AMSER Case of the Month August 2023

HPI: 77-year-old female with altered mental status, weakness, and difficulty speaking

Gabriel Noguera, MS4, Lake Erie College of Osteopathic Medicine
Emiliya Boriskina, MS4, Lake Erie College of Osteopathic Medicine
Dr. Eric Spitzer, Rochester Regional Health
Dr. Joel Thompson, Rochester Regional Health

LECOM LAKE ERIE COLLEGE OF OSTEOPATHIC MEDICINE

ROCHESTER REGIONAL HEALTH

AMSER

Patient Presentation

- HPI: 77-year-old female presenting to ED with chief complaint of sudden onset right sided weakness, difficulty speaking, and altered mental status with expressive aphasia.
  - Last known well was one hour prior
  - EMS reported resolution of motor symptoms en route to hospital with only global aphasia still present.
  - NIHSS of 5.
- PMHx: T2DM, HTN, HLD, GERD, anxiety, depression, former smoker (30 pack year).

Pertinent Labs

CBC	BMP	Coagulation Studies
WBC - 6.3	NA - 137	PT - 12.6
HB - 8.3	K - 4.0	APTT - 38.9
HCT - 30	Cl - 100	INR - 1.1
PLT - 253	CO2 - 28	
	BUN - 25	
	Cr - 0.9	
	Glucose - 235	

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 3: **New focal neurologic defect, fixed or worsening. Less than 6 hours. Suspected stroke.**

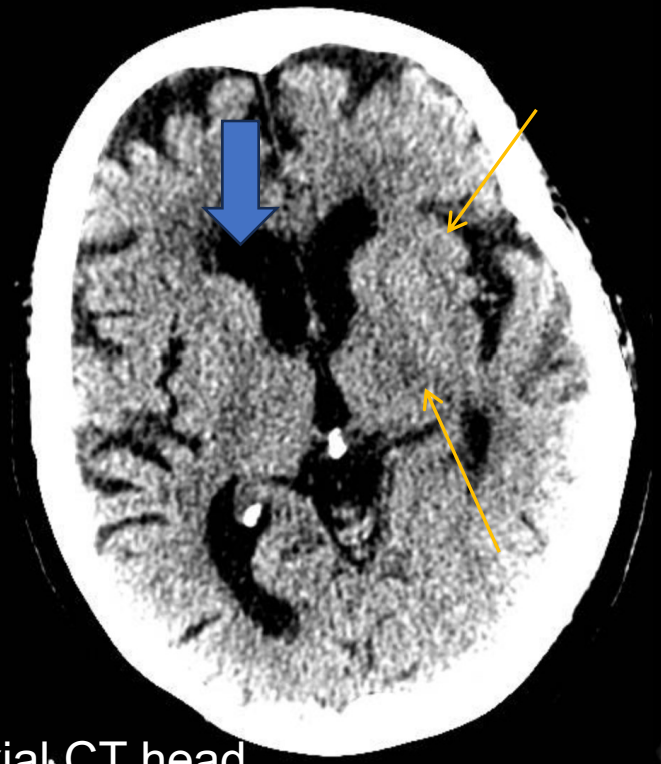
Radiologic Procedure	Rating	Comments	RRL*
CT head without IV contrast	9	Parenchymal brain imaging and CT or MR vascular imaging of the head and neck should be considered. Noncontrast head CT is often obtained first to assess for hemorrhage or large infarct. MRI is more sensitive than CT for acute infarct.	☢☢☢
MRI head without IV contrast	8	Parenchymal brain imaging and CT or MR vascular imaging of the head and neck should be considered. Can be useful if there is a contraindication to contrast. Noncontrast head CT is often obtained first to assess for hemorrhage or large infarct. MRI is more sensitive than CT for acute infarct.	O
MRI head without and with IV contrast	8	Noncontrast head CT is often obtained first to assess for hemorrhage or large infarct. MRI head with contrast can be helpful to determine the age of infarct and to evaluate for other causes of symptoms such as tumor or infection.	O

