Case of the Quarter

Emergency Medicine Interest Group

Vincent Fu, MD (PGY-1) | 01 November 2022

LOYOLA MEDICINE

EMIG CASE OF THE QUARTER

Session Overview

LOYOLA MEDICINE

CASE ONE

Bread & Butter EM

CASE TWO

More Interesting...

EMIG CASE OF THE QUARTER

Case One

Bread & Butter EM

LOYOLA MEDICINE

68yo M presents with acute onset of speech difficulty & right-sided weakness.

68 YO M | SPEECH DIFFICULTY, RIGHT-SIDED WEAKNESS

What do you want to know?

HPI (HISTORY OF PRESENT ILLNESS)

LOYOLA MEDICINE

Last known well 3 hours ago. At dinner, pt had difficulty finding words, numbness & weakness in R arm + leg. Wife called 911.

FURTHER Hx

LOYOLA MEDICINE

PMHx: HTN, T2DM

PSHx: none

Meds: labetalol, metformin

Allergies: NKA

FHx: Mother had stroke @ age 57

ROS (REVIEW OF SYSTEMS)

CONSTITUTIONAL	Denies weight loss, fever and chills.
HEENT	Denies changes in vision and hearing.
RESPIRATORY	Denies SOB and cough.
CV	Denies palpitations and CP.
GI	Denies abdominal pain, n/v/d.
GU	Denies dysuria and urinary frequency.
