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นพ.วีรวัฒน์ แสงภัทราชัย

ภาควิชาอายุรศาสตร์ คณะแพทยศาสตร์ศิริราชพยาบาล

THE 4th SIRIRAJ STROKE CONFERENCE 2019

CLOSING THE GAP IN STROKE CARE

Stroke Case Discussion

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May 31st 2019

Outline

- Case 1
- Case 2
- Case 3
- Case 4

Case 1

Courtesy of Chompoonuch Lertanathum, M.D.

Case 1

- A 37-year-old Myanmar man
- Right-handedness
- Hometown: Myanmar
- Occupation: Driver
- Baseline status: Totally independence

- Chief complaint: Weakness of left arm and leg for 55 minutes

Case 1: Present Illness

- Last seen normal: 55 minutes prior (Apr 8th 2019, 11.30 AM), the patient was sitting.

- 55 mins prior (Apr 4th 2019, 11.30 AM), while he was sitting and working, he suddenly collapsed with weakness on the left side of body.
- He still alert and could follow to commands but he had speech difficulty.
- A witness did not observe the patient's face.
- He had no head trauma, headache, nausea or vomiting.
- The mobile CT was activated.

Case 1: Present Illness

- Last week, he had palpitation and went to Rajavithi hospital.
- He was diagnosed with atrial fibrillation and moderate mitral stenosis with left atrial thrombus.
- Transthoracic echocardiography (Mar 29th 2019) revealed LVEF 49%, moderate degree of mitral stenosis, left atrial thrombus.
- Warfarin was initiated. Last INR before discharge against advice was 1.1.

Case 1: Medication History

- **Current medication**
  - **Warfarin 2.5 mg/day**

Case 1: Physical Examination

At mobile CT (Apr 8th 2019, 12.25 PM)(55 mins later)

- **Vital signs: BP 109/67 mmHg, P 65/min, totally irregular pulse.**
- **Ht 170 cm, BW 52 kg, BMI 18 kg/m^2**
- **CVS: Loud S1, diastolic rumbling murmur at apex.**
- **RS: No adventitious sound.**
- **Abd: Soft, no tenderness, liver and spleen not palpable.**

Case 1: Physical Examination

- NS: E4V5M6, sleepiness
- Able to answer only his age and follow 2 commands.
- CN II: Pupils 2.5 mm BRTL, left homonymous hemianopia by threat.
- CN III, IV, VI: Gaze preference to the right, full EOM by doll's eye
- CN VII: Mild left facial palsy; UMN, moderate dysarthria
- Motor power: Gr V of right extremities, gr II of left arms and gr III of left leg
- Sensation: Impaired gross touch sensation on the left side
- Language: Impaired repetition and fluency
- Neglect cannot evaluated

NIHSS

	Date/Time		4/8/19 12.40 PM
1A	Consciousness	0 = Alert 1 = Sleepiness 2 = Stupor 3 = Come	1
1B	Questions	0 = Answers both questions 1 = Answers only one question 2 = Answers neither questions	1
1C	Commands	0 = Performs both tasks 1 = Performs only one task 2 = Performs neither tasks	0
2	Gaze	0 = Normal 1 = Partial gaze palsy 2 = Total gaze palsy	1
3	Visual field	0 = No visual loss 1 = Partial hemianosia 2 = Total hemianopsia 3 = Bilateral hemianopsia	2
4	Facial palsy	0 = Without facial paralysis 1 = Minor facial paralysis 2 = Partial facial paralysis 3 = Complete facial paralysis	1
5	Arm strength	0 = Normal 1 = Drifts down before 10 seconds 2 = Some effort against gravity 3 = No effort against gravity 4 = No movement UN = Limb amputated	Left.....3..... Right.....0.....
6	Leg strength	0 = Normal 1 = Drifts down before 5 seconds 2 = Some effort against gravity 3 = No effort against gravity 4 = No movement UN = Limb amputated	Left.....2..... Right.....1.....
7	Ataxia	0 = Does not present ataxia 1 = Ataxia in only one limb 2 = Ataxia in two limbs UN = Limb amputated	0
8	Sensory	0 = Without sensory alteration 1 = Mild to moderate sensory loss 2= Severe or complete sensory loss	1
9	Language	0 = Without language alteration 1 = Mild to moderate aphasia 2 = Severe aphasia 3 = Mute or global aphasia	1
10	Dysarthria	0 = Without dysarthria 1 = Mild to moderate dysarthria 2 = Severe dysarthria or anarthria UN = Intubation	2
11	Inattention	0 = Without attention 1 = Mild inattention 2 = Severe inattention	0
	Total		16

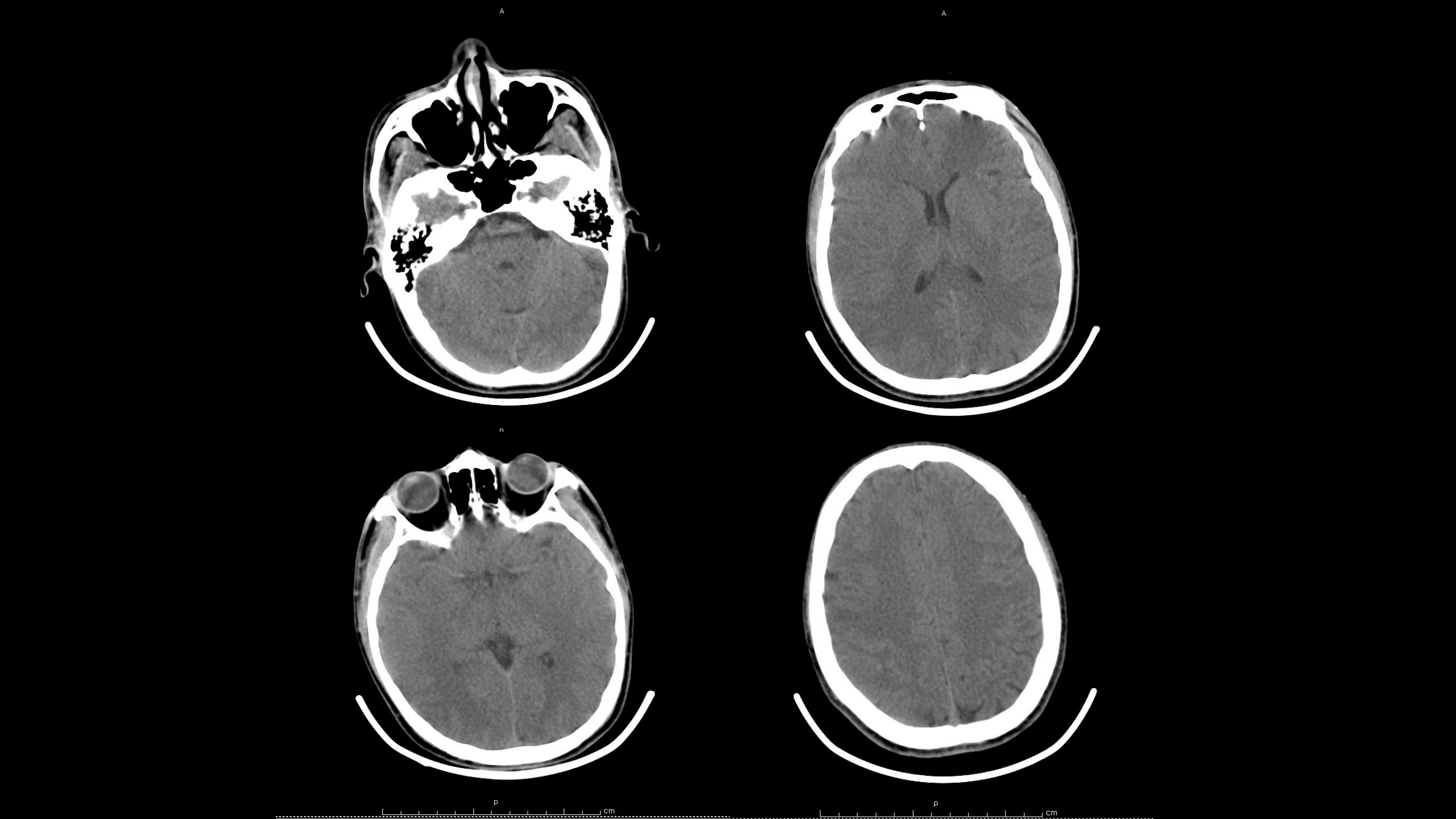
Case 1: Problem List

- A 37-year-old Myanmar man with recently diagnosed valvular atrial fibrillation with mitral stenosis and LA thrombus presented with …

1. Sudden right hemiplegia for 55 minutes.
2. History of low INR
3. Abnormal physical examination revealed
   - Sleepiness
   - Can answer only age
   - Left homonymous hemianopia, gaze preference to the right
   - Left facial palsy; UMNL, moderate dyarthria
   - Left hemiparesis and hemihypoesthesia
   - Impaired repetition and fluency

Case 1: Investigation

- POCT glucose: 105 mg/dL
- POCT INR: 1.1
- BP: Rt arm 109/67 mmHg, Lt arm 105/65 mmHg
- Equal radial pulses, no radio-femoral delay.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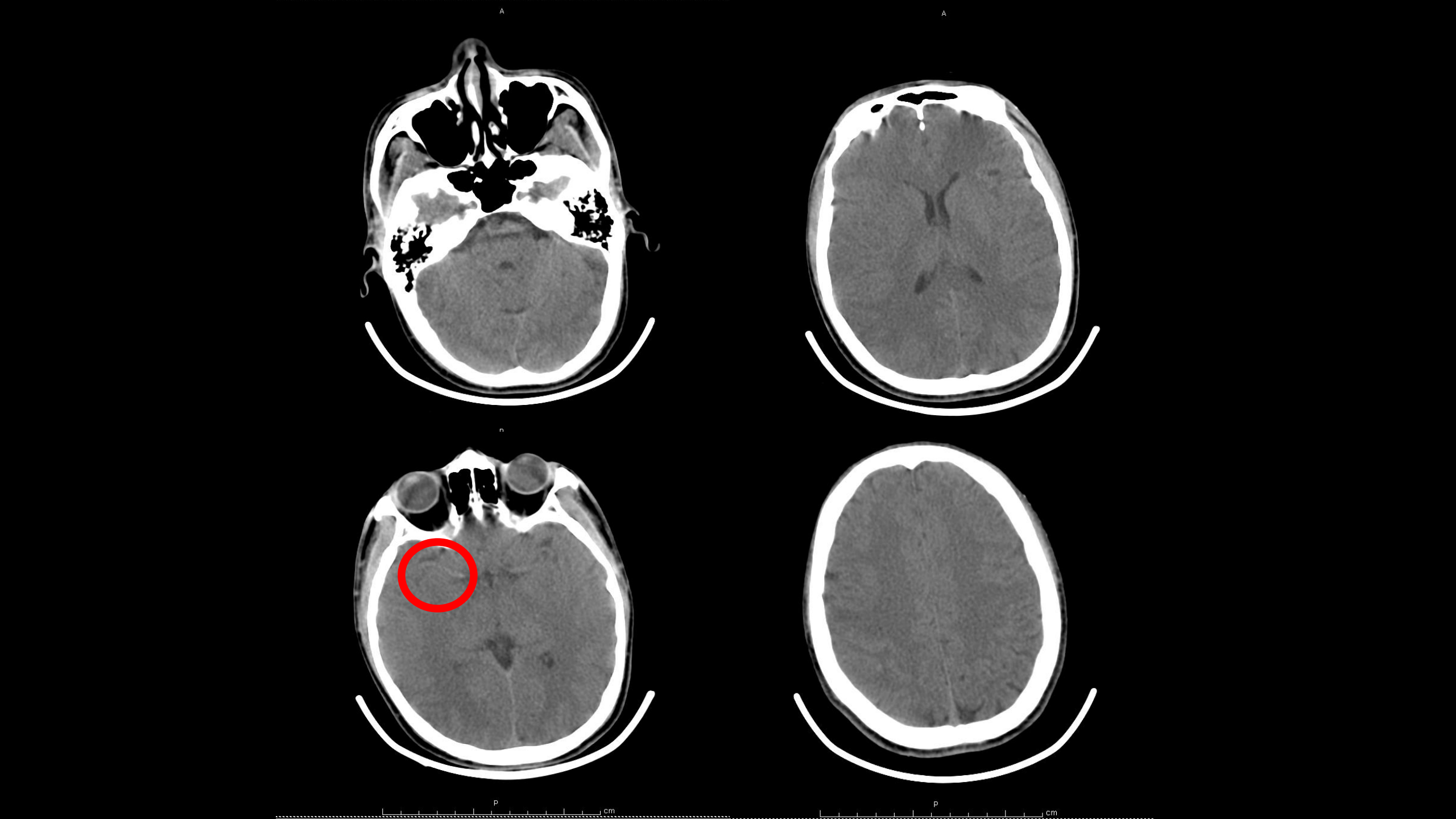
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Case 1: Impression

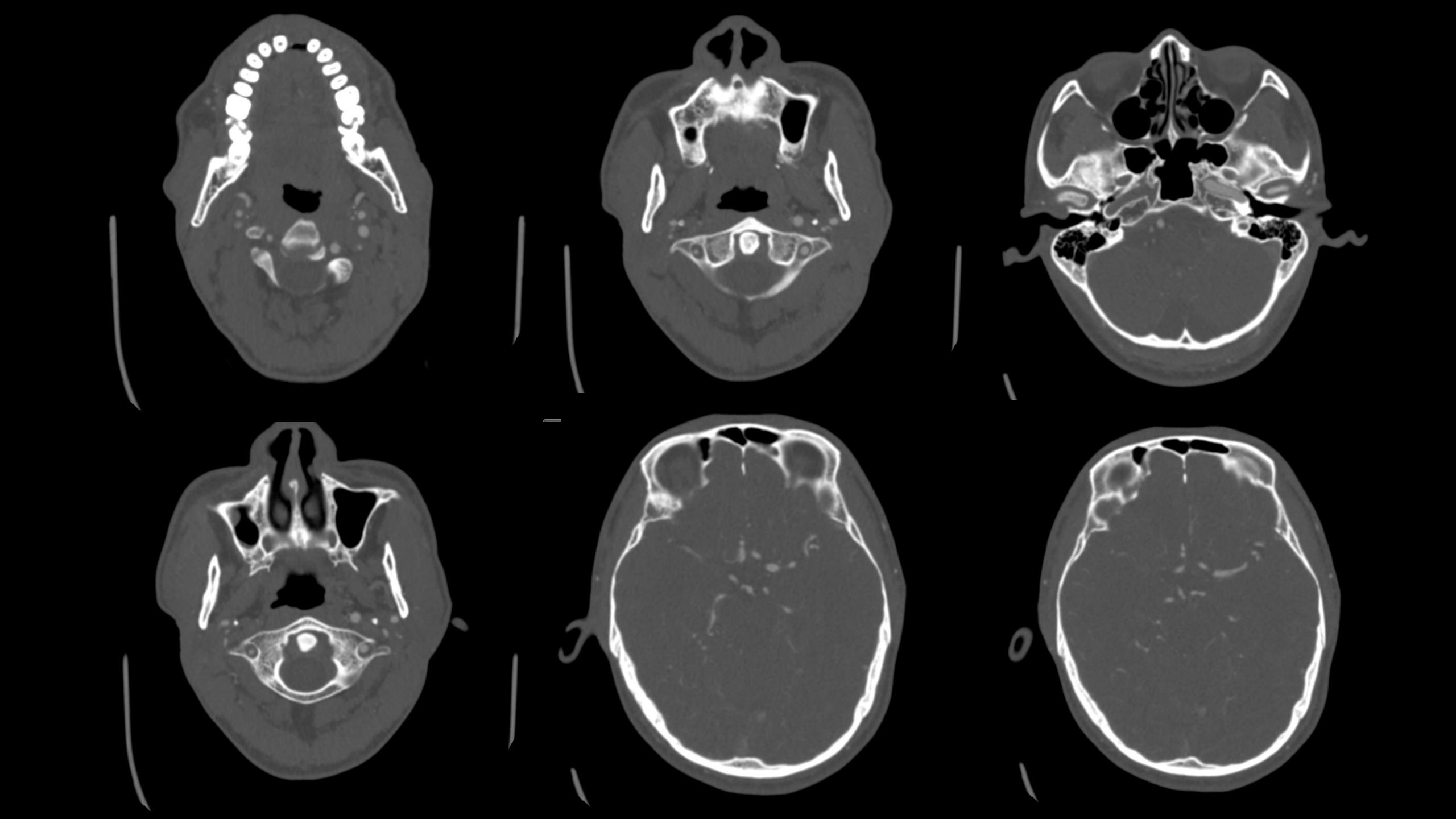
- Acute right middle cerebral artery occlusion
- Valvular atrial fibrillation with moderate mitral stenosis and left atrial thrombus

