

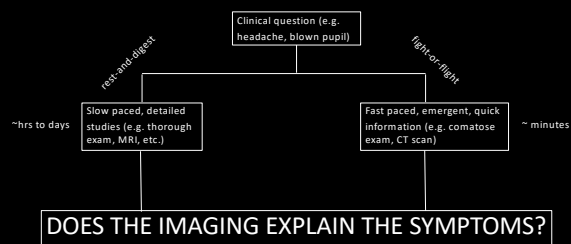
# The Neurological exam and Neuroimaging

By Shervin Rahimpour MD  
Duke University, Department of Neurosurgery

## Objectives

- Establish a **systemic and efficient** approach to testing the components of neurological exam
- Develop a systematic approach to interpreting a head CT
- Know the basics of MR images, including the differences between the various sequences

(1)

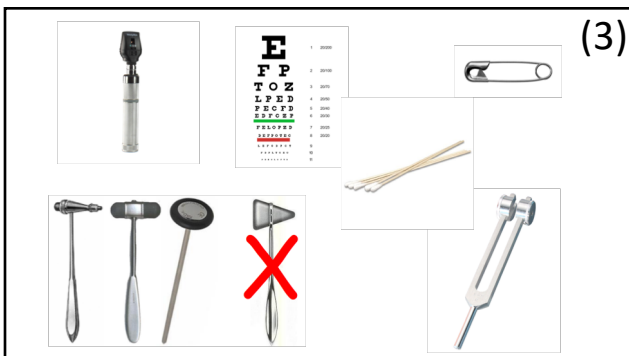


(2)

## Keep an open mind (VITAMIN C)

- Vascular
- Infectious
- Traumatic
- Autoimmune
- Metabolic
- Idiopathic/iatrogenic
- Neoplastic
- Congenital

(3)

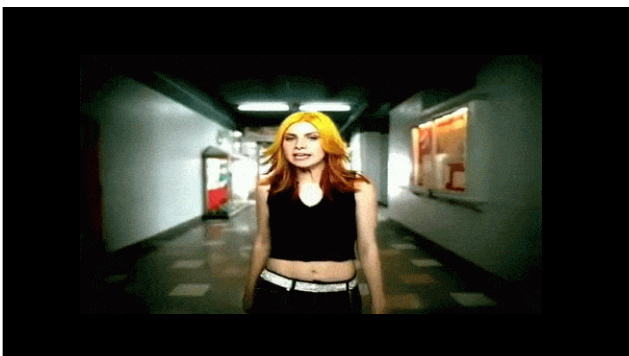
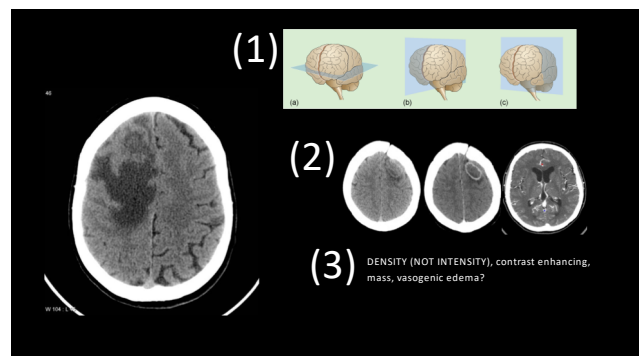
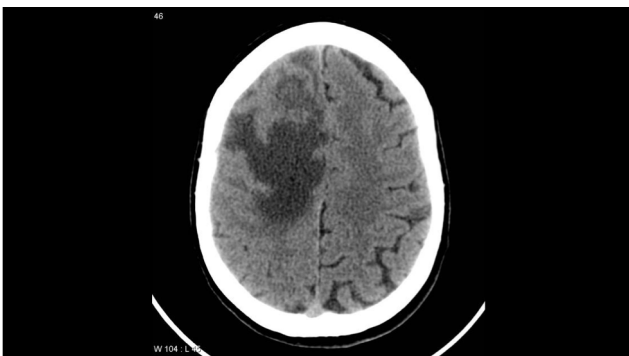


- Chief Complaint: Headache
- History of Present Illness: 67 year-old male, former smoker, presents to ED with on going headaches for several months, this morning noticing L sided hand clumsiness.