MSK	Denies myalgia and joint pain.
SKIN	Denies rash and pruritus.
NEUROLOGICAL	R arm + R leg weakness + numbness.
	Word finding difficulty. Confused per wife.
PSYCHIATRIC	Denies recent changes in mood.
	Denies anxiety and depression.

68 YO M | SPEECH DIFFICULTY, RIGHT-SIDED WEAKNESS

What do you check on physical exam?

PHYSICAL EXAM

LOYOLA MEDICINE

GENERAL	WD/WN. NAD.
EYES	EOMI. PERRL.
HEENT	MMM. R facial droop, forehead spared.
LUNGS	Nonlabored, CTAB.
CARDIOVASCULAR	RRR. No murmur. No JVD.
ABDOMEN	Soft, non-tender, non-distended. No masses.
EXTREMITIES	No edema. Non-tender.
SKIN	No rashes or lesions. Warm, dry.
NEUROLOGIC	Expressive aphasia, RUE 2/5 strength, RLE 2/5 strength, RUE+RLE loss of SLT.
PSYCHIATRIC	AAOx1 (name only). Confused.

VITALS

LOYOLA MEDICINE

T	37.1 C
HR	85
BP	192 / 121
RR	18
SpO2	98% on RA

VITALS

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68 YO M | SPEECH DIFFICULTY, RIGHT-SIDED WEAKNESS

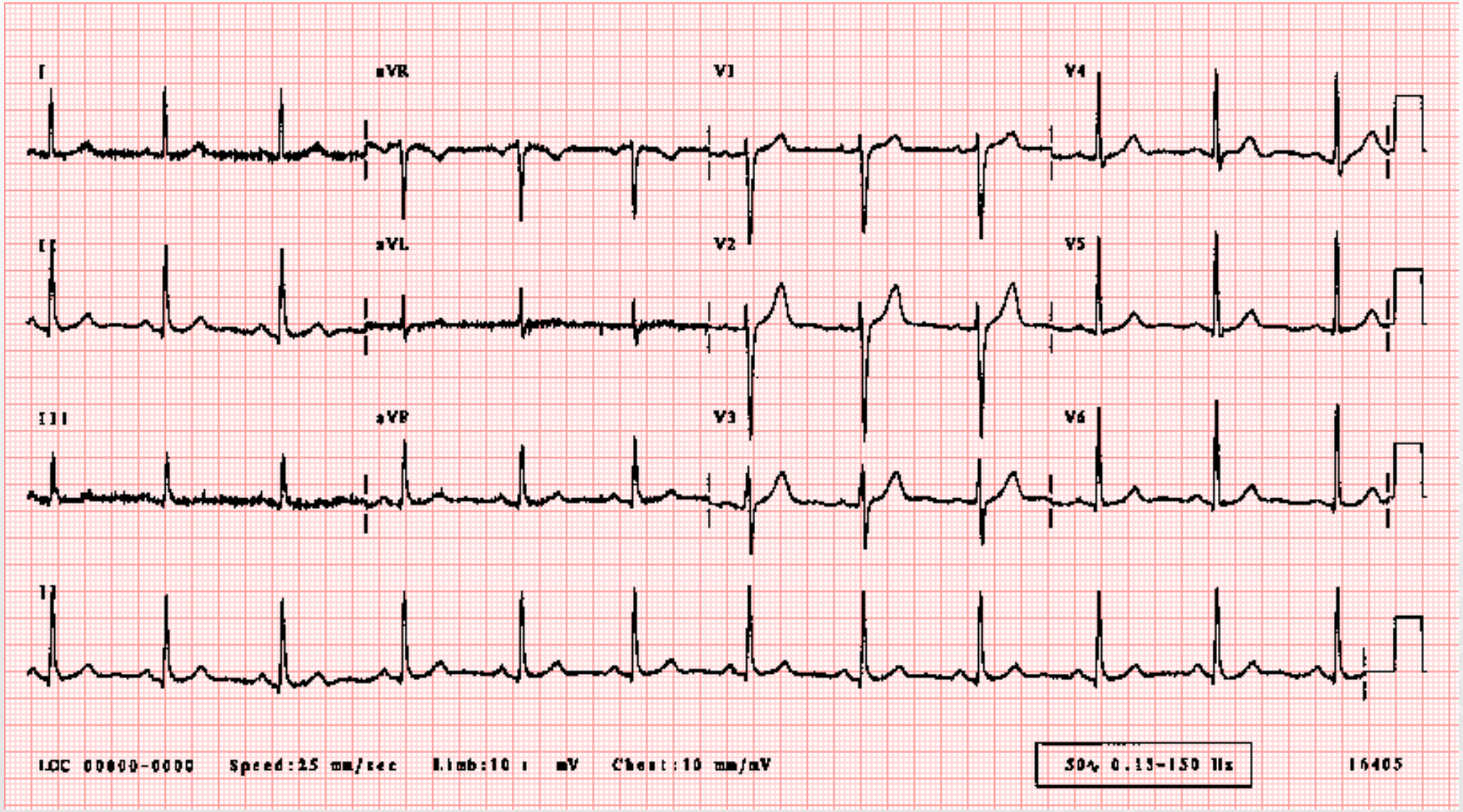
What labs/imaging do you want?