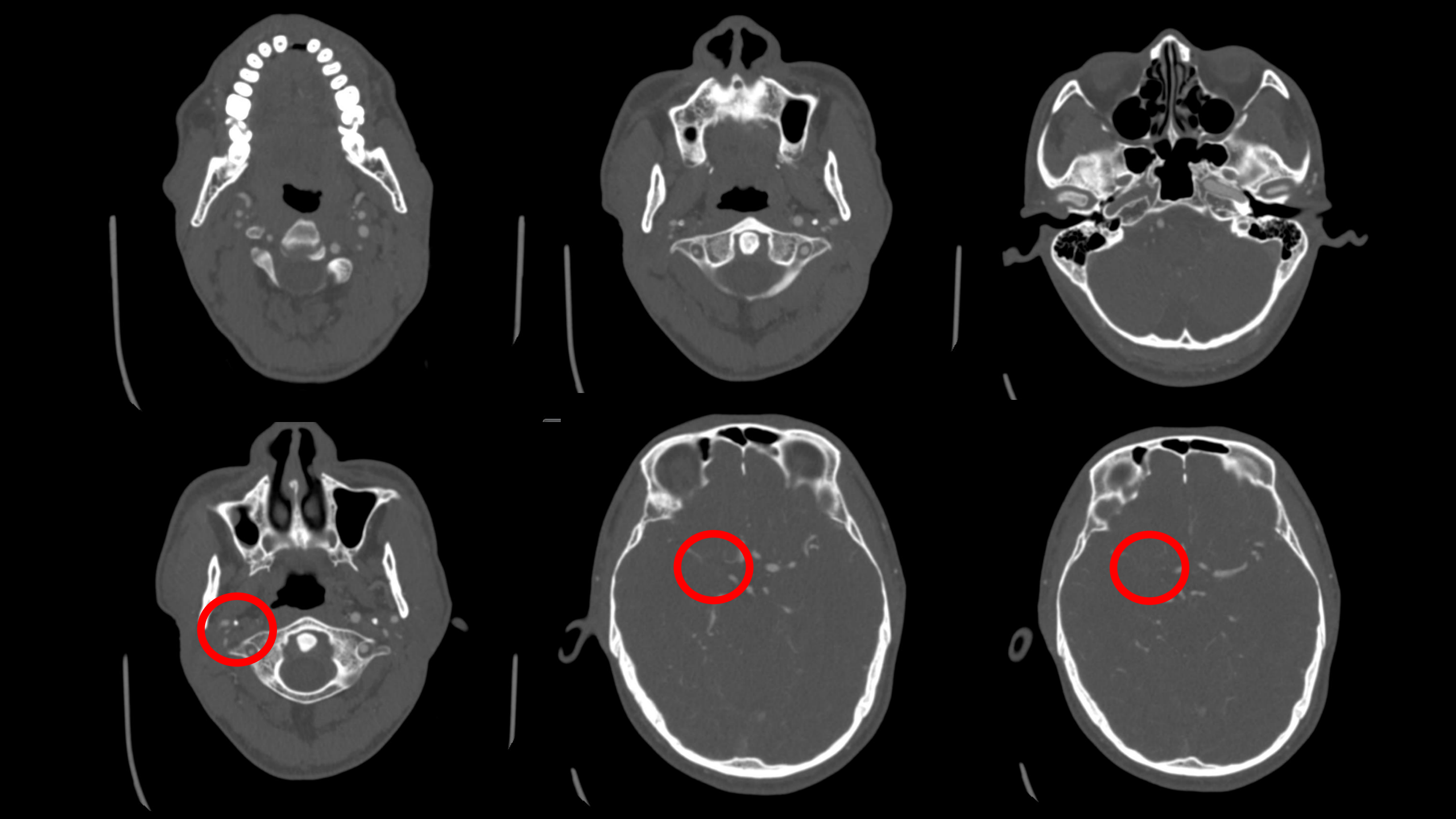
Case 1: Question

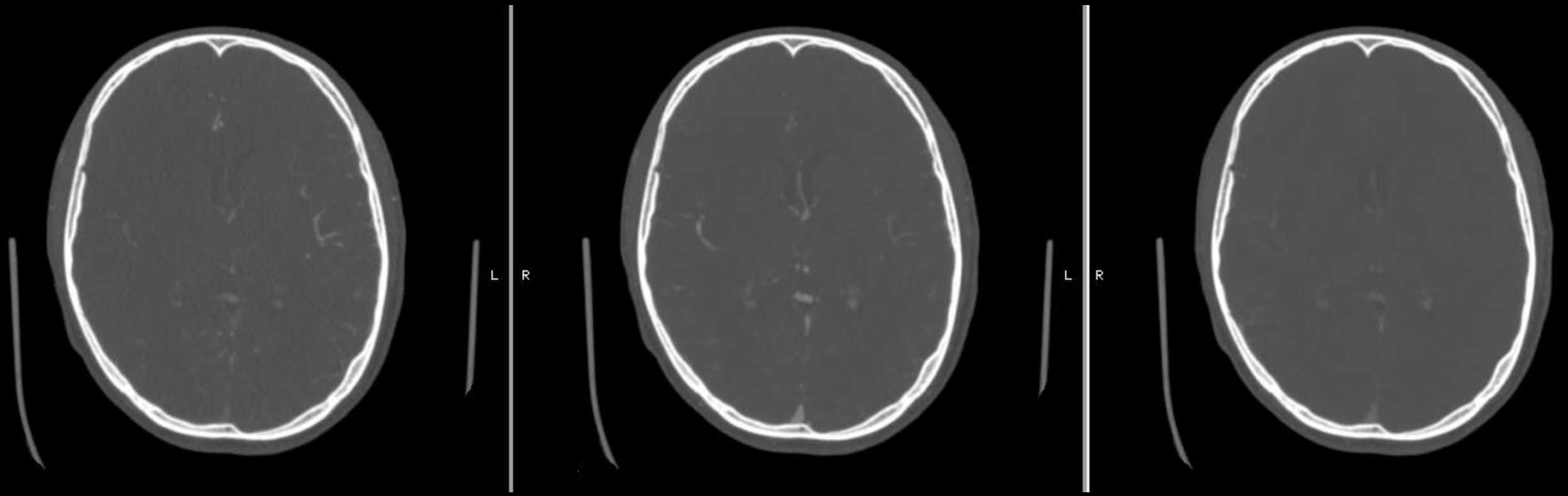
What would you do ?

Case 1: Initial Management

- **No contraindication of rtPA.**
- **rtPA 0.9 mg/kg: 4.6 mg IV in 1 min (12.49 AM)(DTN 24 min) then rtPA 42.2 mg IV in 1 hr**
- **Sent him for multiphase CTA brain and carotid a.**



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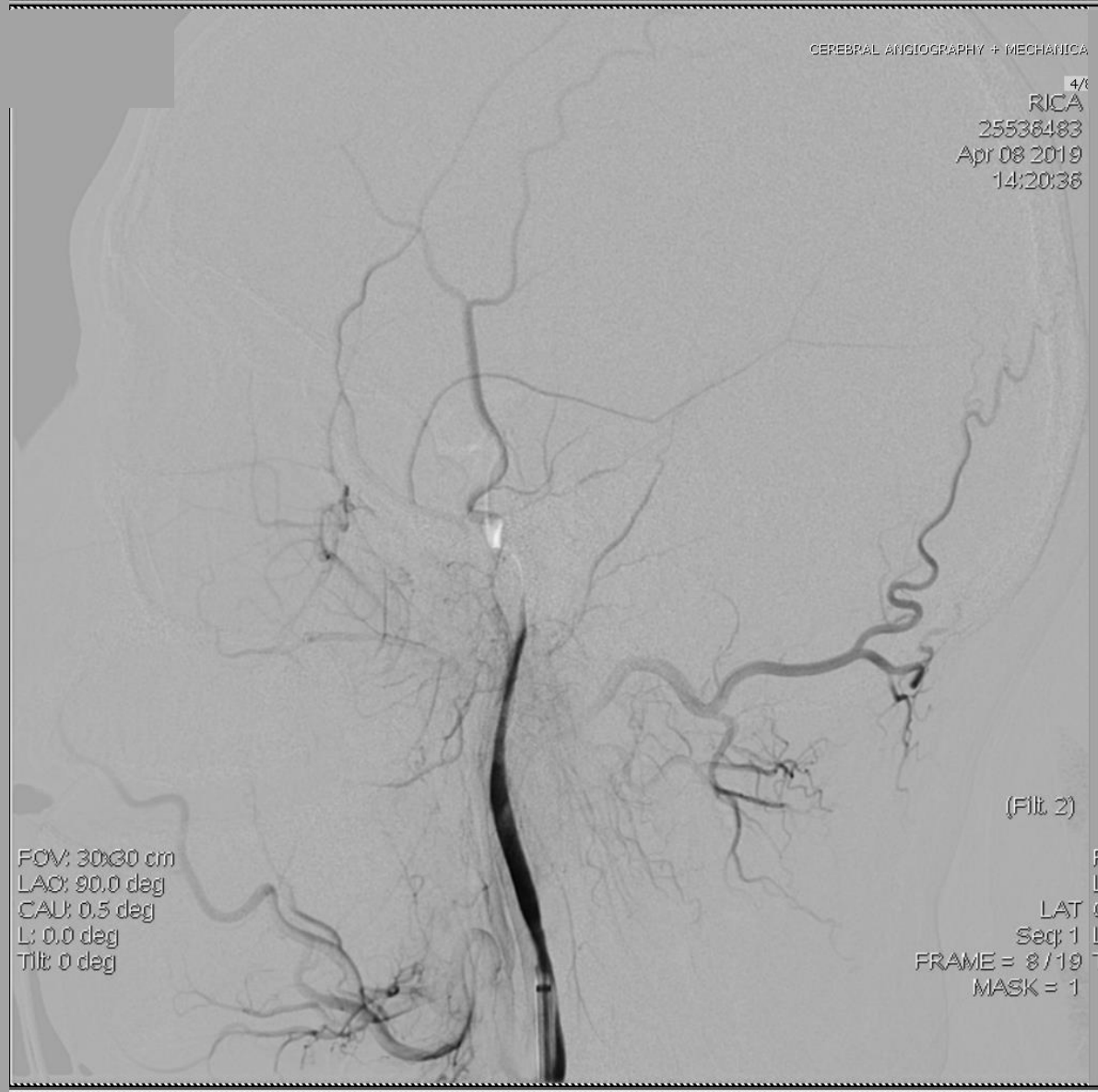
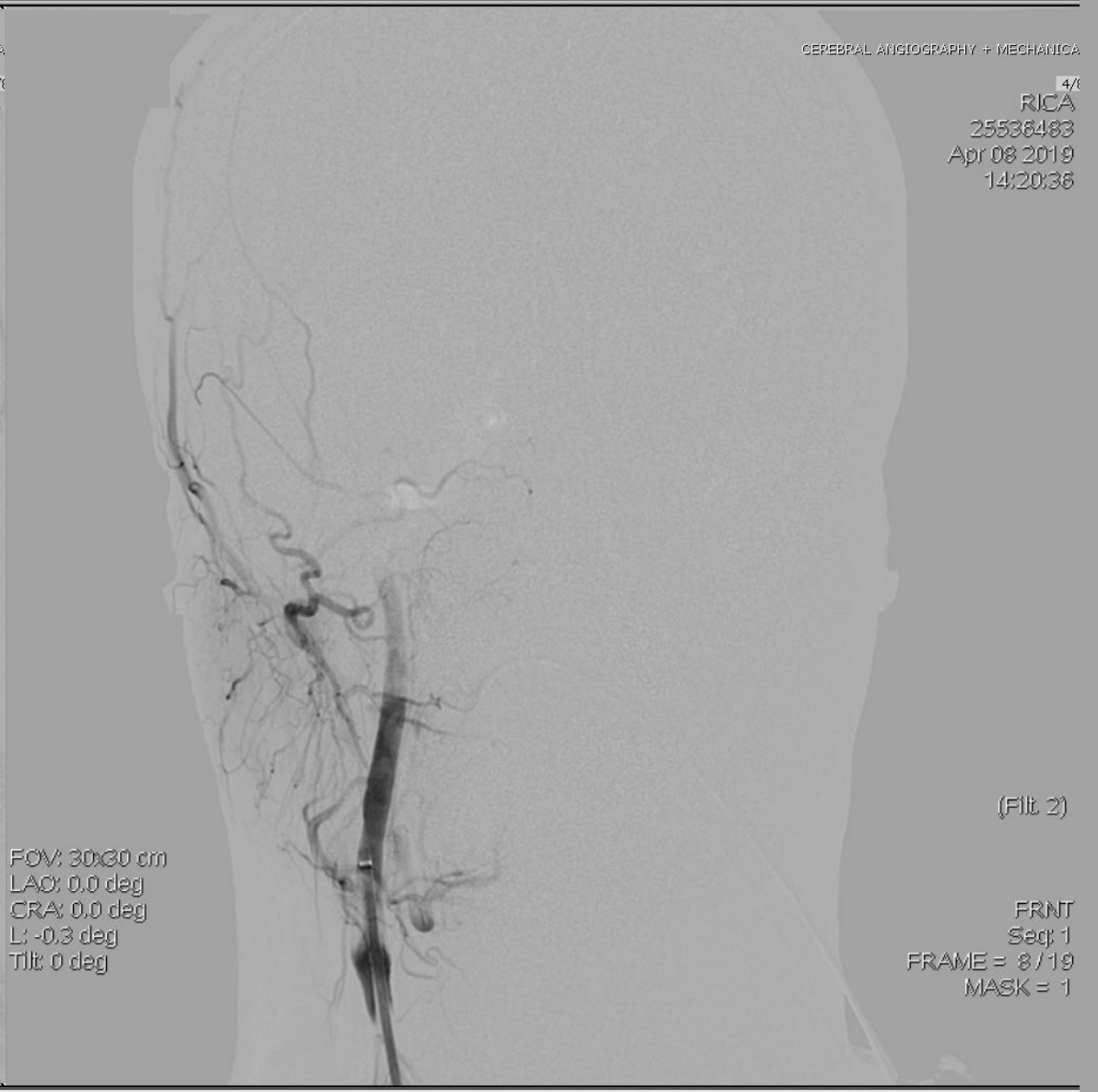
Case 1: Impression