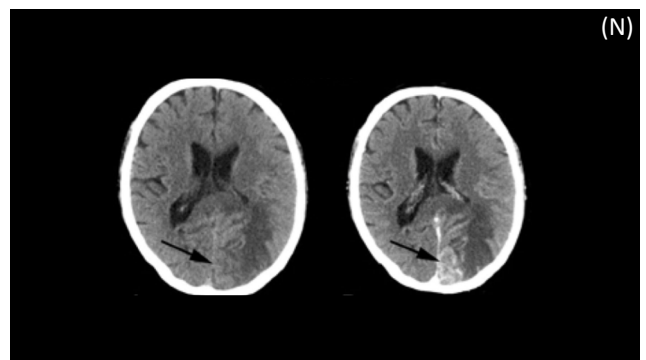
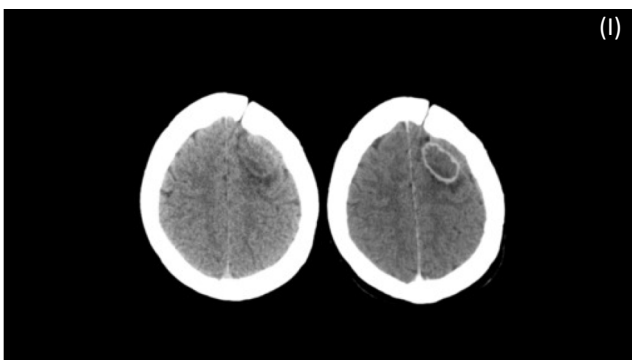
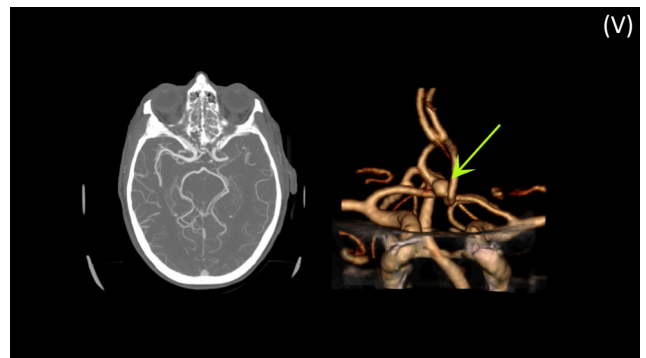
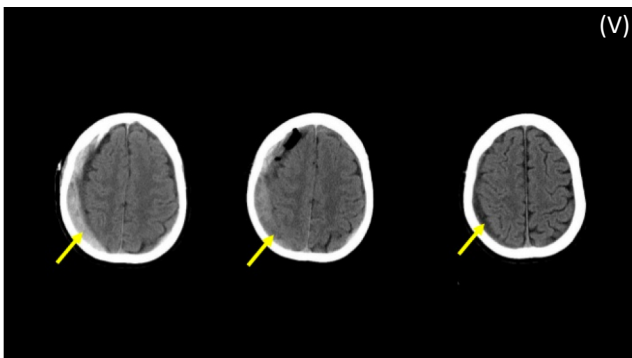
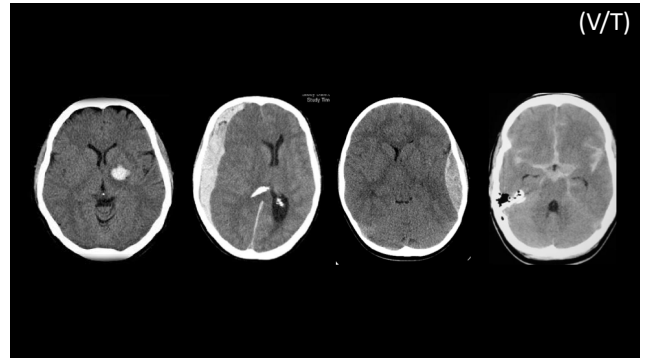
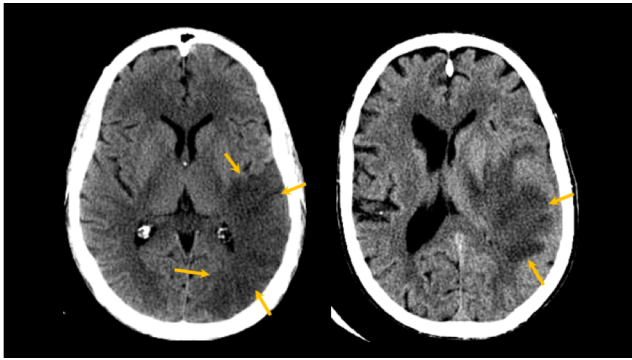
### 8 components to the exam