LABS

POC Glucose	95
CBC	wnl
CMP	wnl
PT/INR, aPTT	wnl
Troponin	<0.03
Type & Screen	B+

CASE ONE

EKG

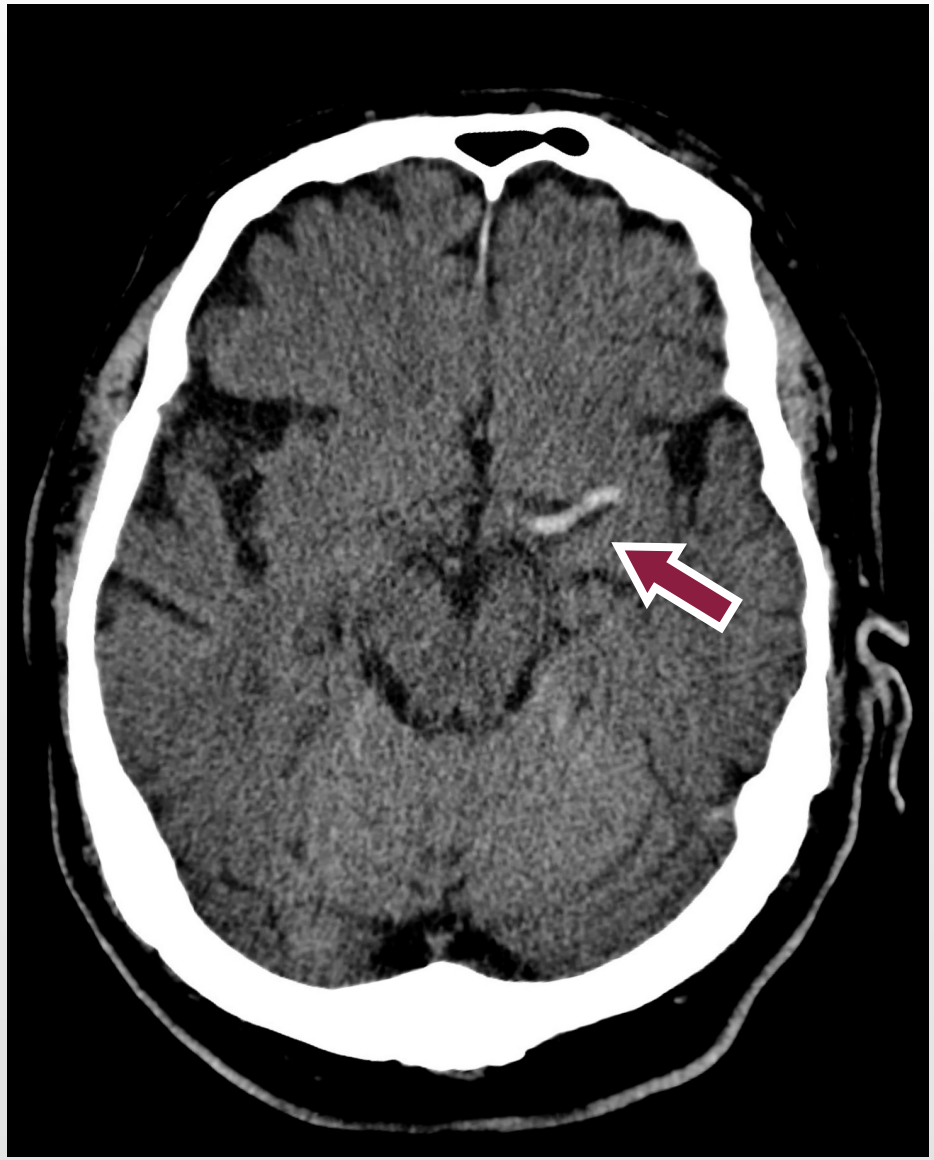


Source: ECG Library

CASE ONE

CTA HEAD W/ CONTRAST

LOYOLA MEDICINE



Hyperdense MCA sign

(large vessel occlusion @ left M1)

Source: Assoc Prof Frank Gaillard, Radiopaedia.org, rID: 7150

68 YO M | SPEECH DIFFICULTY, RIGHT-SIDED WEAKNESS

What is in your differential diagnosis?

DIFFERENTIAL DIAGNOSIS

CVA vs TIA	(i.e. stroke vs “mini-stroke”)
Structural Brain Lesion	(tumor, AVM, aneurysm, hemorrhage)
Infection	(cerebral abscess, septic emboli)
Seizure Disorder	(epilepsy, Todd’s paralysis)
Peripheral Neuropathy	(Bell’s palsy)
Toxic-Metabolic Disorders	(hypoglycemia, hyponatremia)
Complicated Migraine	
Conversion Disorder	

68 YO M | SPEECH DIFFICULTY, RIGHT-SIDED WEAKNESS

What is your final diagnosis?

LOYOLA MEDICINE

Ischemic Stroke (CVA)