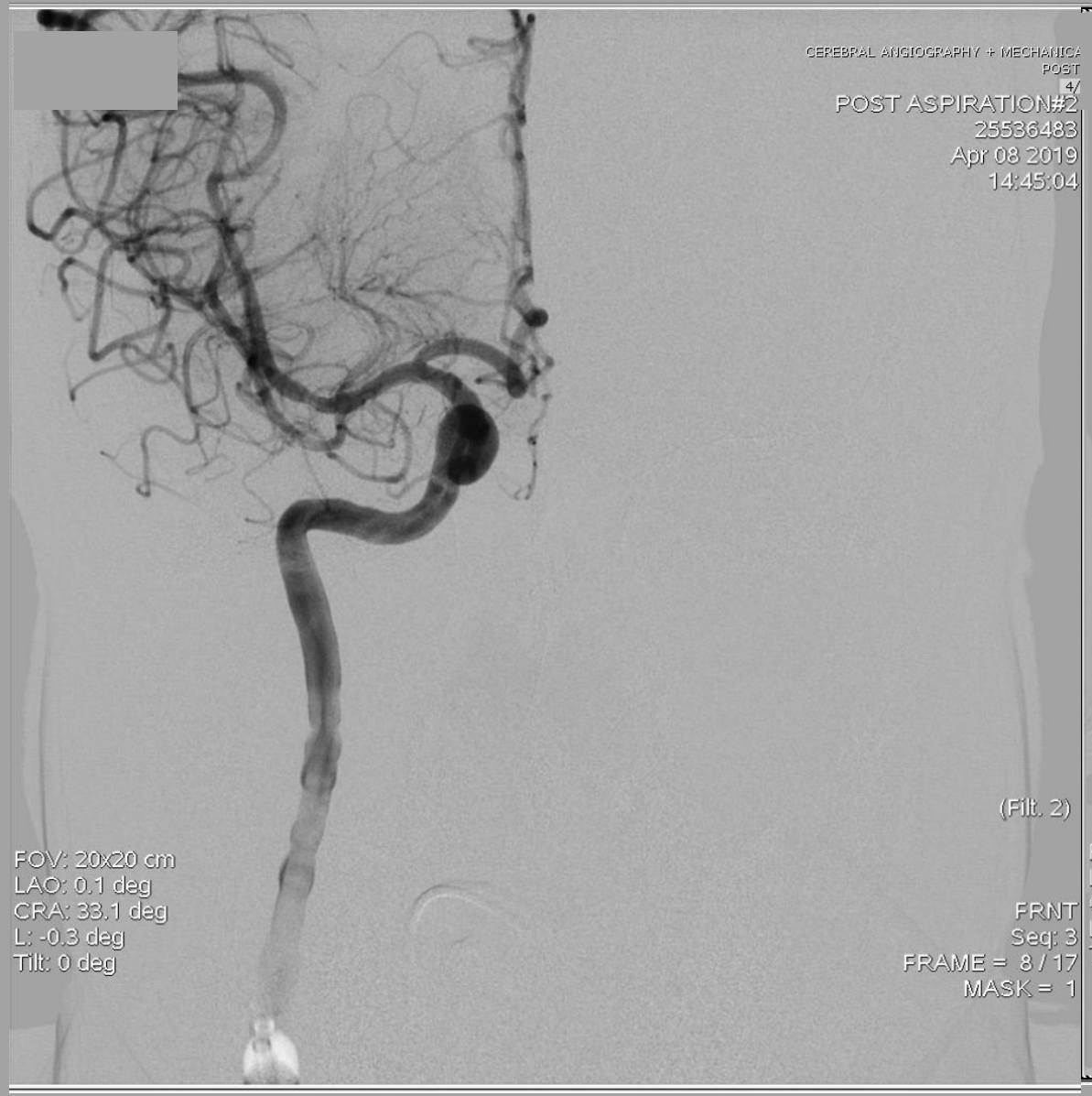
- **Acute supraclinoid part of right internal carotid artery occlusion**

Case 1: Management

- Activated intervention neuroradiologist.
- Proceeded the patient to cerebral angiography and mechanical thrombectomy.


CEREBRAL ANGIOGRAPHY + MECHANICA
RICA
25536483
Apr 08 2019
14:20:36
(Filt. 2)
FOV: 30x30 cm
LAO: 90.0 deg
CAU: 0.5 deg
L: 0.0 deg
Tilt: 0 deg
LAT
Seq: 1
FRAME = 8 / 19
MASK = 1


CEREBRAL ANGIOGRAPHY + MECHANICA
RICA
25536483
Apr 08 2019
14:20:36
(Filt. 2)
FOV: 30x30 cm
LAO: 0.0 deg
CRA: 0.0 deg
L: -0.3 deg
Tilt: 0 deg
FRNT
Seq: 1
FRAME = 8 / 19
MASK = 1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POST
4/
POST ASPIRATION#2
25536483
Apr 08 2019
14:45:04
(Filt. 2)
FOV: 20x20 cm
LAO: 0.1 deg
CRA: 33.1 deg
L: -0.3 deg
Tilt: 0 deg
FRNT
Seq: 3
FRAME = 8 / 17
MASK = 1


CEREBRAL ANGIOGRAPHY + MECHANICA
POST
4/
POST ASPIRATION#1
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Apr 08 2019
14:36:35
(Filt. 2)
FOV: 30x30 cm
LAO: 90.0 deg
CAU: 0.5 deg
L: 0.0 deg
Tilt: 0 deg
LAT
Seq: 2
FRAME = 10 / 16
MASK = 1


CEREBRAL ANGIOGRAPHY + MECHANICA
4/
CONTROL RICA
25536483
Apr 08 2019
14:46:56
(Filt. 2)
FOV: 20x20 cm
LAO: 0.1 deg
CRA: 33.1 deg
L: -0.3 deg
Tilt: 0 deg
FRNT
Seq: 4
FRAME = 7 / 16
MASK = 1

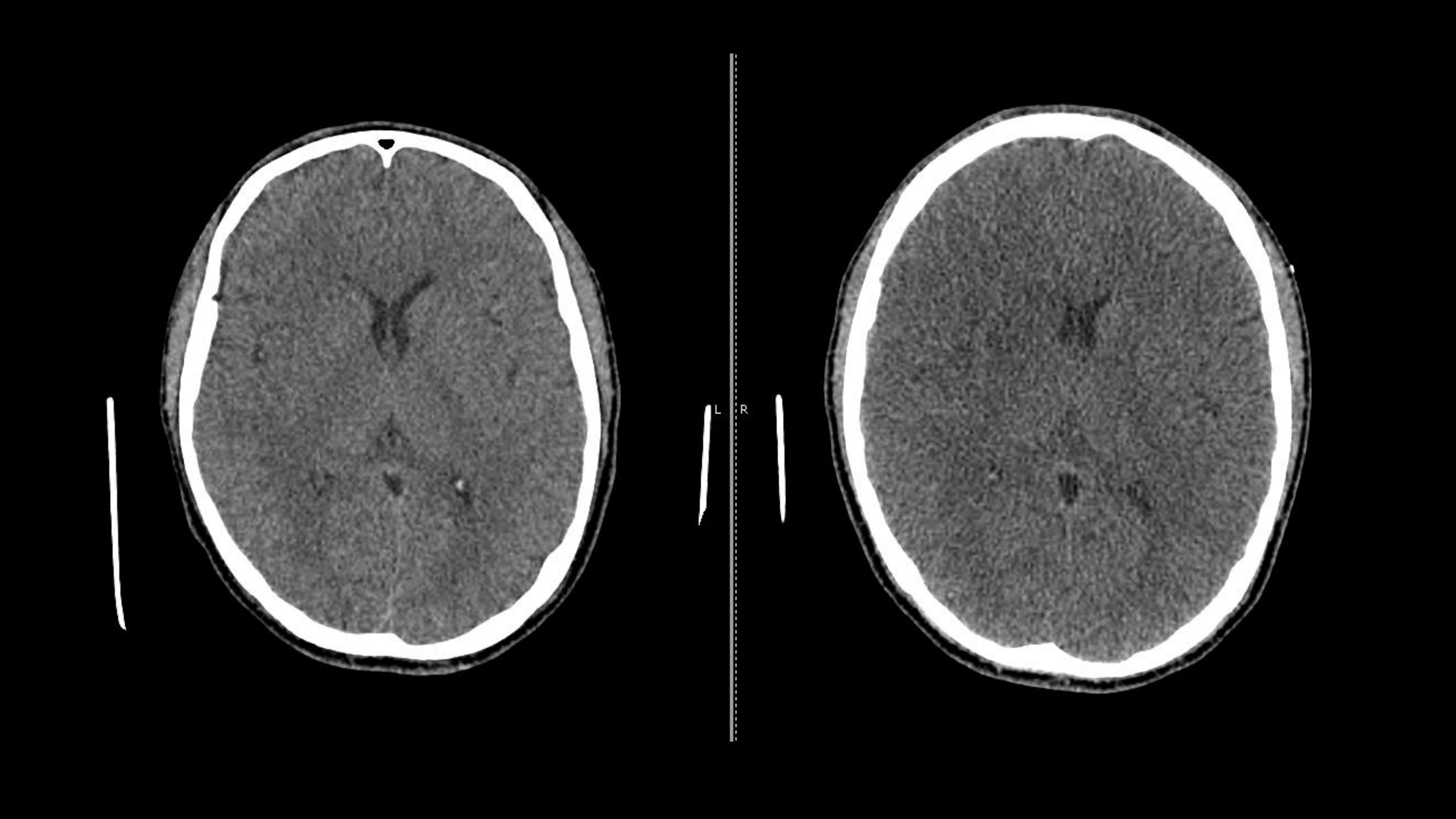

CEREBRAL ANGIOGRAPHY + MECHANIC
4
CONTROL RICA
25536483
Apr 08 2019
14:48:58
(Filt. 2)
FOV: 30x30 cm
LAO: 90.0 deg
CAU: 0.5 deg
L: 0.0 deg
Tilt: 0 deg
LAT
Seq: 4
FRAME = 7 / 18
MASK = 1

Case 1: Impression

- **Acute right supraclinoid internal carotid artery occlusion**
- **Mechanism: Cardioembolic cause: AF, LA thrombus**
- **Valvular AF with moderate mitral stenosis**

NIHSS

			Date/Time	4/8/19 12.40 PM	4/23/19 12.00 PM
1A	Consciousness	0 = Alert 1 = Sleepiness 2 = Stupor 3 = Come		1	0
1B	Questions	0 = Answers both questions 1 = Answers only one question 2 = Answers neither questions		1	0
1C	Commands	0 = Performs both tasks 1 = Performs only one task 2 = Performs neither tasks		0	0
2	Gaze	0 = Normal 1 = Partial gaze palsy 2 = Total gaze palsy		1	0
3	Visual field	0 = No visual loss 1 = Partial hemianosia 2 = Total hemianopsia 3 = Bilateral hemianopsia		2	0
4	Facial palsy	0 = Without facial paralysis 1 = Minor facial paralysis 2 = Partial facial paralysis 3 = Complete facial paralysis		1	1
5	Arm strength	0 = Normal 1 = Drifts down before 10 seconds 2 = Some effort against gravity 3 = No effort against gravity 4 = No movement UN = Limb amputated		Left.....3..... Right.....0.....	Left.....0..... Right.....0.....
6	Leg strength	0 = Normal 1 = Drifts down before 5 seconds 2 = Some effort against gravity 3 = No effort against gravity 4 = No movement UN = Limb amputated		Left.....2..... Right.....1.....	Left.....0..... Right.....0.....
7	Ataxia	0 = Does not present ataxia 1 = Ataxia in only one limb 2 = Ataxia in two limbs UN = Limb amputated		0	0
8	Sensory	0 = Without sensory alteration 1 = Mild to moderate sensory loss 2= Severe or complete sensory loss		1	0
9	Language	0 = Without language alteration 1 = Mild to moderate aphasia 2 = Severe aphasia 3 = Mute or global aphasia		1	0
10	Dysarthria	0 = Without dysarthria 1 = Mild to moderate dysarthria 2 = Severe dysarthria or anarthria UN = Intubation		2	0
11	Inattention	0 = Without attention 1 = Mild inattention 2 = Severe inattention		0	0
			Total	16	1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Case 1: Management

- **Started warfarin at day 14.**

AHA/ASA Guideline

2018 Guidelines for the Early Management of Patients With Acute Ischemic Stroke

A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association

Reviewed for evidence-based integrity and endorsed by the American Association of Neurological Surgeons and Congress of Neurological Surgeons

Endorsed by the Society for Academic Emergency Medicine

William J. Powers, MD, FAHA, Chair; Alejandro A. Rabinstein, MD, FAHA, Vice Chair; Teri Ackerson, BSN, RN; Opeolu M. Adeoye, MD, MS, FAHA; Nicholas C. Bambakidis, MD, FAHA; Kyra Becker, MD, FAHA; José Biller, MD, FAHA; Michael Brown, MD, MSc; Bart M. Demaerschalk, MD, MSc, FAHA; Brian Hoh, MD, FAHA; Edward C. Jauch, MD, MS, FAHA; Chelsea S. Kidwell, MD, FAHA; Thabele M. Leslie-Mazwi, MD; Bruce Ovbiagele, MD, MSc, MAS, MBA, FAHA; Phillip A. Scott, MD, MBA, FAHA; Kevin N. Sheth, MD, FAHA; Andrew M. Southerland, MD, MSc; Deborah V. Summers, MSN, RN, FAHA; David L. Tirschwell, MD, MSc, FAHA; on behalf of the American Heart Association Stroke Council

Telemedicine	COR	LOE
4. **Telestroke/teleradiology evaluations of AIS patients can be effective** for correct IV alteplase eligibility decision making.	IIa	B-R
5. Administration of IV **alteplase guided by telestroke consultation for patients with AIS may be as safe and as beneficial as that of stroke centers**.	IIb	B-NR
6. Providing **alteplase decision-making support via telephone consultation to community physicians is feasible and safe** and may be considered when a hospital has access to neither an in-person stroke team nor a telestroke system.	IIb	C-LD

IV Alteplase	COR	LOE
1. IV alteplase (0.9 mg/kg, maximum dose 90 mg over 60 minutes with initial 10% of dose given as bolus over 1 minute) is **recommended for selected patients who may be treated within 3 hours** of ischemic stroke symptom onset or patient last known well or at baseline state.	I	A

Mechanical Thrombectomy	COR	LOE
1. Patients eligible for IV alteplase **should receive IV alteplase even if EVTs are being considered.**	I	A
3. Patients should receive mechanical thrombectomy with a stent retriever if they meet all the following criteria**: (1) prestroke mRS score of 0 to 1; (2) causative occlusion of the internal carotid artery or MCA segment 1 (M1); (3) age ≥18 years; (4) NIHSS score of ≥6; (5) ASPECTS of ≥6; and (6) treatment can be initiated (groin puncture) within 6 hours of symptom onset.**	I	A

Case 2

Courtesy of Pimkamon Siangwattana, M.D.