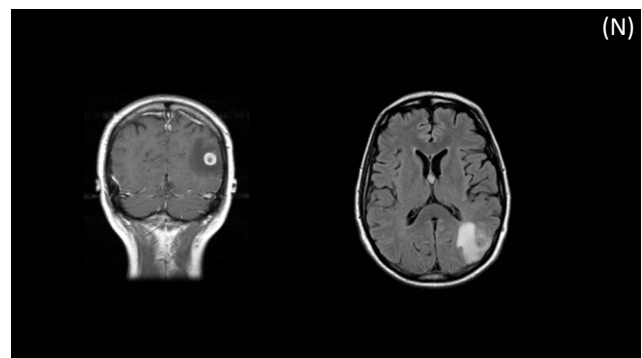
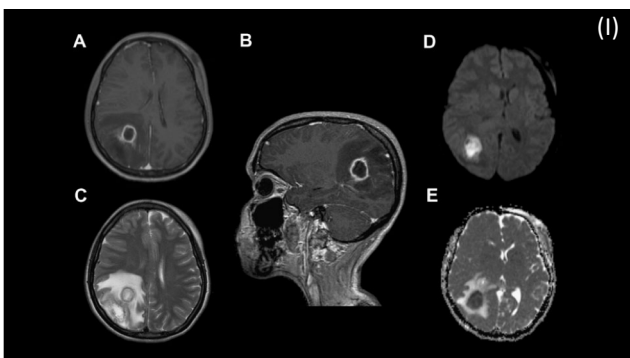
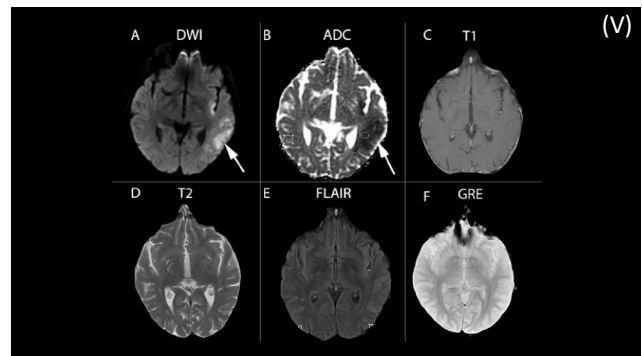
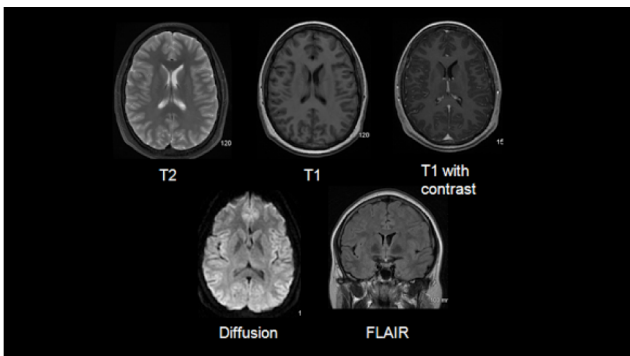
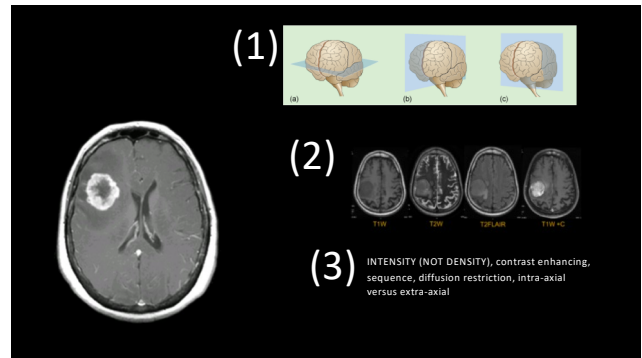
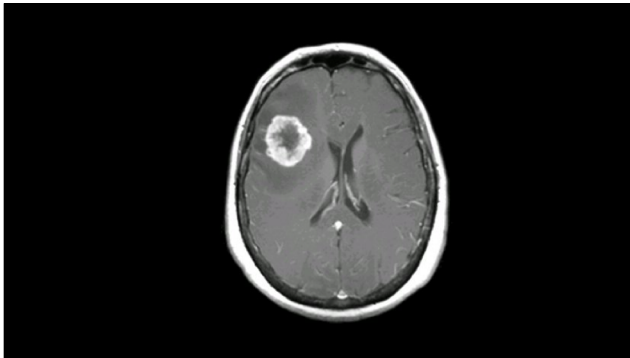
- Mental Status (orientation: month/year, name, place)
- Speech (assess naming, reading and comprehension)
- Cranial Nerves (pupils, EOMs, VFs, facial sensation and strength, hearing, palate, shoulder shrug, tongue ROM)
- Muscles Strength (deltoids to EHL, tailor appropriately, drift?)
- Sensory (vague, tailor appropriately)
- Reflexes (triceps, biceps, patellar, Achilles)
- Coordination (tailor appropriately)
- Gait (tailor appropriately, disposition consideration)



