stereotactic radiotherapy (masses <3cm)
    - not helpful here
  - Surgical resection
    - Prolong survival, symptom palliation, histopathologic tissue sample

References:

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