Case 2

- A 60-year-old Thai man
- Right-handedness
- Hometown: Bangkok
- Occupation: None
- Baseline status: Totally independence

- Chief complaint: Drowsiness for 1.5 hours.

Case 2: Present Illness

- Last seen normal: 5 hrs prior (Feb 18th 2019, 9.00 AM), the patient had breakfast and talked to his wife normally. After that, he came back to his room.

- 1.5 hrs prior (Feb 18th 2019, 12.30 PM), his wife found him lying on the bed.
- She noticed that her husband become slurred and clumsy.
- He could follow to some of her commands.
- She tried to bring him up, but he could not sit by himself. He was totally unable to move his left arm and leg. She noted her husband's face drooped on the left as well.
- So she called an ambulance, then mobile CT was activated. Stroke fast track was activated.

Case 2: Present Illness

- He reported no headache or head trauma.
- He used unknown over-the-counter-drug as a pain reliever.
- He denied smoking or alcohol use.

Case 2: Past Medical History

- His past medical history consisted of
  - Essential hypertension
  - Hyperlipidemia
  - Chronic atrial fibrillation: currently on warfarin 11 mg/wk.

Case 2: Medication History

- Current medication
  - Warfarin 11 mg/week
    - Last dose was taken 13 hrs ago
  - Carvedilol 50 mg/day
  - Atorvastatin 40 mg/day
  - Fenofibrate 200 mg/day

Case 2: Physical Examination

- Mobile CT: 2.00 PM (5 hours from LSN)
- Vital signs: BP 202/130 mmHg, P 94/min, totally irregular pulse.
- BW 90 kg
- NS: E3V5M6, can answer questions and follow commands.
- CN II: Pupils 2 mm BRTL, left homonymous hemianopia by threat
- CN III, IV, VI: Forceful gaze preference to the right, VOR positive
- CN VII: Left facial weakness, UMN, mild dysarthria
- Motor power: Gr 0 on the left, gr V on the right

NIHSS

	Date/Time		2/18/19 14.10 PM
1A	Consciousness	0 = Alert 1 = Sleepiness 2 = Stupor 3 = Come	1
1B	Questions	0 = Answers both questions 1 = Answers only one question 2 = Answers neither questions	0
1C	Commands	0 = Performs both tasks 1 = Performs only one task 2 = Performs neither tasks	0
2	Gaze	0 = Normal 1 = Partial gaze palsy 2 = Total gaze palsy	1
3	Visual field	0 = No visual loss 1 = Partial hemianosia 2 = Total hemianopsia 3 = Bilateral hemianopsia	1
4	Facial palsy	0 = Without facial paralysis 1 = Minor facial paralysis 2 = Partial facial paralysis 3 = Complete facial paralysis	2
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6	Leg strength	0 = Normal 1 = Drifts down before 5 seconds 2 = Some effort against gravity 3 = No effort against gravity 4 = No movement UN = Limb amputated	Left.....4..... Right.....0.....
7	Ataxia	0 = Does not present ataxia 1 = Ataxia in only one limb 2 = Ataxia in two limbs UN = Limb amputated	0
8	Sensory	0 = Without sensory alteration 1 = Mild to moderate sensory loss 2= Severe or complete sensory loss	0
9	Language	0 = Without language alteration 1 = Mild to moderate aphasia 2 = Severe aphasia 3 = Mute or global aphasia	0
10	Dysarthria	0 = Without dysarthria 1 = Mild to moderate dysarthria 2 = Severe dysarthria or anarthria UN = Intubation	1
11	Inattention	0 = Without attention 1 = Mild inattention 2 = Severe inattention	0
	Total		14

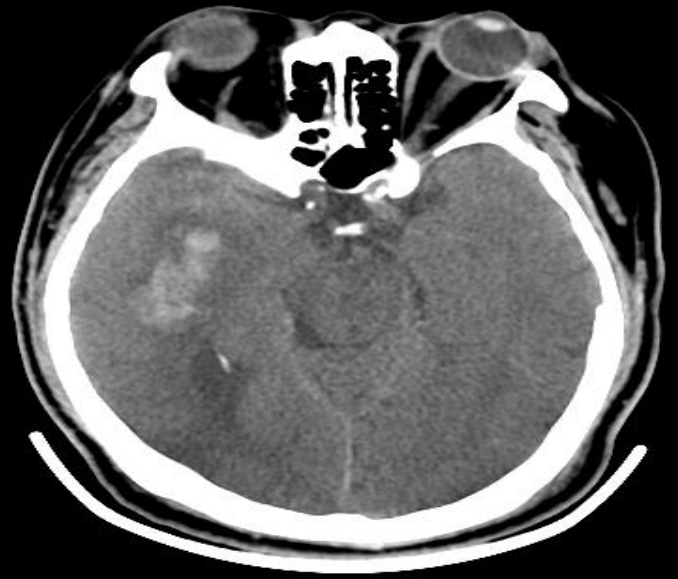
Case 2: Problem List

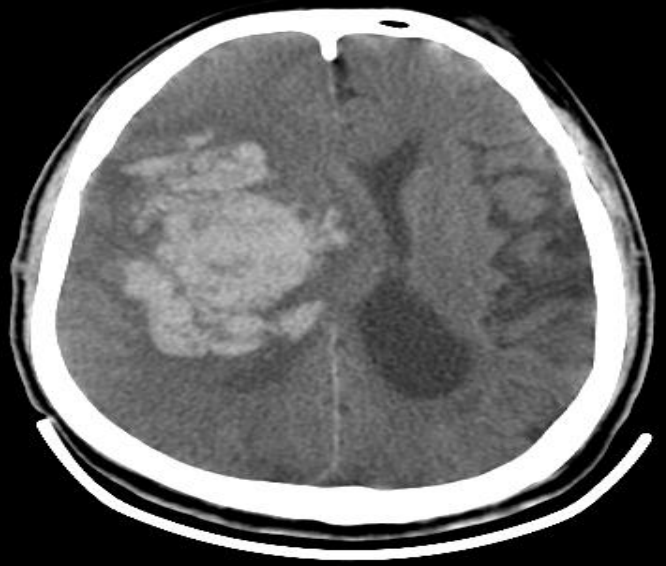
- A 60-year-old Thai man with PMHx of HT, hyperlipidemia and AF, currently on warfarin presented with …

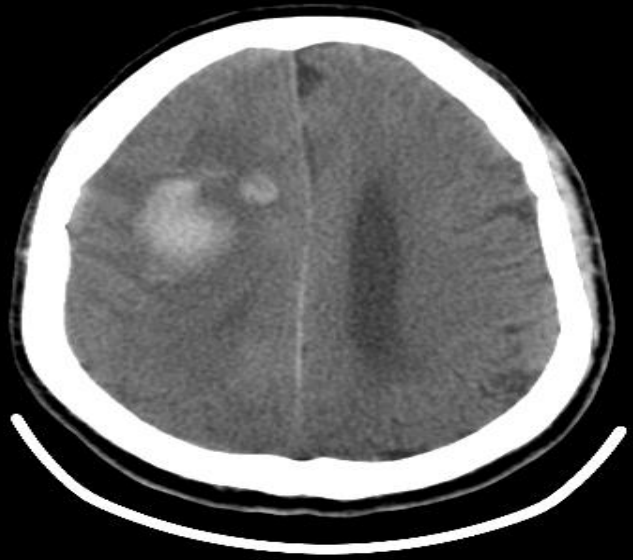
1. Acute left hemiplegia for 5 hours.
2. History of over-the-counter-drug use
3. Abnormal physical examination revealed
   - Severe hypertension
   - Gaze preference to the right
   - Left homonymous hemianopia
   - Left facial palsy, upper motor neuron lesion
   - Mild dysarthria

Case 2: Investigation

- **POCT glucose: 161 mg/dL**
- **POCT INR: Error**







Case 2: Impression

- **Acute intraparenchymal hemorrhage at right basal ganglion**
- **Warfarin associated intracerebral hemorrhage is most likely.**

Case 2: Initial Management

- **Nicardipine 2 mg IV stat**
- **Then Nicardipine (1:5) IV infusion: Keep BP < 140/90 mmHg**
- **NSS infusion**
- **Transfered to Siriraj Hospital.**

Case 2: Physical Examination

- Siriraj Hospital: 3.00 PM (6 hours from LSN)
- Vital signs: BP 181/100 mmHg, P 94/min, BT 36.4◦c, RR 20/min
- CVS: Totally irregular, no murmur
- NS: E3V4M6, cannot answer to neither questions.
- Pupils 2 mm SRTLBE, forceful gaze preference to the right
- Left homonymous hemianopia by threat
- Left facial weakness, upper motor neuron pattern, mild dysarthria
- Motor power: Gr 0 on the left, Gr V on the right
- No neglect

NIHSS

	Date/Time		2/18/19 14.10 PM	2/18/19 15.00 PM
1A	Consciousness	0 = Alert 1 = Sleepiness 2 = Stupor 3 = Come	1	1
1B	Questions	0 = Answers both questions 1 = Answers only one question 2 = Answers neither questions	0	2
1C	Commands	0 = Performs both tasks 1 = Performs only one task 2 = Performs neither tasks	0	0
2	Gaze	0 = Normal 1 = Partial gaze palsy 2 = Total gaze palsy	1	1
3	Visual field	0 = No visual loss 1 = Partial hemianosia 2 = Total hemianopsia 3 = Bilateral hemianopsia	1	1
4	Facial palsy	0 = Without facial paralysis 1 = Minor facial paralysis 2 = Partial facial paralysis 3 = Complete facial paralysis	2	2
5	Arm strength	0 = Normal 1 = Drifts down before 10 seconds 2 = Some effort against gravity 3 = No effort against gravity 4 = No movement UN = Limb amputated	Left.....4..... Right.....0.....	Left.....4..... Right.....0.....
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7	Ataxia	0 = Does not present ataxia 1 = Ataxia in only one limb 2 = Ataxia in two limbs UN = Limb amputated	0	0
8	Sensory	0 = Without sensory alteration 1 = Mild to moderate sensory loss 2= Severe or complete sensory loss	0	0
9	Language	0 = Without language alteration 1 = Mild to moderate aphasia 2 = Severe aphasia 3 = Mute or global aphasia	0	0
10	Dysarthria	0 = Without dysarthria 1 = Mild to moderate dysarthria 2 = Severe dysarthria or anarthria UN = Intubation	1	1
11	Inattention	0 = Without attention 1 = Mild inattention 2 = Severe inattention	0	0
	Total		14	16

Case 2: Investigation

- **POCT INR: 6.2**

Case 2: Investigation

- PT 57.9 sec, INR 5.4, aPTT 59.0 sec
- CBC: Hb 12.4 gm/dL, Hct 37.4 %, MCV 87.4 fL, WBC 11,290/uL, Neutrophil 85.3 %, Lymphocyte 11.7 %, platelet 189k/uL
- Creatinine 1.3 mg/dL, eGFR 59.31 mL/min/1.73m^2

Case 2: Question

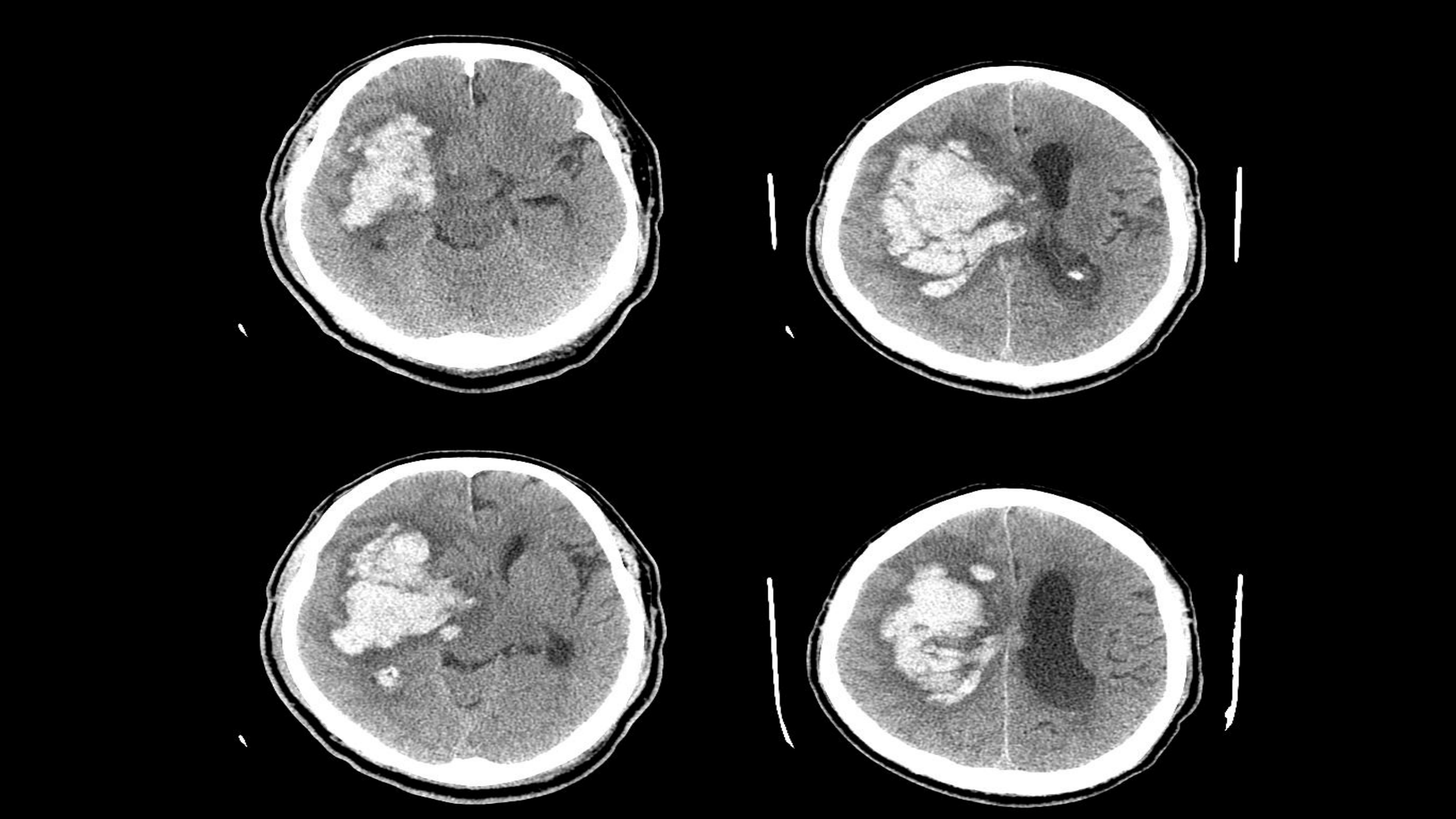
What would you do ?