This imaging modality was ordered by the ER physician

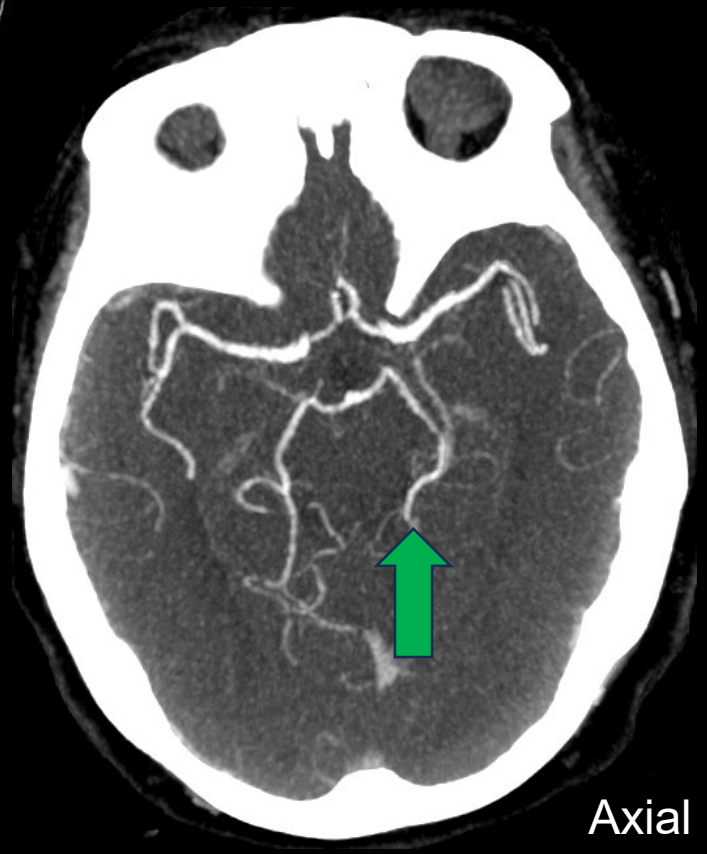
AMSER

Findings (unlabeled)

Findings: (labeled)



Axial CT head w/o contrast



Axial MIP CTA image

Findings:

- Prominence of the ventricle system and extra-axial spaces, consistent with age-appropriate cortical and central atrophy.
- Clear gray/white matter differentiation with visualization of the internal and posterior limbs. No hypoattenuation of the insular ribbon (earliest sign of ischemic stroke).
- PCA occlusion of distal left P2/P3.

Impression:

- Age-appropriate cortical and central atrophy with mild chronic microangiopathic ischemic changes. No acute intracranial process is seen. Distal PCA occlusion of P2/P3 not amenable to thrombectomy.

AMSER

Clinical Progression:

After imaging the patient remained in the TPA window. ED consulted neurology and agreed on thrombolytic therapy with Tenecteplase.

2 hours later the patient stopped following commands, became agitated, nauseous, and had increased BP. NIHSS increased to 7.

Follow-up Imaging?

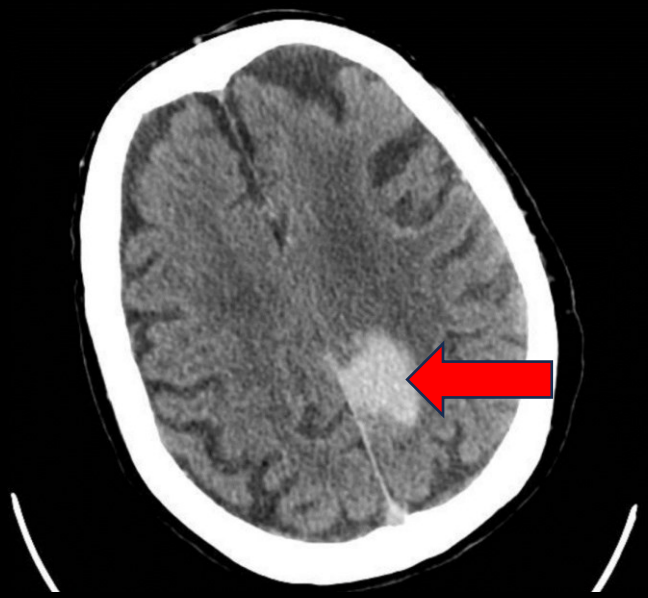
Select the applicable ACR Appropriateness Criteria

Mental status change, coagulopathy or anticoagulant	CT head without IV contrast	1-10 mSv ☢☢☢	0.3-3 mSv [ped] ☢☢☢	Usually appropriate	●
	MRI head without IV contrast	0 mSv O	0 mSv [ped] O	Usually appropriate	●
	MRI head without and with IV contrast	0 mSv O	0 mSv [ped] O	May be appropriate	●
	CT head without and with IV contrast	1-10 mSv ☢☢☢	3-10 mSv [ped] ☢☢☢☢	May be appropriate	●
	CT head with IV contrast	1-10 mSv ☢☢☢	0.3-3 mSv [ped] ☢☢☢	Usually not appropriate	●