affecting left MCA territory

M1 LVO on CT angiography

FINAL DIAGNOSIS

LOYOLA MEDICINE

Call a Stroke Code

usually done already by ED staff
neurology consult if not automatically paged

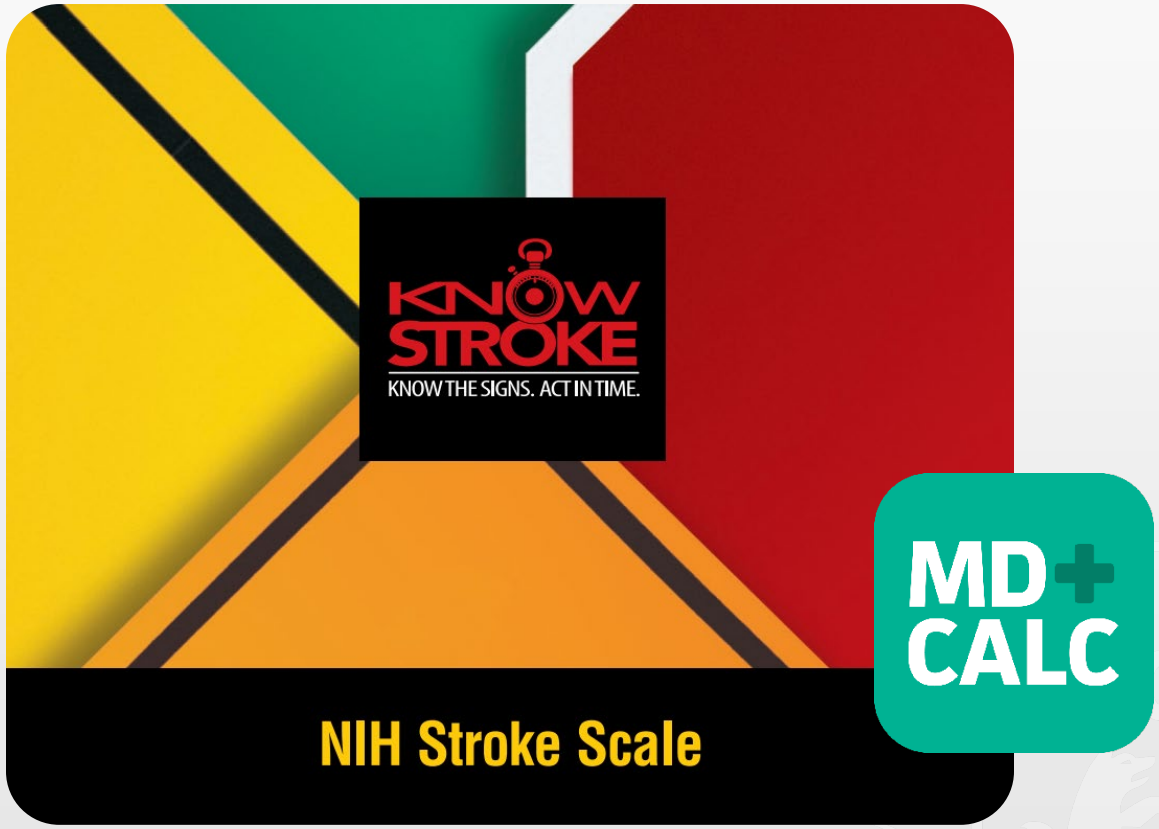
68 YO M | SPEECH DIFFICULTY, RIGHT-SIDED WEAKNESS

What can you use to assess stroke severity?

CASE ONE

NIHSS TO ASSESS STROKE SEVERITY

LOYOLA MEDICINE



NIHSS <4 = highly likely to have a good clinical outcome

Sources: National Institutes of Health & National Institute of Neurological Disorders and Stroke // MDCalc

CONTENT REVIEW

Cerebrovascular Accident (CVA)

5th Leading Cause of Death (in the US)

Prevalence: expected ↑20% by 2030

Source: SAEM / CDEM Curriculum

LOYOLA MEDICINE

Stroke: acute onset of neurologic deficit caused by disruption of cerebral blood flow to a localized region of the brain

Source: SAEM / CDEM Curriculum

LOYOLA MEDICINE

The reversibility and extent of symptoms in stroke is critically dependent on the duration of this blood flow disruption.

TIME IS BRAIN

Early recognition and treatment is key.

Source: SAEM / CDEM Curriculum

CEREBROVASCULAR ACCIDENT

Acute stroke most commonly results from occlusion of an intracranial artery by **thrombosis** within the artery, **thromboembolism** from an extracranial source, or **hemorrhage.**

87% of CVAs are ischemic strokes

less commonly: intracerebral or subarachnoid hemorrhage

Source: SAEM / CDEM Curriculum

SYMPTOMS *

changes in vision
changes in speech
focal numbness or weakness
disequilibrium or alteration in level of consciousness

* highly variable neurologic deficits depending on which vessel is occluded, extent of occlusion, & amount of collateral circulation

Source: SAEM / CDEM Curriculum

How to determine the exact time of onset?

LAST KNOWN WELL

Awoke w/ symptoms > overnight bathroom or kitchen?

Onset when awake > phone calls, television shows?

Use friends & family to assist with HPI whenever possible.

Source: SAEM / CDEM Curriculum

CEREBROVASCULAR ACCIDENT

LOYOLA MEDICINE

RISK FACTORS

hypertension
diabetes
hyperlipidemia
tobacco abuse
advanced age
atrial fibrillation / prosthetic heart valve
prior CVA/TIA

Source: SAEM / CDEM Curriculum

LOYOLA MEDICINE

STROKE MIMICS

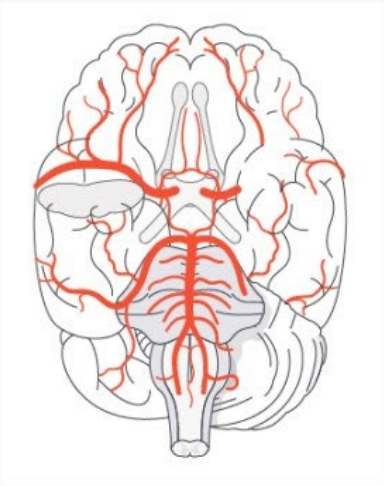
Hypoglycemia
Complicated migraine
Seizure / post-seizure neurologic deficit
Conversion disorder