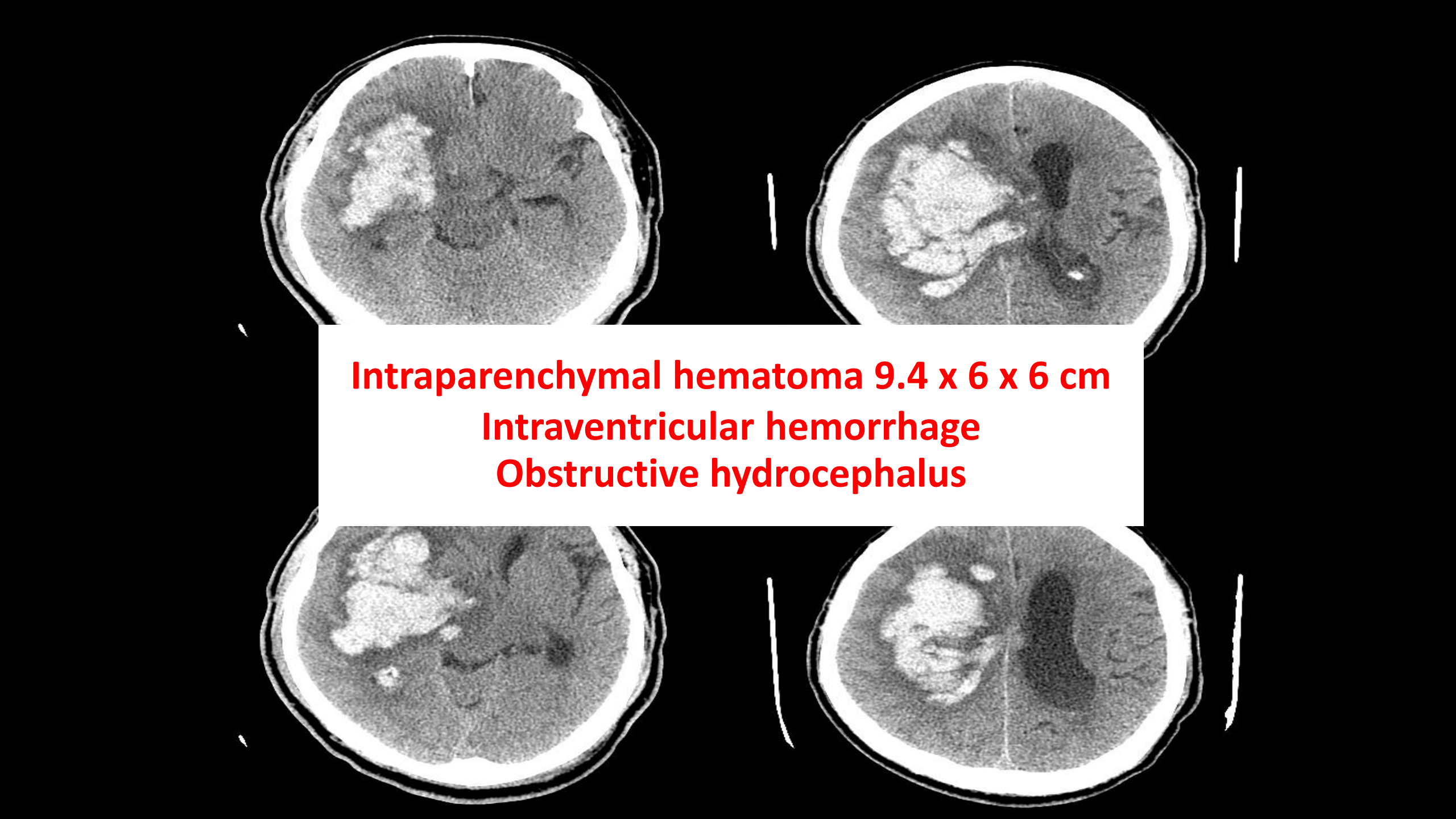
Case 2: What did we do?

- Continue nicardipine IV: Keep BP < 140/90 mmHg.
- Vitamin K 10 mg IV stat
- Fresh frozen plasma (FFP) administration: 10 mL/kg
- Consult hematologist for Prothrombin Complex Concentrates.
- Consult neurosurgeon for emergency craniotomy with clot removal.

Case 2: What did we do?

- At 4.00 PM (1 hour later), the patient developed decrease level of consciousness.
  - NS: E1V1M4, pupils Rt 3 mm RTL, Lt 2 mm fixed, not follow to any commands, motor power gr 0 of left extremities gr III of Rt extremities.
- Endotracheal intubation (4.00 PM)
- PCC 4,500 units (50 units/kg, BW 90 kg) IV in 15 mins (4.15 PM)
- F/U INR 1.9 (6.30 PM)
- PCC 1,000 units (25 units/kg, BW 90 kg) IV in 15 mins (7.30 PM)
- BP control 130-150/80 mmHg




Intraparenchymal hematoma 9.4 x 6 x 6 cm
Intraventricular hemorrhage
Obstructive hydrocephalus

Case 2: Operative Note

- Operation: Right temporal craniotomy with clot removal
- Operative time: 3 hours 25 minutes (start 7.30 PM)
- Estimated blood loss: 250 mL
- Operative finding:
  - Intraparenchymal hematoma 120 mL with fluid component
  - No active bleeding site seen
  - After clot removal, brain was slagged and palsation was seen.

Case 2: Progress

- 24 hours after surgery
- NS: E3VTM6, can follow to commands.
- Pupils 2 mm RTLBE, partial gaze preference to the right
- Left homonymous hemianopia by threat
- Left facial weakness, upper motor neuron pattern
- Motor power: Gr I on the left, Gr IV on the right
- No neglect

NIHSS

	Date/Time		2/18/19 14.10 PM	2/18/19 15.00 PM	2/19/19 11.00 PM
1A	Consciousness	0 = Alert 1 = Sleepiness 2 = Stupor 3 = Come	1	1	0
1B	Questions	0 = Answers both questions 1 = Answers only one question 2 = Answers neither questions	0	2	2
1C	Commands	0 = Performs both tasks 1 = Performs only one task 2 = Performs neither tasks	0	0	0
2	Gaze	0 = Normal 1 = Partial gaze palsy 2 = Total gaze palsy	1	1	1
3	Visual field	0 = No visual loss 1 = Partial hemianosia 2 = Total hemianopsia 3 = Bilateral hemianopsia	1	1	1
4	Facial palsy	0 = Without facial paralysis 1 = Minor facial paralysis 2 = Partial facial paralysis 3 = Complete facial paralysis	2	2	2
5	Arm strength	0 = Normal 1 = Drifts down before 10 seconds 2 = Some effort against gravity 3 = No effort against gravity 4 = No movement UN = Limb amputated	Left.....4..... Right.....0.....	Left.....4..... Right.....0.....	Left.....3..... Right.....1.....
6	Leg strength	0 = Normal 1 = Drifts down before 5 seconds 2 = Some effort against gravity 3 = No effort against gravity 4 = No movement UN = Limb amputated	Left.....4..... Right.....0.....	Left.....4..... Right.....0.....	Left.....3..... Right.....1.....
7	Ataxia	0 = Does not present ataxia 1 = Ataxia in only one limb 2 = Ataxia in two limbs UN = Limb amputated	0	0	0
8	Sensory	0 = Without sensory alteration 1 = Mild to moderate sensory loss 2= Severe or complete sensory loss	0	0	0
9	Language	0 = Without language alteration 1 = Mild to moderate aphasia 2 = Severe aphasia 3 = Mute or global aphasia	0	0	0
10	Dysarthria	0 = Without dysarthria 1 = Mild to moderate dysarthria 2 = Severe dysarthria or anarthria UN = Intubation	1	1	UN
11	Inattention	0 = Without attention 1 = Mild inattention 2 = Severe inattention	0	0	0
	Total		14	16	14+UN




Case 2: Progress

- Off endotracheal tube
- Referral
- NS: E4V5M6, can answer questions and follow to commands.
- Pupils 2 mm RTLBE, no gaze preference
- Left homonymous hemianopia by threat
- Left facial weakness, upper motor neuron pattern, no dysarthria
- Motor power: Gr I on the left, Gr IV on the right
- No neglect

Case 2: Timeline

LSN Feb 18th 2019, 9.00 AM

FSA Feb 18th 2019, 12.30 PM

Mobile CT
Feb 18th 2019, 2.00 PM

ETT
Feb 18th 2019, 4.00 PM

IV vitamin K, PCC
Feb 18th 2019, 4.15 PM

Craniotomy with clot removal
Feb 18th 2019, 7.30 PM

IV anti-hypertensives

Reversal of anticoagulants

Surgical removal of clot

Warfarin Associated Intracerebral Hemorrhage

- 90% of warfarin associated death and permanent disability.
- Mortality rate of 52-73%
- Occur as 0.3-0.8%/year in warfarin-treated patients.
- Rapid BP lowering and correction of INR are recommended for delay hematoma expansion.
- Goal INR correction is < 1.4 as soon as possible.
- PCC is a mixture of vitamin K dependent plasma clotting factor, which 60-90% of patients can reduce INR below 1.3 within 30 minutes after infusion.
- PCC is preferred to FFP due to more rapid (do not need to thawing), no requirement of blood grouping and smaller infusion volume.

LA Garcia-Rodriguez et al. Neurology 2013.
EM Bershad and JI Suarez. Neurocrit Care 2010.

Case 3

Courtesy of Saikaew Lapanakorkiat, M.D.

Case 3

- A 62-year-old Thai man
- Right-handedness
- Hometown: Bangkok
- Occupation: Retired teacher
- Baseline status: Totally independence

- Chief complaint: Weakness on right side for 50 minutes.

Case 3: Present Illness

- Last seen normal: 1 hr prior (Apr 6th 2019, 6.40 PM), the patient walked in his house and had dinner with his wife.

- 50 mins prior (Apr 6th 2019, 7.00 PM), while sitting on the chair and having dinner, he suddenly dropped a spoon from his right hand.
- He was able to raise his right arm and make a fist by his right hand partially.
- He had slurred speech.
- He could not stand up by himself due to weakness of the right leg.
- He was in a good consciousness and can response to questions and commands.
- His wife called an ambulance, then he was sent to Siriraj Hospital. Stroke fast track was activated.

Case 3: Present Illness

- 1 week prior, he felt fatigue and had shortness of breath when walking upstair, but he had no leg swelling or had to wake up at night due to breathlessness.
- He had fever and sorethroat as well.
- He went to nearby clinic and received antibiotics, required to take 4 times a day, for 1 week.
- He lost his weight for 10 kg, from 90 to 80 kg, in past 1 month.
- He denied any head injury.
- No history of smoking and alcohol use was noted.

Case 3: Past Medical History

- His past medical history consisted of
  - Poorly controlled type 2 diabetes with diabetic nephropathy
    - Last HbA1C was 10.5%.
  - Hyperlipidemia
  - Hypertension
  - Chronic kidney disease, stage 3B

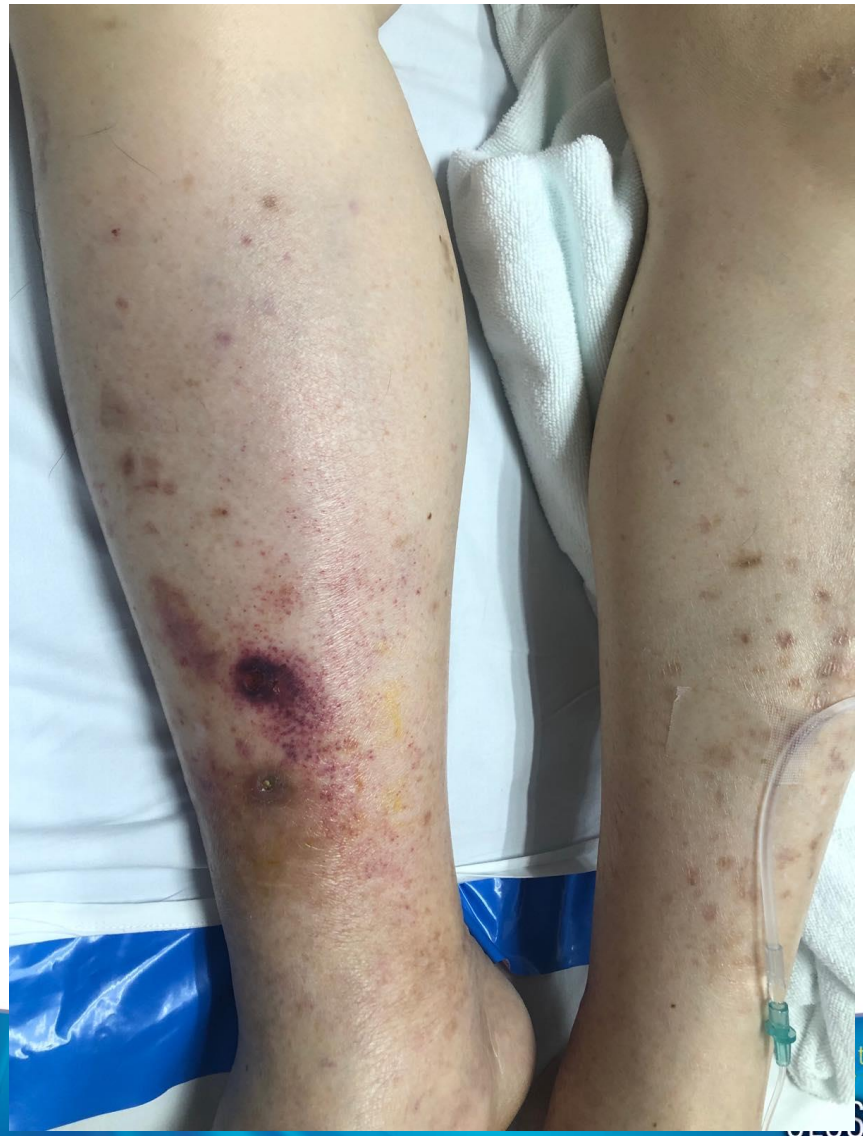
Case 3: Medication History

- Current medication
  - ASA 81 mg/day
  - Metformin 2,000 gm/day
  - Candesartan 8 mg/day
  - Pitavastatin 2 gm/day
  - Insulin glargine 60 units/day
  - Methylcobalamin 1,000 ug/day