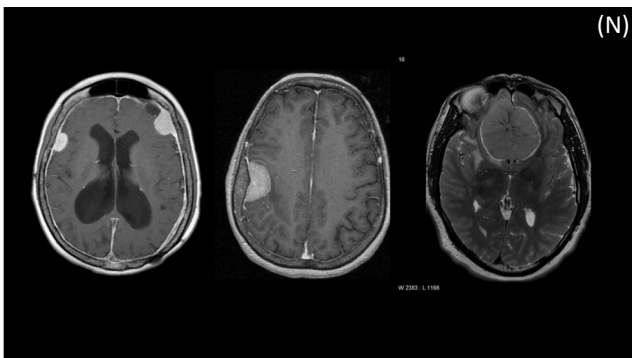
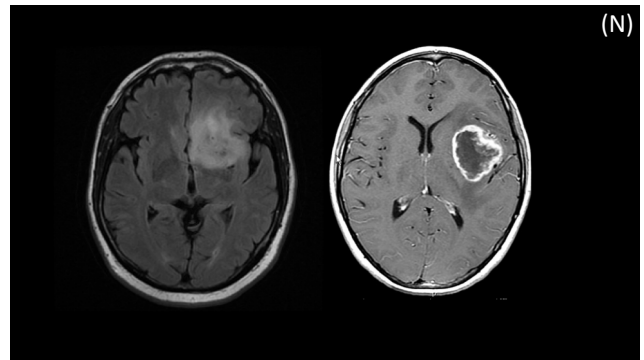
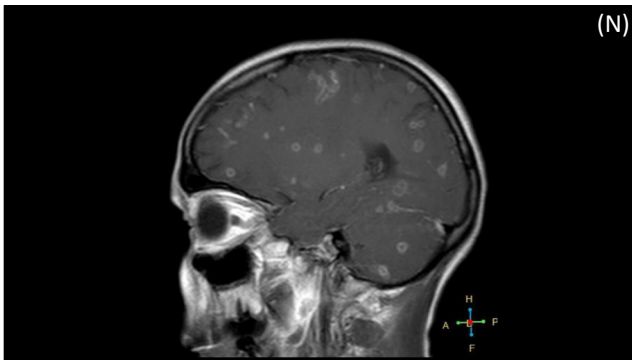
### VITAMIN C

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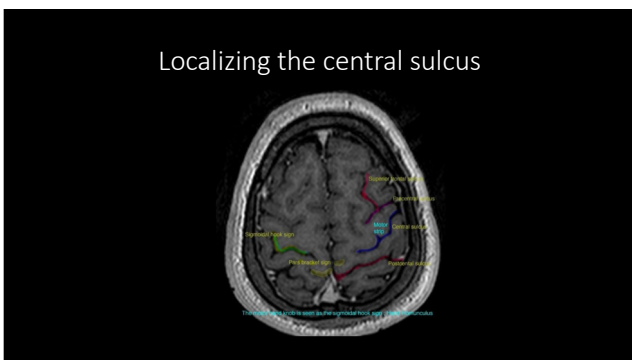