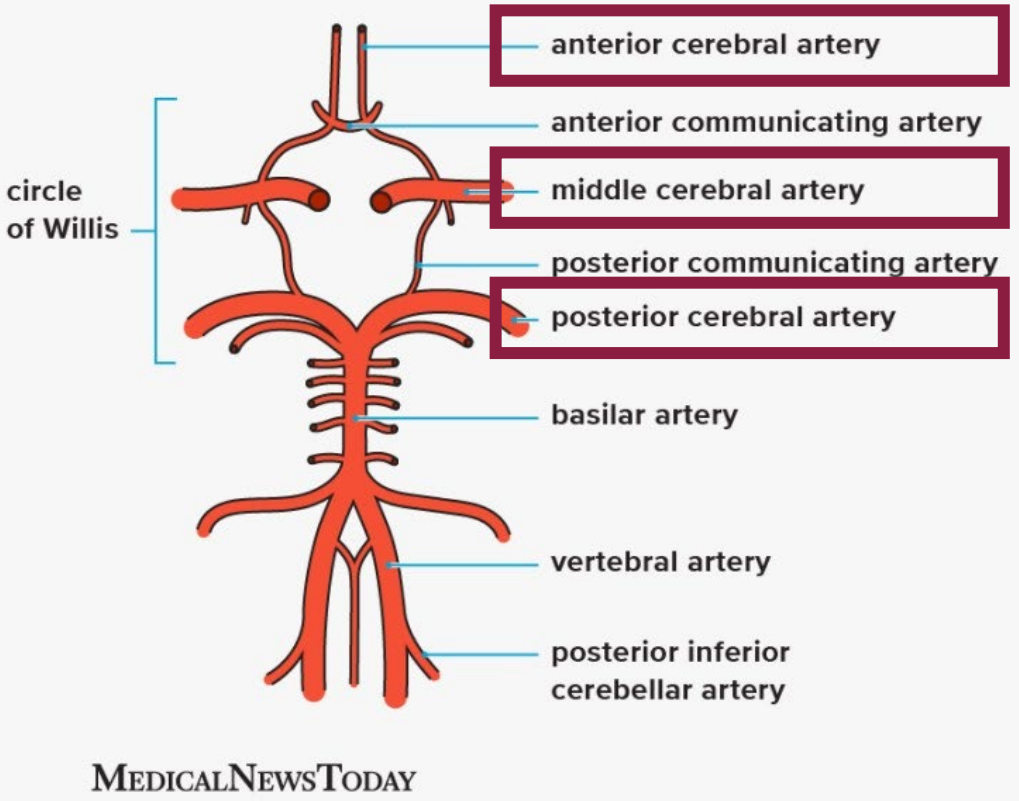
stroke mimic symptoms usually progress slowly over time, or may progress from one area of the body to another

Source: SAEM / CDEM Curriculum

CEREBROVASCULAR ACCIDENT

Circle of Willis





ACA > leg

MCA > face & arm

PCA > homonomous hemianopsia

Sources: MedicalNewsToday // SAEM / CDEM Curriculum

CEREBROVASCULAR ACCIDENT

Back to the case…

LOYOLA MEDICINE

Ischemic Stroke (CVA)

affecting left MCA territory

M1 LVO on CT angiography

68 YO M | ISCHEMIC STROKE

How do you treat this patient?

LOYOLA MEDICINE

tPA

up to 4.5 hours after symptom onset
best if administered within 90 minutes of onset

[!] contraindicated in/risk of intracranial hemorrhage

REPEAT VITALS

LOYOLA MEDICINE

T	37.2 C
HR	90
BP	198 / 125
RR	22
SpO2	97% on RA

tPA cutoff:
185/115

nicardipine gtt

as long as you have time to lower the BP first…

LOYOLA MEDICINE

mechanical thrombectomy

recommended for occlusion of internal carotid or proximal middle cerebral (M1) arteries

NIHSS > 6 | within 6-16 hours of sx onset

aspirin

for pts who do not/cannot receive thrombolytic therapy
administer within 24-48 hours of stroke onset

68 YO M | ISCHEMIC STROKE

Where do you send this patient?

Admit to Neuro ICU

with neurology following for further monitoring

EMIG CASE OF THE QUARTER

Case Two

More Interesting...

LOYOLA MEDICINE

70yo F presents with CC of "multiple complaints".

70 YO F | MULTIPLE COMPLAINTS

What do you want to know?

LOYOLA MEDICINE

Patient reports yesterday she developed fevers, chills, body aches, headache, neck and back pain, and abdominal pain.

FURTHER Hx

LOYOLA MEDICINE

PMHx:	HTN
PSHx:	C-section (1984)
Meds:	lisinopril
Allergies:	Peanuts (hives, anaphylaxis)
FHx:	HTN in both parents

LOYOLA MEDICINE

CONSTITUTIONAL	Decreased appetite, not eating.
HEENT	Denies changes in vision and hearing.
RESPIRATORY	Denies SOB and cough.
CV	Denies palpitations and CP.
GI	Denies abdominal pain, n/v/d.
GU	Denies dysuria and urinary frequency.
MSK	Weakness, not walking. Denies joint pain.
SKIN	Denies rash and pruritus.
NEUROLOGICAL	Denies headache and syncope.
PSYCHIATRIC	Denies recent changes in mood.
	Denies anxiety and depression.

70 YO F | MULTIPLE COMPLAINTS

What do you check on physical exam?