Case 3: Physical Examination

- Vital signs: BP 182/95 mmHg, P 102/min, BT 37.5◦c, RR 28/min
- SpO_2 99%RA, BW 83 kg
- GA: Marked pallor, no jaundice, pitting edema 1+ both legs
- HEENT: No subconjunctival hemorrhage
- Skin: Multiple petechiae at right legs, diabetic shin spots, no Osler's node, no Janeway lesion
- CVS: Normal S1/S2, no murmur
- RS: Fine crepitation BLL
- Abdomen: No distension, soft, liver and spleen not palpable
- LN: No superficial lymphadenopathy

Case 3: Physical Examination



Case 3: Physical Examination

- NS: E4V5M6, can answer questions and follow commands.
- CN II: Pupils 3 mm BRTL, no visual field defect, fundoscopy: sharp disc, exudate and dot-blot hemorrhage seen BE
- CN III, IV, VI: No gaze preference, full EOM
- CN VII: No facial weakness, mild dysarthria
- Motor power: Gr V all, Pronator drift seen on right arm, reflex 2+ all, absent Babinski's sign
- No neglect
- No stiffness of neck

NIHSS

	Date/Time		4/6/19 7.53 PM
1A	Consciousness	0 = Alert 1 = Sleepiness 2 = Stupor 3 = Come	0
1B	Questions	0 = Answers both questions 1 = Answers only one question 2 = Answers neither questions	0
1C	Commands	0 = Performs both tasks 1 = Performs only one task 2 = Performs neither tasks	0
2	Gaze	0 = Normal 1 = Partial gaze palsy 2 = Total gaze palsy	0
3	Visual field	0 = No visual loss 1 = Partial hemianosia 2 = Total hemianopsia 3 = Bilateral hemianopsia	0
4	Facial palsy	0 = Without facial paralysis 1 = Minor facial paralysis 2 = Partial facial paralysis 3 = Complete facial paralysis	0
5	Arm strength	0 = Normal 1 = Drifts down before 10 seconds 2 = Some effort against gravity 3 = No effort against gravity 4 = No movement UN = Limb amputated	Left.....0..... Right.....1.....
6	Leg strength	0 = Normal 1 = Drifts down before 5 seconds 2 = Some effort against gravity 3 = No effort against gravity 4 = No movement UN = Limb amputated	Left.....0..... Right.....0.....
7	Ataxia	0 = Does not present ataxia 1 = Ataxia in only one limb 2 = Ataxia in two limbs UN = Limb amputated	0
8	Sensory	0 = Without sensory alteration 1 = Mild to moderate sensory loss 2= Severe or complete sensory loss	0
9	Language	0 = Without language alteration 1 = Mild to moderate aphasia 2 = Severe aphasia 3 = Mute or global aphasia	0
10	Dysarthria	0 = Without dysarthria 1 = Mild to moderate dysarthria 2 = Severe dysarthria or anarthria UN = Intubation	1
11	Inattention	0 = Without attention 1 = Mild inattention 2 = Severe inattention	0
	Total		2

Case 3: Problem List

- A 62-year-old Thai man with PMHx of poorly controlled type 2 diabetes, HT, HLP and CKD stage 3b presented with …

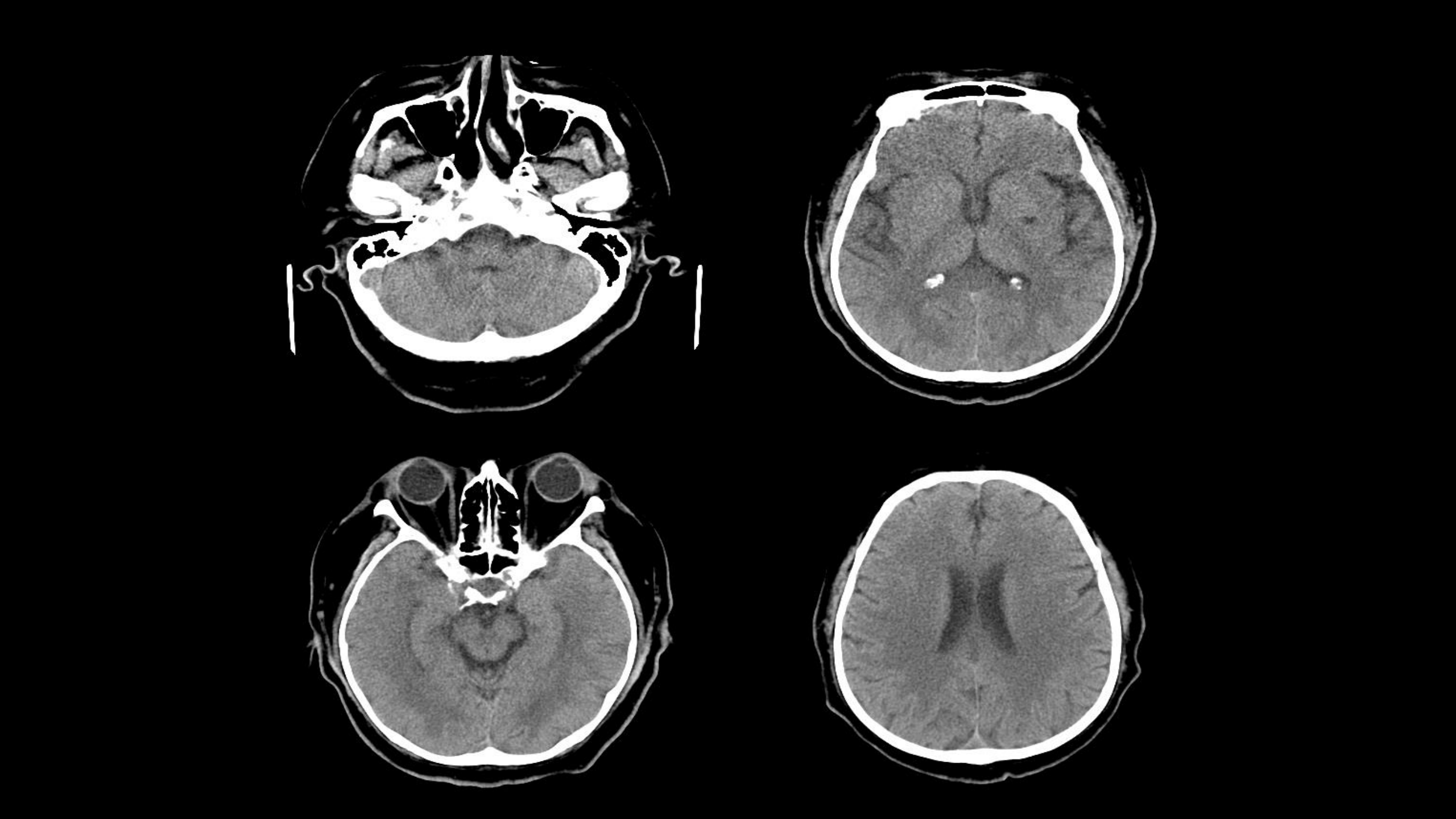
1. Sudden right hemiplegia for 50 minutes
2. Low grade fever with sorethroat for 1 week
3. Dyspnea on exertion for 1 week
4. Significant weight loss for 1 month
5. Abnormal physical examination revealed
   - Mild dysarthria
   - Pronator drift of right arm
   - Marked pallor with petechiae seen on right leg
   - Fine crepitation both lower lungs

Case 3: Question

What is your differential diagnosis?

Case 3: Investigation

- **POCT glucose: 146 mg/dL**



Case 3: Impression

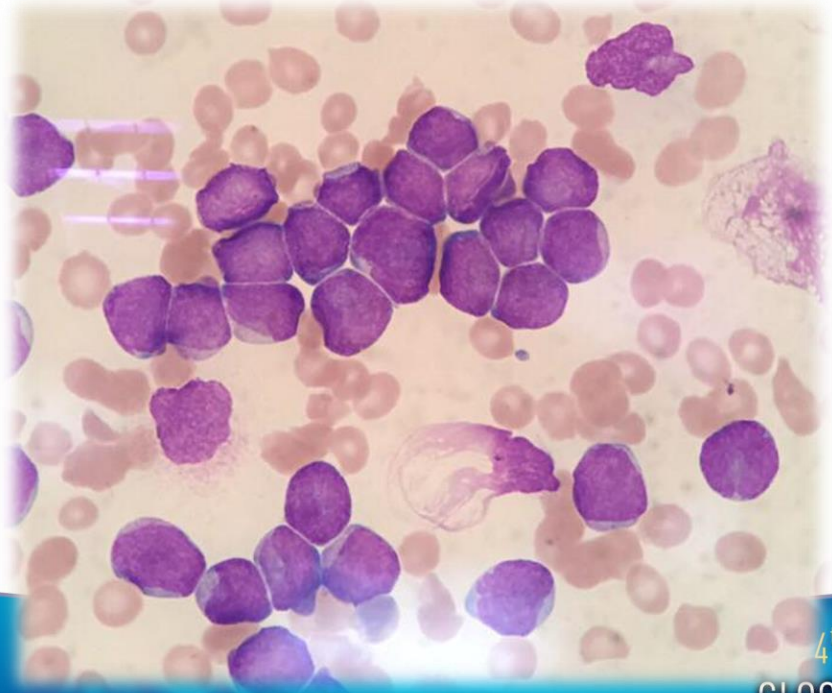
- **Acute ischemic stroke is most likely.**
- **Old left basal ganglion infarction**

Case 3: Initial Management

- ASA 81 mg/day
- Clopidogrel 300 mg/day
- Atorvastatin 40 mg/day
- Admitted to stroke unit.

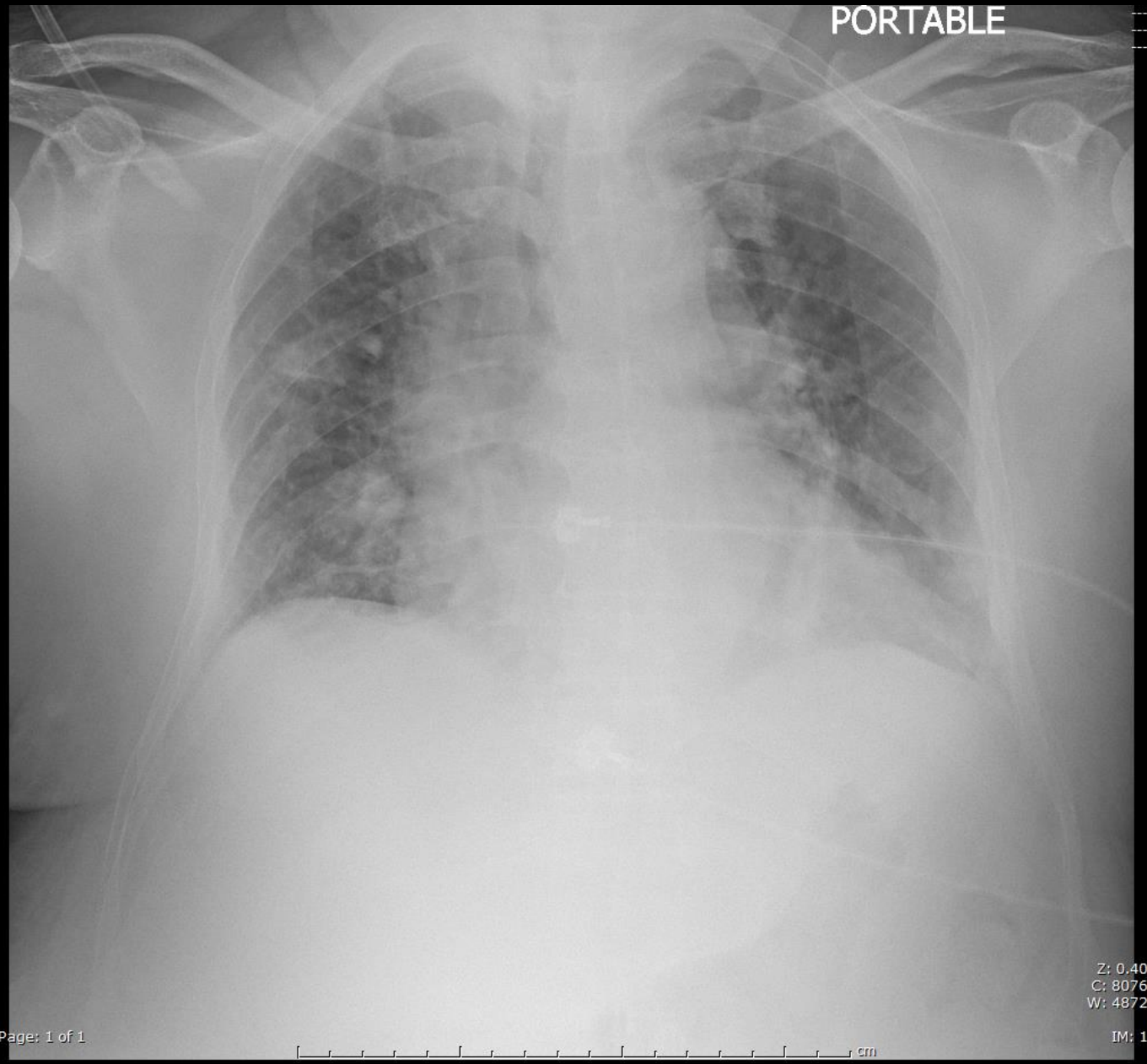
Case 3: Investigation

- **CBC:** **Hb 6.3 gm/dL, Hct 18.5 %, MCV 89.4 fL, WBC 414,260/uL, Neutrophil 1 %, promyelocyte 2 %, Blast 97 %, platelet 47k/uL.**



Case 3: Investigation

- **BUN 38.1 mg/dL, Creatinine 3.1 mg/dL, eGFR 20.45 mL/min/1.73m^2**
- **Blood chemistry: Na 136 mM/L, K 5.5 mM/L, Cl 103 mM/L, HCO_3 20 mM/L, uric 9.3 mg/dL, Ca 7.4 mg/dL, corrected Ca 8.76 mg/dL, PO_4 3.3 mg/dL**
- **LFT: AST/ALT 57/41 U/L, albumin 2.3 gm/dL, globulin 3.5 gm/dL, total protein 5.8 gm/dL, TB/DB 0.37/0.2 mg/dL**
- **PT 14.2 sec, INR 1.31, aPTT 29.1 sec**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Case 3: Impression

- **Acute ischemic stroke from hyperviscosity with acute lymphoblastic leukemia**
- **Old left basal ganglion infarction**
- **Acute kidney injury on top chronic kidney disease**

Case 3: Management

- Off ASA and clopidogrel
- IV fluid infusion 120 mL/hr
- Emergency hematologist consultation
  - Septic work up with Piperacillin/tazobactam administration
  - Start hydroxyurea 4,000 mg/day
  - Start febuxostat 80 mg/day

Case 3: Progress

- **Start Chemotherapy: Cytarabine arabinoside**
- **Start leukapheresis**

- **Developed left MCA infarction with malignant cerebral edema.**

Stroke mechanism: TOAST Classification

TABLE 1. TOAST Classification of Subtypes of Acute Ischemic Stroke

Large-artery atherosclerosis (embolus/thrombosis)*
Cardioembolism (high-risk/medium-risk)*
Small-vessel occlusion (lacune)*
Stroke of other determined etiology*
Stroke of undetermined etiology
a. Two or more causes identified
b. Negative evaluation
c. Incomplete evaluation

TOAST, Trial of Org 10172 in Acute Stroke Treatment.
*Possible or probable depending on results of ancillary studies.