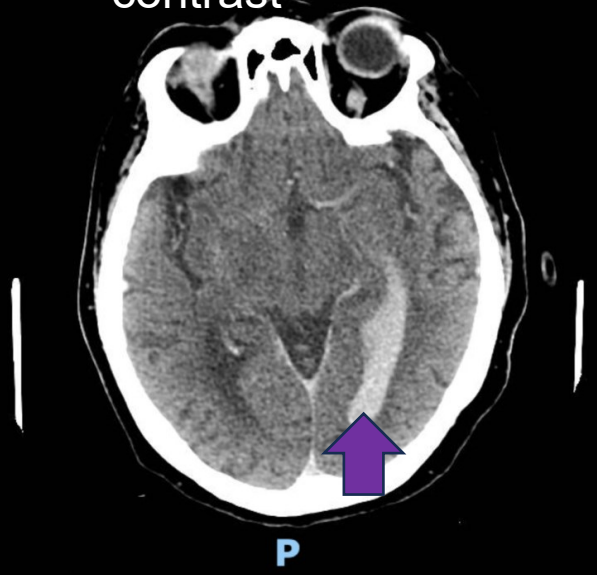
This imaging modality was ordered by the ER physician

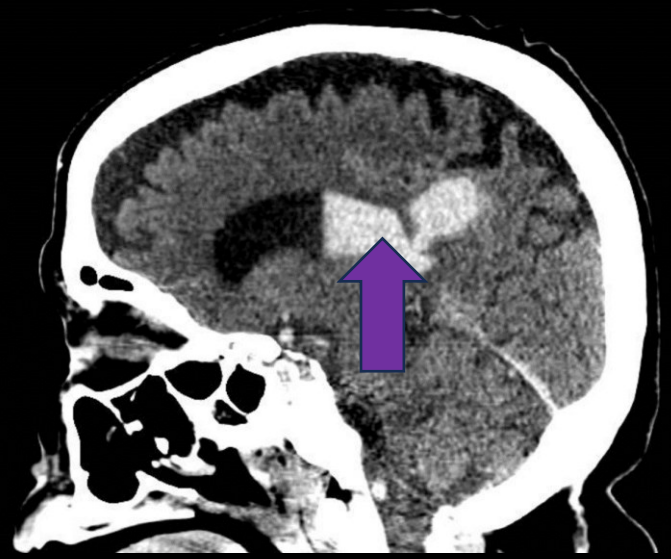
Findings (unlabeled)

Findings: (labeled)



Axial CT head w/o contrast





Sagittal CT head w/o contrast

Findings:

- Intra-axial hyperdensity in the left medial parietal lobe.
- Blood products in the left lateral ventricle.
- Subcentimeter left temporal hematoma (not pictured).

Impression:

- Acute intraparenchymal hemorrhage in the left medial parietal lobe with extension into the left lateral ventricle.

AMSER

Final Dx:

Distal Left Posterior Circulation Stroke Complicated by Left Medial Parietal Hemorrhage with Intraventricular Extension

Case Discussion- Differential Diagnosis

- Differential Diagnosis for patient presenting with altered mental status, weakness, and difficulty speaking:
  - CVA
  - TIA
  - ICH
  - Hypoglycemia
  - Drug Toxicity
  - Intracranial Mass
  - Infection
  - Head Trauma

Case Discussion- IV Thrombolysis

- IV thrombolysis within 4.5 hours of symptom onset is associated with an increased risk of ICH by 5-7%.
- However, if patient is outside the 4.5 hour window, but meets imaging criteria, intervention may still be beneficial (Wake-Up Stroke Trial) [3].
  - Criteria: unwitnessed stroke onset who had an ischemic parenchymal brain lesion on MRI diffusion-weighted imaging but no corresponding hyperintensity on FLAIR.
  - Statistically significant positive outcomes observed with the intervention group.