CASE TWO

EXAM

LOYOLA MEDICINE

GENERAL	WD/WN. NAD.
EYES	EOMI. PERRL.
HEENT	MMM. Trachea midline.
NECK / BACK	TTP cervical & thoracolumbar paraspinals.
LUNGS	Nonlabored, CTAB.
CARDIOVASCULAR	Tachycardic. No murmur. No JVD.
ABDOMEN	Soft, no masses. TTP RLQ, RUQ.
EXTREMITIES	No edema. Non-tender.
SKIN	No rashes or lesions. Warm, dry.
NEUROLOGIC	No FND. CN II-XII grossly intact.
PSYCHIATRIC	AAOx4. Appropriate mood & affect.

CASE TWO

VITALS

LOYOLA MEDICINE

T	39.1 C
HR	105
BP	130 / 80
RR	22
SpO2	96% on RA

CASE TWO

VITALS

LOYOLA MEDICINE

T	39.1 C
HR	105
BP	130 / 80
RR	22
SpO2	96% on RA

70 YO F | MULTIPLE COMPLAINTS

What labs/imaging do you want?

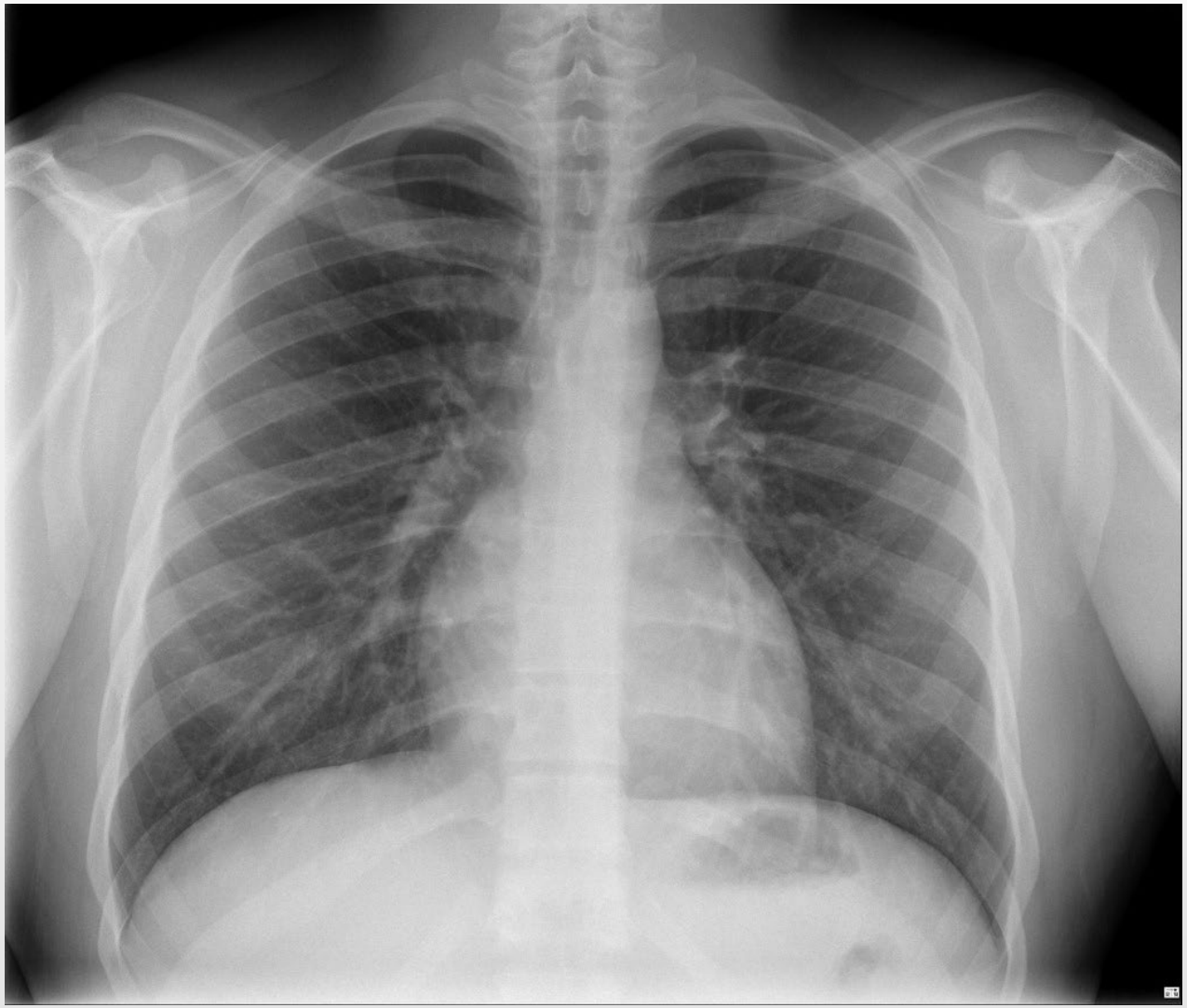
LOYOLA MEDICINE

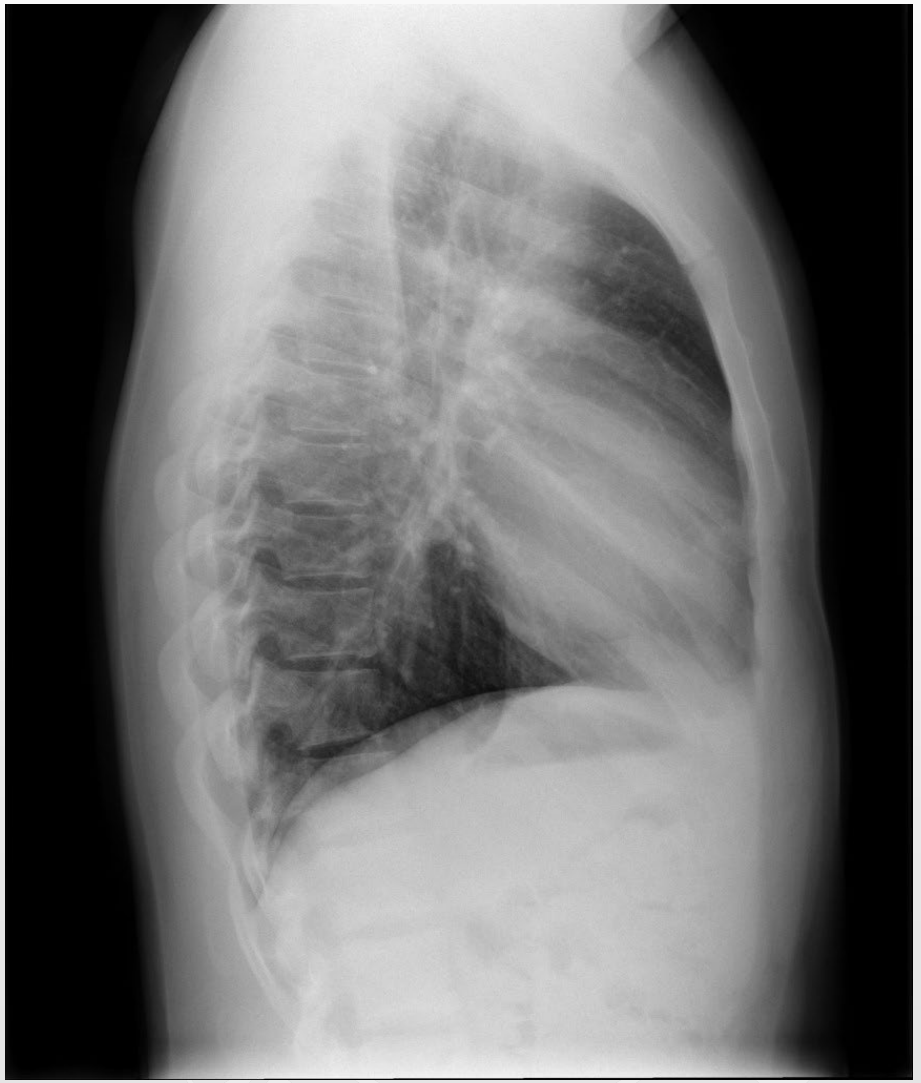
POC Glucose	105
CBC	WBC 14.5
CMP	wnl
U/A	negative
Viral URI 4-plex	negative

CASE TWO

CHEST X-RAY

LOYOLA MEDICINE





Source: Assoc Prof Craig Hacking, Radiopaedia.org, rID: 40794

CASE TWO

CT ABDOMEN & PELVIS W/ CONTRAST

LOYOLA MEDICINE

Source: Dr Andrew Dixon, Radiopaedia.org, rID: 36677

70 YO F | MULTIPLE COMPLAINTS

Patient returns from CT, nurse comes to get you...

LOYOLA MEDICINE

Pt is now AAOx1, somnolent. T 39.2

POC Glucose	96
Repeat Exam	+neck stiffness

70 YO F | MULTIPLE COMPLAINTS

What do you do next?

LOYOLA MEDICINE

What should you check before an LP?

CT Head w/o Contrast

70 YO F | MULTIPLE COMPLAINTS

What is your working diagnosis?

LOYOLA MEDICINE

Meningoencephalitis

fever, headache, nuchal rigidity, altered mentation

70 YO F | MULTIPLE COMPLAINTS

What medications do you order right now?

LOYOLA MEDICINE

vancomycin, ceftriaxone, acyclovir, dexamethasone

IV empiric regimen for meningoencephalitis

70 YO F | MULTIPLE COMPLAINTS

LP results come back...