TOAST Investigators. Stroke 1993.

Stroke mechanism: ASCOD

- **A: Atherosclerosis**
- **S: Small-vessel disease**
- **C: Cardiac pathology**
- **O: Other causes**
- **D: Dissection**

P Amarenco et al. Cerebrovasc Dis 2013.

Leukostasis

- Leukostasis is defined as a pathological entity.
- Diagnosed when patients present with acute leukemia, hyperleukocytosis and respiratory or neurological distress.
- Incidence of hyperleukocytosis in ALL ranges between 10% and 30%.
- WBC count is one of the most important prognostic factors in pediatric ALL. (No definite cut-off, WBC > 50,000/uL).
- Treatment focuses on aggressive supportive care + prompt cytoreduction (No definite I/C criteria; In practices, initiate when WBC > 100,000/uL, stop when WBC < 50,000/uL).

P Procu et al. Leukemia and Lymphoma 2000.

Case 4

Case 4

- A 59-year-old Thai man
- Right-handedness
- Hometown: Bangkok
- Occupation: Unemployed
- Baseline status: Totally independence

- Chief complaint: Vertigo for 1 hour 40 minutes.

Case 4: Present Illness

- Last seen normal: 3 hrs 40 min prior (Apr 8th 2019, 11.00 PM), the patient took a shower and went to bed.

- 1 hr 40 min prior (Apr 9th 2019, 1.00 AM), he woke up and felt dizziness and vertigo, so that he could not open his eyes. He had nausea without vomiting. Then he called his wife for help.
- He could partially raise his arms and legs.
- He could sit but swayed to both sides.
- He had no double vision, no aspiration.
- He could speak clearly.
- His wife called an ambulance, then he was sent to Siriraj Hospital. Stroke fast track was activated.

Case 4: Past Medical History

- His past medical history consisted of
  - CA rectum stage 2, T3N0M0
  - S/P surgical removal since 2013
  - S/P chemotherapy, last 2014
  - Last CT chest with whole abdomen 2016: No tumor recurrence.

Case 4: Medication History

- **No current medication.**

Case 4: Physical Examination

- Vital signs: BP 122/64 mmHg, P 82/min, BT 37.7°c, RR 24/min
- SpO_2 100%RA, BW 54 kg
- NS: E4V5M6, can answer questions and follow commands.
- CN II: Pupils 4 mm BRTL, no visual field defect by threat
- CN III, IV, VI: No gaze preference, limited left lateral gaze (90%)
- CN VII: No facial weakness, no dysarthria
- Motor power: Gr IV of right arm, others gr V all
- No impaired sensation
- Impaired finger-to-nose and heel-to-knee of left side
- No neglect

NIHSS

	Date/Time		4/9/19 3.07 AM
1A	Consciousness	0 = Alert 1 = Sleepiness 2 = Stupor 3 = Come	0
1B	Questions	0 = Answers both questions 1 = Answers only one question 2 = Answers neither questions	0
1C	Commands	0 = Performs both tasks 1 = Performs only one task 2 = Performs neither tasks	0
2	Gaze	0 = Normal 1 = Partial gaze palsy 2 = Total gaze palsy	1
3	Visual field	0 = No visual loss 1 = Partial hemianosia 2 = Total hemianopsia 3 = Bilateral hemianopsia	0
4	Facial palsy	0 = Without facial paralysis 1 = Minor facial paralysis 2 = Partial facial paralysis 3 = Complete facial paralysis	0
5	Arm strength	0 = Normal 1 = Drifts down before 10 seconds 2 = Some effort against gravity 3 = No effort against gravity 4 = No movement UN = Limb amputated	Left.....1..... Right.....0.....
6	Leg strength	0 = Normal 1 = Drifts down before 5 seconds 2 = Some effort against gravity 3 = No effort against gravity 4 = No movement UN = Limb amputated	Left.....1..... Right.....0.....
7	Ataxia	0 = Does not present ataxia 1 = Ataxia in only one limb 2 = Ataxia in two limbs UN = Limb amputated	2
8	Sensory	0 = Without sensory alteration 1 = Mild to moderate sensory loss 2= Severe or complete sensory loss	0
9	Language	0 = Without language alteration 1 = Mild to moderate aphasia 2 = Severe aphasia 3 = Mute or global aphasia	0
10	Dysarthria	0 = Without dysarthria 1 = Mild to moderate dysarthria 2 = Severe dysarthria or anarthria UN = Intubation	0
11	Inattention	0 = Without attention 1 = Mild inattention 2 = Severe inattention	0
	Total		5

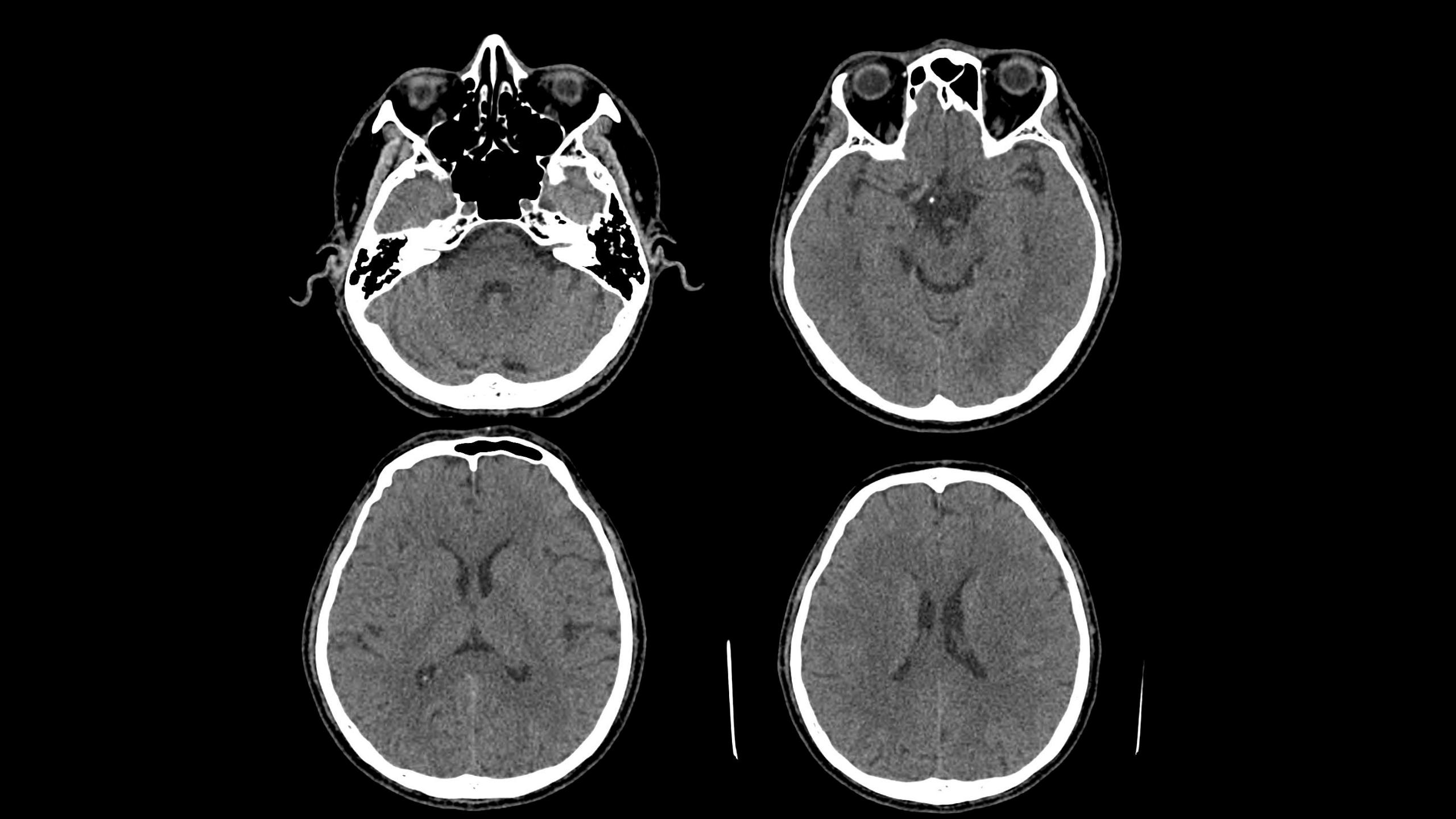
Case 4: Problem List

- A 59-year-old Thai man with PMHx of CA rectum post surgery and chemotherapy about 5 years, presented with …

1. Sudden vertigo for 1 hr 40 min.
2. Abnormal physical examination revealed
   - Limited lateral gaze to the left
   - Rt monoparesis
   - Dysmetria of left arm and leg

Case 4: Investigation

- **POCT glucose: 144 mg/dL**

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Case 4: Impression

- **Acute ischemic stroke is most likely.**
- **CA rectum post surgical removal and chemotherapy.**

Case 4: Initial Management

- **Due to no contraindication of rtPA.**
- **rtPA 0.9 mg/kg: 4.86 mg IV in 1 min (3.27 AM)(DTN 37 min) then rtPA 43.74 mg IV in 1 hr.**
- **Sent him for multiphase CTA brain and carotid a.**

Case 4: Additional History

- He took capsule containing cannabinoid for 1 week.
- Last dose was 11.00 PM.