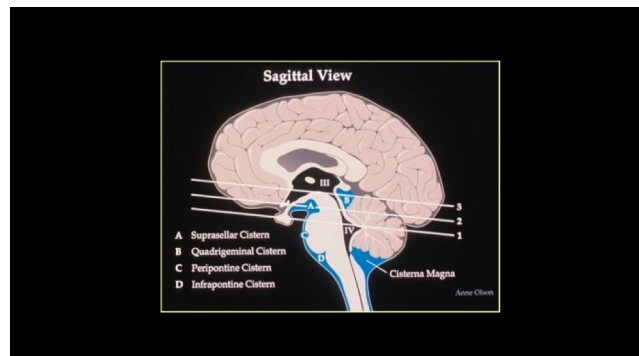
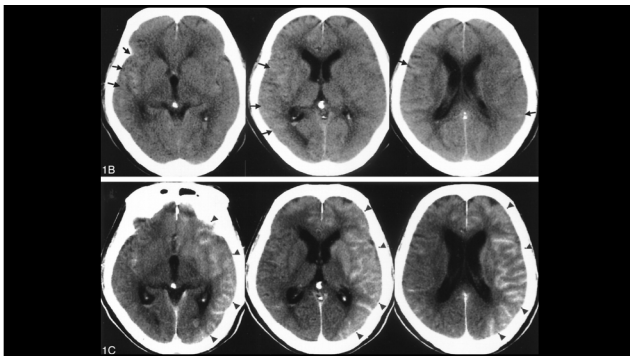


Do the imaging findings correlate with the exam?



Intermission

- Chief Complaint: Nurse concerned patient no longer moving L side as briskly
- History of Present Illness: 47 year old female presented three days prior with worse headache of life and found to have subarachnoid hemorrhage (imaging on next slide).



### Components to the **comatose**/ICU exam

- Mental Status
- Speech
- Cranial Nerves
- Muscles Strength
- Sensory
- Reflexes
- ~~Coordination~~
- ~~Gait~~

### Exam (revised)

- GCS (assesses alertness, verbal and motor)
- Mental Status (intubated, responsive? Sometimes able to assess orientation)
- Speech (comprehending commands?)
- Cranial nerves (pupils, cough, corneal, gag, oculoccephalics)
- Motor (follows commands? Extends, flexes, no movement?)
- Sensory (responds to noxious stimuli?)
- Reflexes (pathologic reflexes, seldom relevant)

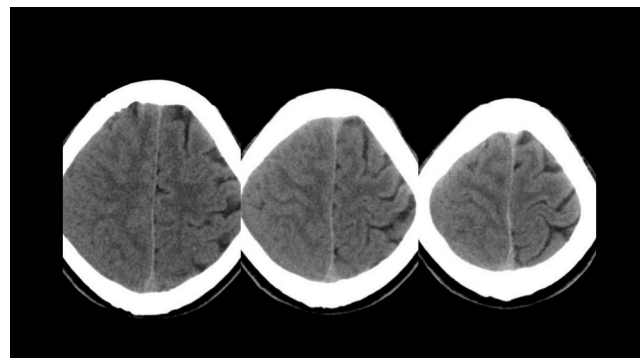
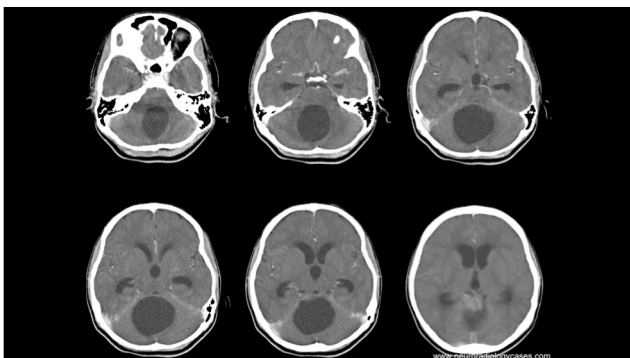
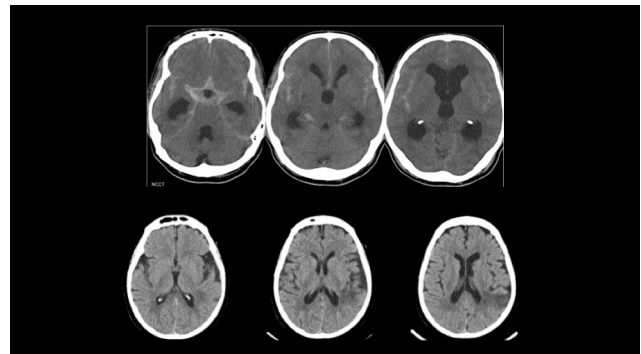
Eye Opening Response	Verbal Response	Motor Response
4 = Spontaneous	5 = Oriented	6 = Obeys commands
3 = To verbal stimuli	4 = Confused	5 = Localizes pain
2 = To pain	3 = Inappropriate words	4 = Withdraws from pain
1 = None	2 = Incoherent	3 = Flexion to pain or decorticate
	1 = None	2 = Extension to pain or decerebrate
		1 = None