Case Discussion- Tenecteplase vs Alteplase

- Tenecteplase often favored over Alteplase for faster door to needle time in ED [5].
- NOR-TEST studies compared Tenecteplase to Alteplase [4].
- NOR-TEST - Tenecteplase 0.4 mg/kg had similar efficacy to Alteplase 0.9mg/kg.
  - Approximately 1100 patients with minor stroke (Avg NIHSS = 4)
  - 3 months post intervention- 5% of patients in both groups had died
  - Serious adverse effects post intervention was 26% in both groups
- NOR-TEST 2 – trial stopped early due to increased number of intracranial hemorrhages in Tenecteplase group [2].
  - Due to early termination, suggest assessing lower dose of Tenecteplase

Patient Course

- Immediately given Tranexamic acid and 10 units of cryoprecipitate to reverse the Tenecteplase and slow the bleeding.
  - Recommended BP goal of < 140/90 (d/t hemorrhagic stroke) with head of bed elevated 30 degrees.
  - Thrombolytics held for 72 hours.
  - CTH repeated every 6 hours to monitor bleed with recommendation for MRI if change in mental status.
- Subsequent MRI confirmed stable hemorrhage and found cortically-based foci of acute/subacute infarcts throughout the right MCA territory suggesting an embolic source.
  - Question of A.fib vs Hypercoagulable state such as cancer.

Patient Course

- Complicated hospital course with patient remaining for a month and a half.
- Developed worsening shortness of breath and cough, with CT chest imaging revealing bilateral lung opacities. Final diagnosis after PET scan, bronchoscopy, and biopsy was early-stage adenocarcinoma of the right lung.
- Currently undergoing radiation for lung cancer.

References:

1. Acute mental status change, delirium, and new onset psychosis [Internet]. [cited 2023Apr27]. Available from: https://acsearch.acr.org/docs/3102409/Narrative/
2. Kvistad CE, Næss H, Helleberg BH, Idicula T, Hagberg G, Nordby LM, Jenssen KN, Tobro H, Rörholt DM, Kaur K, Eltoft A, Evensen K, Haasz J, Singaravel G, Fromm A, Thomassen L. Tenecteplase versus alteplase for the management of acute ischaemic stroke in Norway (NOR-TEST 2, part A): a phase 3, randomised, open-label, blinded endpoint, non-inferiority trial. Lancet Neurol. 2022 Jun;21(6):511-519. doi: 10.1016/S1474-4422(22)00124-7. Epub 2022 May 4. PMID: 35525250.
3. Lees KR, Bluhmki E, von Kummer R, Brott TG, Toni D, Grotta JC, Albers GW, Kaste M, Marler JR, Hamilton SA, Tilley BC, Davis SM, Donnan GA, Hacke W; ECASS, ATLANTIS, NINDS and EPITHET rt-PA Study Group; Allen K, Mau J, Meier D, del Zoppo G, De Silva DA, Butcher KS, Parsons MW, Barber PA, Levi C, Bladin C, Byrnes G. Time to treatment with intravenous alteplase and outcome in stroke: an updated pooled analysis of ECASS, ATLANTIS, NINDS, and EPITHET trials. Lancet. 2010 May 15;375(9727):1695-703. doi: 10.1016/S0140-6736(10)60491-6. PMID: 20472172.
4. Logallo N, Novotny V, Assmus J, Kvistad CE, Alteheld L, Rønning OM, Thommessen B, Amthor KF, Ihle-Hansen H, Kurz M, Tobro H, Kaur K, Stankiewicz M, Carlsson M, Morsund Å, Idicula T, Aamodt AH, Lund C, Næss H, Waje-Andreassen U, Thomassen L. Tenecteplase versus alteplase for management of acute ischaemic stroke (NOR-TEST): a phase 3, randomised, open-label, blinded endpoint trial. Lancet Neurol. 2017 Oct;16(10):781-788. doi: 10.1016/S1474-4422(17)30253-3. Epub 2017 Aug 2. PMID: 28780236.
5. Warach SJ, Dula AN, Milling TJ, Miller S, Allen L, Zuck ND, Miller C, Jesser CA, Misra LR, Miley JT, Mawla M, Ding MC, Bertelson JA, Tsui AY, Jefferson JR, Davison HM, Shah DN, Ellington KT, Padrick MM, Nova AS, Krishna VR, Davis LA, Paydarfar D. Prospective Observational Cohort Study of Tenecteplase Versus Alteplase in Routine Clinical Practice. Stroke. 2022 Dec;53(12):3583-3593. doi: 10.1161/STROKEAHA.122.038950. Epub 2022 Sep 23. PMID: 36148657.

AMSER