Case 4: Impression

- **Acute ischemic stroke**

NIHSS

			Date/Time	4/9/19 3.07 AM	4/10/19 00.00 AM
1A	Consciousness	0 = Alert 1 = Sleepiness 2 = Stupor 3 = Come		0	0
1B	Questions	0 = Answers both questions 1 = Answers only one question 2 = Answers neither questions		0	0
1C	Commands	0 = Performs both tasks 1 = Performs only one task 2 = Performs neither tasks		0	0
2	Gaze	0 = Normal 1 = Partial gaze palsy 2 = Total gaze palsy		1	0
3	Visual field	0 = No visual loss 1 = Partial hemianosia 2 = Total hemianopsia 3 = Bilateral hemianopsia		0	0
4	Facial palsy	0 = Without facial paralysis 1 = Minor facial paralysis 2 = Partial facial paralysis 3 = Complete facial paralysis		0	0
5	Arm strength	0 = Normal 1 = Drifts down before 10 seconds 2 = Some effort against gravity 3 = No effort against gravity 4 = No movement UN = Limb amputated		Left.....1..... Right.....0.....	Left.....0..... Right.....0.....
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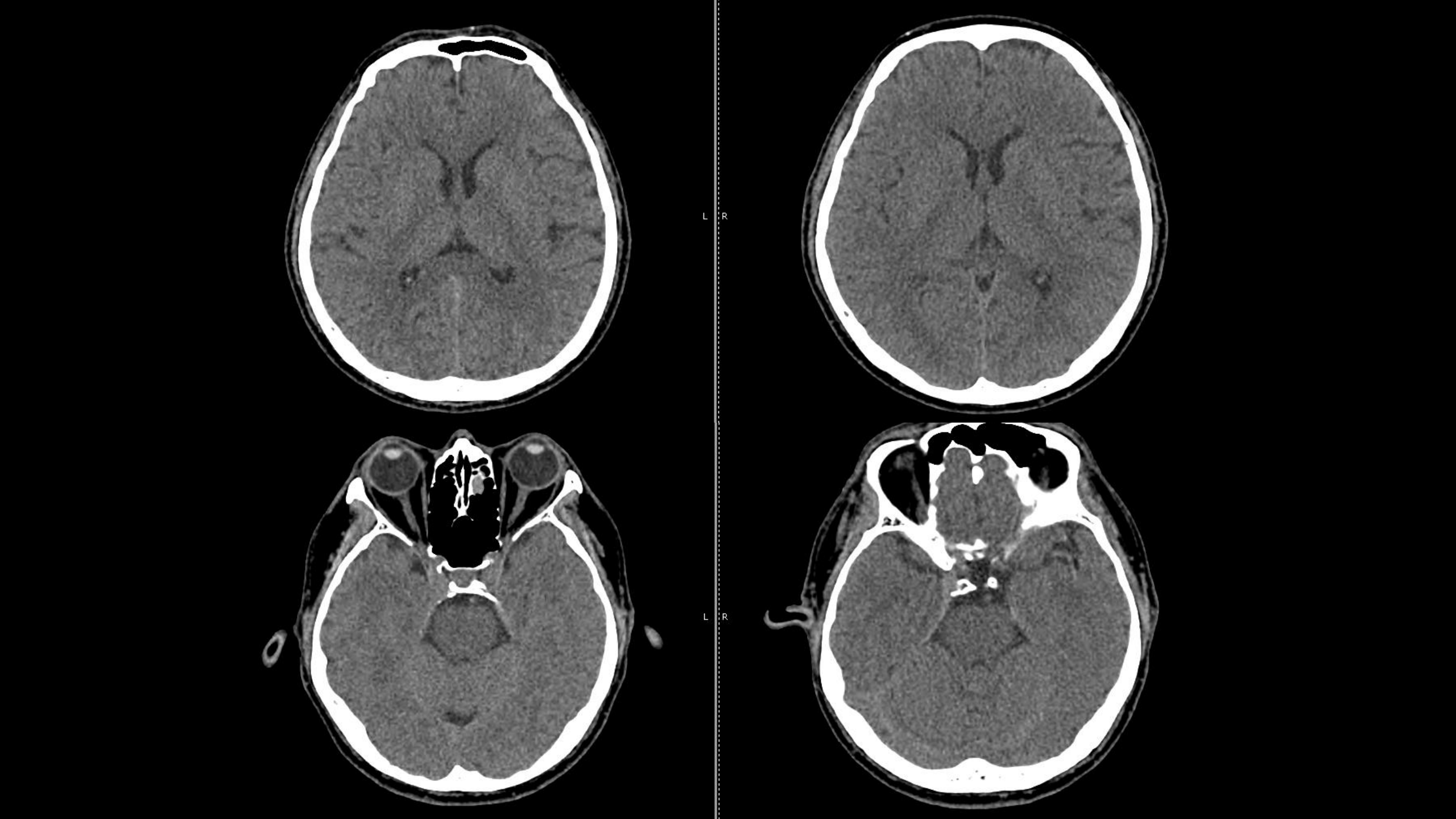
7	Ataxia	0 = Does not present ataxia 1 = Ataxia in only one limb 2 = Ataxia in two limbs UN = Limb amputated		2	0
8	Sensory	0 = Without sensory alteration 1 = Mild to moderate sensory loss 2= Severe or complete sensory loss		0	0
9	Language	0 = Without language alteration 1 = Mild to moderate aphasia 2 = Severe aphasia 3 = Mute or global aphasia		0	0
10	Dysarthria	0 = Without dysarthria 1 = Mild to moderate dysarthria 2 = Severe dysarthria or anarthria UN = Intubation		0	0
11	Inattention	0 = Without attention 1 = Mild inattention 2 = Severe inattention		0	0
			Total	5	0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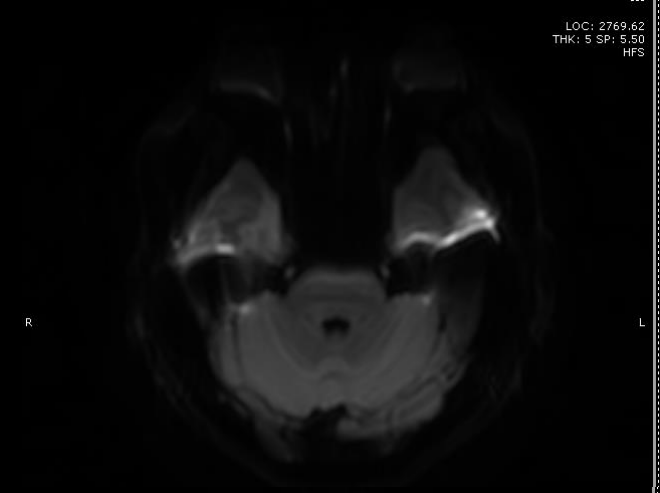
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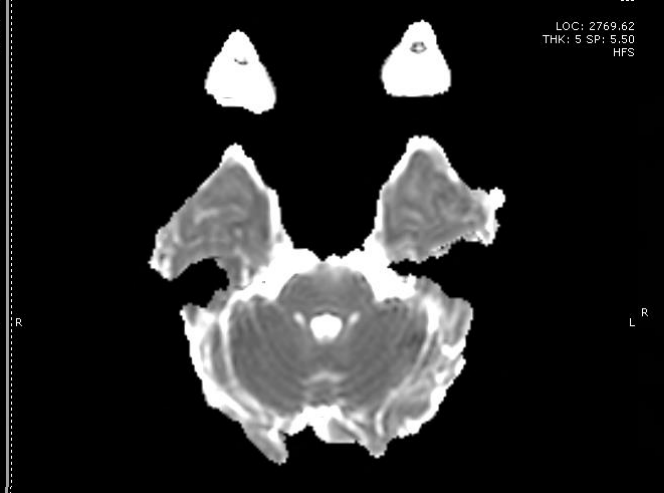
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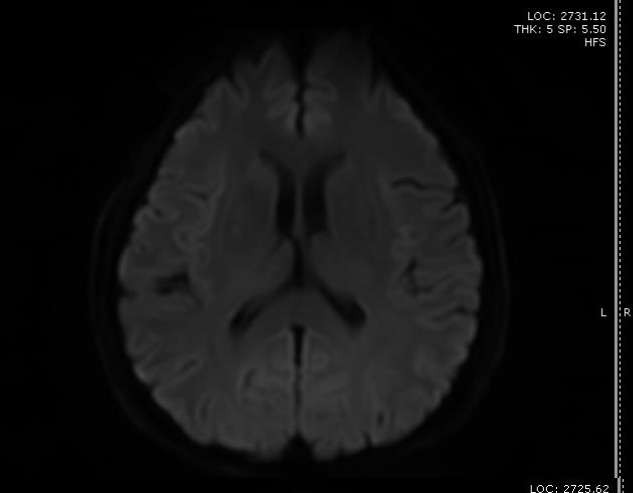
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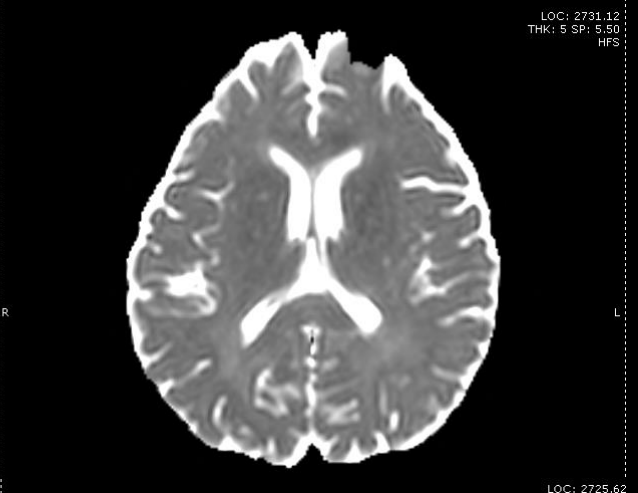
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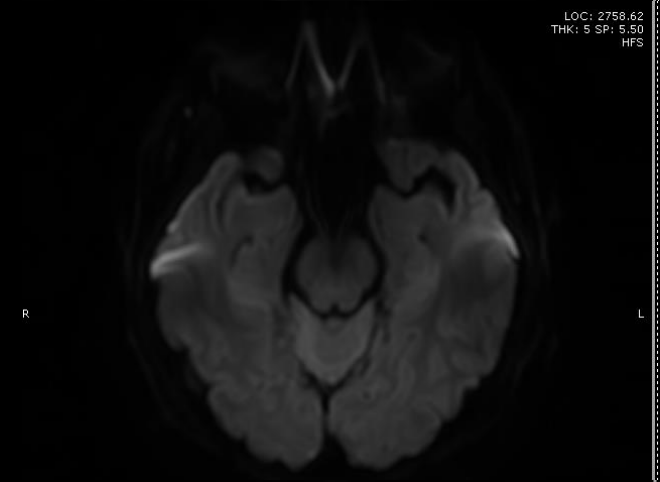
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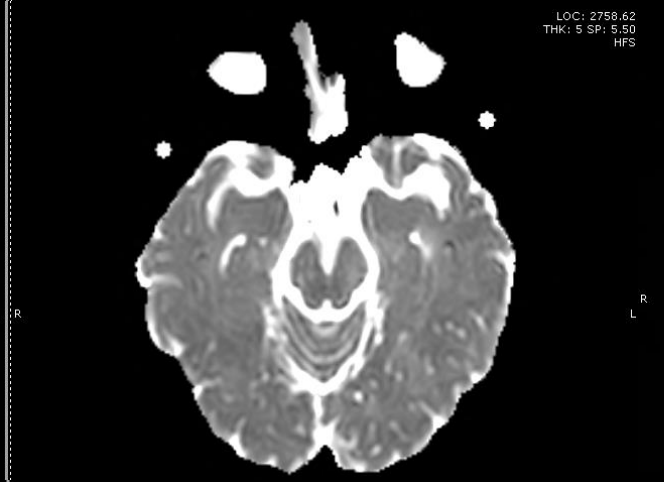
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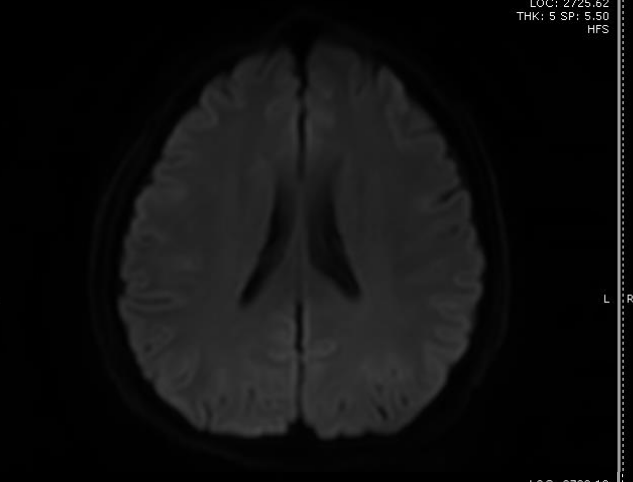
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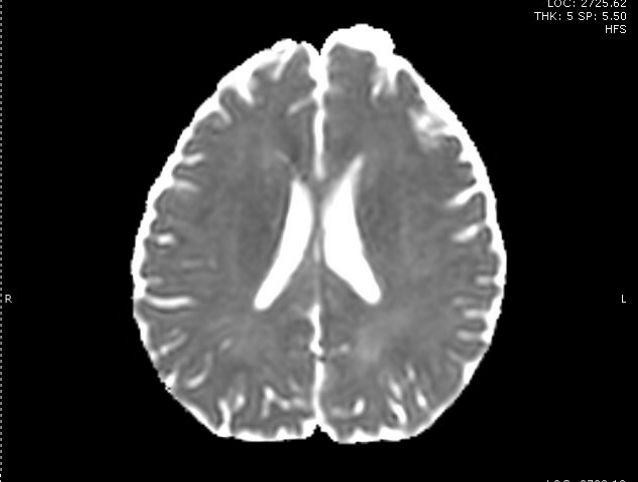
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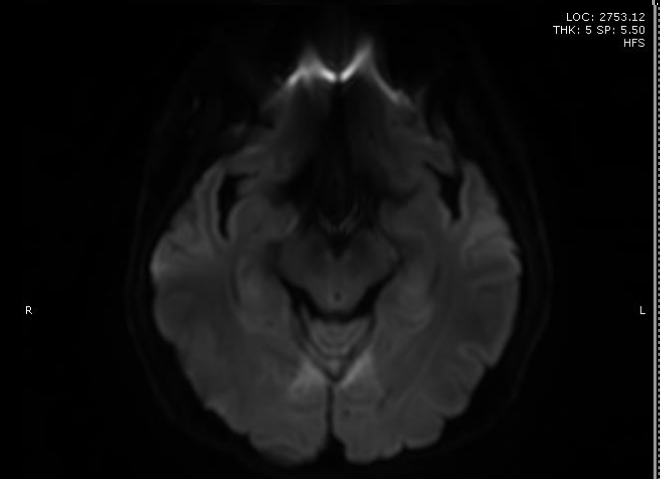
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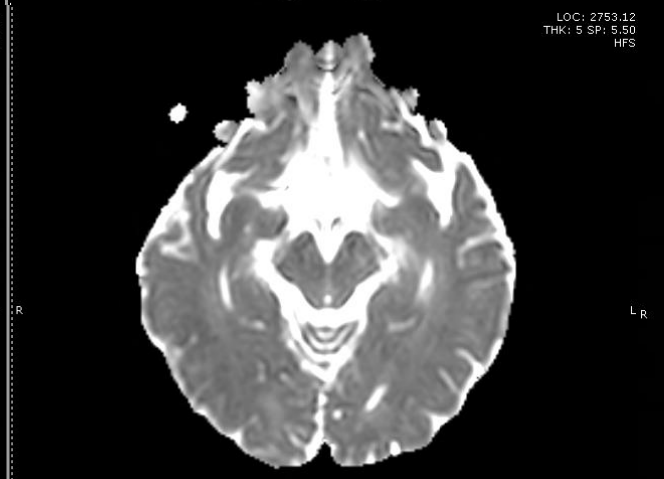
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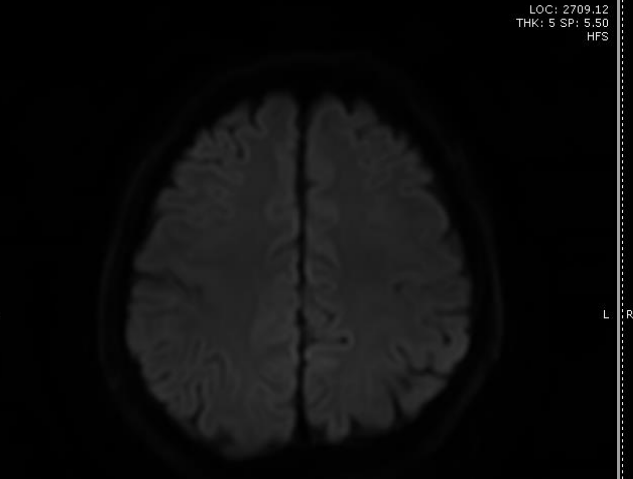
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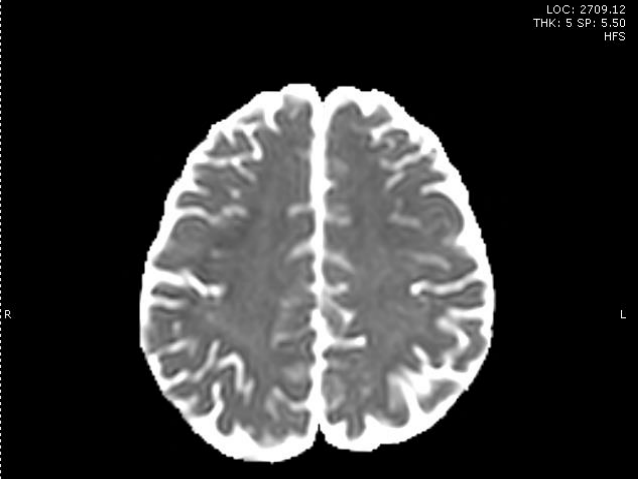
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Illicit Agents and Neurologic Complications

Categories of recreational drugs
Opioids
Psychostimulants
Cannabis/marijuana
Sedatives/hypnotics
Hallucinogens
Inhalants
Phencyclidine
Anticholinergics
Ethanol
Tobacco

Neurologic complications of illicit drug abuse
Traumatic brain/spinal cord/ peripheral nerve injury
CNS infection
Seizure
Stroke
Neuromuscular complication eg. GBS, plexopathy, rhabdomyolysis
Spongiform encephalopathy
Parkinsonism
Cognitive impairment

Mechanism of Stroke Related to Illicit Drug Use

Drugs	Mechanism
Cocaine	Vasospasm Cardioembolic: myocardial arrhythmia, arrhythmia, cardiomyopathy Prothrombotic state: endothelial dysfunction, platelet activation Vasculitis
Amphetamine	Vasculitis from direct toxic or immunological effect
Opioids	Cardioembolic: endocarditis, arrhythmia, embolization of foreign substances Global hypoperfusion and hypoxia Compression of carotid artery Vasculitis
Cannabis	Changes in cerebral autoregulation Hypotension Vasospasm Cerebral vasoconstriction syndrome Vasculitis Cardioembolic: arrhythmia, myocardial infarction
Anabolic steroids	Enhanced atherogenesis Prothombotic effect Cardioembolic: arrhythmia

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Take Home Message

- **Acute management of stroke**
  - **Ischemic stroke**
  - **Hemorrhagic stroke**
- **Stroke mechanism should be established in every stroke patient.**

THE 4th SIRIRAJ STROKE CONFERENCE 2019

CLOSING THE GAP IN STROKE CARE

Stroke Case Discussion