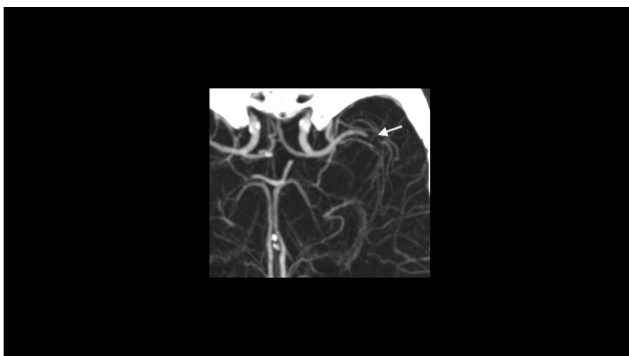
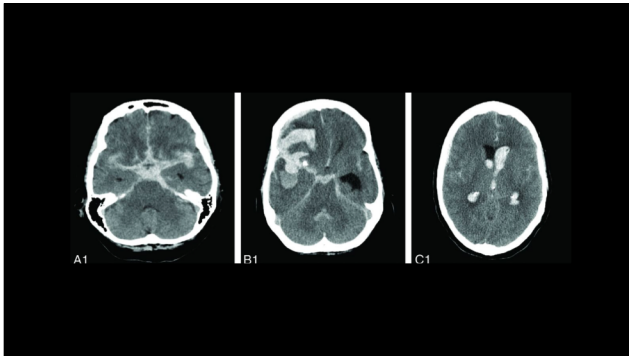
## Exam:

- GCS 6T (E2 VT M3)
- Mental Status: intubated, exam off sedation, opens eyes to stimulation
- Cranial nerves: R > L pupil, + cough, + corneal, + gag
- Motor: RU/LE: flexion posture, LU/LE: no movement
- Sensory: grimaces to noxious stimulation RU/LE

## Acute things to worry about (intervene-able)

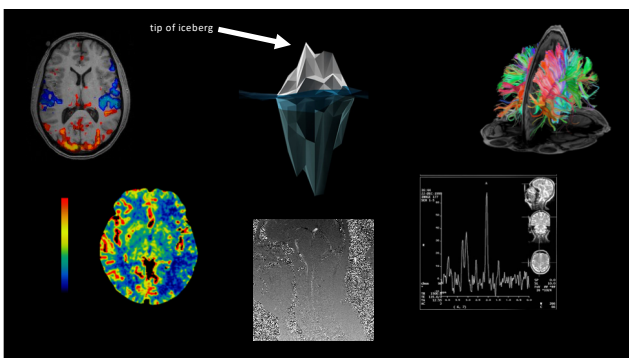
- Hydrocephalus
- Intracerebral hemorrhage
- Stroke





## Objectives

- Establish a **systemic and efficient** approach to testing the components of neurological exam
- Develop a systematic approach to interpreting a head CT
- Know the basics of MR images, including the differences between the various sequences



Thank You!

*I hear and I forget.  
I see and I remember.  
I do and I understand.*

Confucius

### EPIC and PACS example

- MRN: FA4498
- MRN: D1874623