CASE TWO

LUMBAR PUNCTURE / CSF ANALYSIS

LOYOLA MEDICINE

Clarity	Clear
Color	Xanthochromic
Volume	Tube 4 = 6 ml
RBC	98
WBC	225
Seg'd Neutrophils	18
Lymphocytes	59
Monocytes	19
Basophils	4
Glucose, CSF	60
Protein	402

CASE TWO

LUMBAR PUNCTURE / CSF ANALYSIS

LOYOLA MEDICINE

Clarity	Clear
Color	Xanthochromic (!)
Volume	Tube 4 = 6 ml
RBC	98 ^
WBC	225 ^
Seg'd Neutrophils	18
Lymphocytes	59 ^
Monocytes	19
Basophils	4
Glucose, CSF	60
Protein	402 ^

70 YO F | MULTIPLE COMPLAINTS

What is your final diagnosis?

LOYOLA MEDICINE

HSV Encephalitis

lymphocytic pleocytosis
elevated RBCs / xanthochromia
high protein / normal glucose

neonatal HSV: thrombocytopenia, elevated LFTs

CSF CULTURES & PCR

LOYOLA MEDICINE

CSF PCR

positive for HSV-2

CSF Cx

negative

CONTENT REVIEW

CSF Analysis

LOYOLA MEDICINE

CT Head w/o Contrast

ensure no SAH, ICH, or brain herniation

CASE TWO

NORMAL CSF ANALYSIS

LOYOLA MEDICINE

Color & Clarity	clear, colorless
Cell Count	<5 RBC <5 WBC
Glucose	>0.6x serum glucose
Protein	23-38 mg/dL

Source: Taming the SRU

CSF COLOR & CLARITY

Xanthochromia = yellowish tinge

caused by RBCs breaking down to bilirubin

can distinguish between traumatic tap & SAH

Source: Taming the SRU

CSF COLOR & CLARITY

Turbid = cloudy

caused by presence of cells/bacteria

takes as few as 200 WBCs or 400 RBCs

Bloody = presence of RBCs

traumatic tap vs SAH

takes about 6000 RBCs / microL

Source: Taming the SRU

LOYOLA MEDICINE

CSF should be acellular. (wnl up to 5 RBC or WBCs)

If traumatic tap: cell count is repeated in fourth tube of CSF collected to see if cells have “cleared”, indicating SAH or other source of cells is less likely.

Source: Taming the SRU

CSF GLUCOSE

CSF glucose is normally >0.6x serum glucose.

Low CSF glucose = bacterial infection

Source: Taming the SRU

LOYOLA MEDICINE

CSF protein typically ranges 23-38 mg/dL.

Markedly high	= tuberculosis infection
Very high	= bacterial infection
Moderately high	= viral infection

Source: Taming the SRU

CASE TWO

CSF ANALYSIS SUMMARY

LOYOLA MEDICINE

	Normal	Bacterial	Viral	SAH
Opening Pressure	7-18	>30	Normal or Mildly Increased	Increased (60% of Cases)
Appearance	Clear, Colorless	Turbid	Clear	Grossly bloody, Xanthrochromic, or Clear
Protein (mg/dL)	23-38	Increased	Normal to Decreased	Increased (1 mg/dL per 1000 RBCs)
Glucose (mmol/L)	2/3rds Serum Glucose	Decreased	Normal	Normal
Gram Stain	Negative	Positive (60-90% of Cases)	Negative	Negative
Glucose CSF:Serum Ratio	0.6	<0.4	>0.6	0.6
White Cell Count	<5 cells	Predominately Neutrophils	Predominately Lymphocytes	May See Increase d/t Bleeding

Source: Taming the SRU

HSV ENCEPHALITIS

Back to the case…

CASE TWO

LUMBAR PUNCTURE / CSF ANALYSIS

LOYOLA MEDICINE

Clarity	Clear
Color	Xanthochromic (!)
Volume	Tube 4 = 6 ml
RBC	98 ^
WBC	225 ^
Seg'd Neutrophils	18
Lymphocytes	59 ^
Monocytes	19
Basophils	4
Glucose, CSF	60
Protein	402 ^

HSV Encephalitis

lymphocytic pleocytosis
elevated RBCs / xanthochromia
high protein / normal glucose

70 YO F | HSV ENCEPHALITIS

How do you treat this patient?

IV acyclovir

can stop the vanc / ctx

70 YO F | HSV ENCEPHALITIS

Where do you send this patient?

LOYOLA MEDICINE

Admit to Hospital

patient remained in hospital on IV acyclovir for one week
mentation improved, negative brain MRI

discharged home to complete 21-day course of antivirals

EMIG CASE OF THE QUARTER

thank you

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