Simulation 1: RMCA Stroke and BP Dependent Exam

Clinical Objectives:

- ☐ Recognized hemiplegic weakness and gaze deviation as consistent with acute ischemic stroke
- ☐ Calculate an NIHSS
- ☐ Screen for contraindications to tPA
- ☐ Administer tPA with correct dosing once BP is appropriately controlled
- ☐ Identify criteria to involve endovascular team
- ☐ Recognize the differential for acute worsening in neurologic exam after tPA: Hemorrhage vs. Blood Pressure Dependent Exam

Behavioral Objectives:

- ☐ Shift from anchoring bias that this is not alcohol withdrawal or hepatic encephalopathy

Environment and Persons:
Environment: ED
Persons: Mannequin vs SP (depending on randomization), Daughter (Embedded Person)

Patient Demographics/PMH :

Age	80	Allergies	None	Social	Retired, history of smoking
Gender	F			PMH	HTN DM HLD Alcohol use disorder, in remission H/o cirrhosis
Height/Weight		Ethnicity		Medication	Lisinopril Carvedilol ASA Simvastatin Lantus Metformin
Labs	None	X-ray		Other History	

Room Setup :

- ☐ Medical Record will be printed out
- ☐ Patient will already have IV access
- ☐ Patient is not hooked up to the monitor
- ☐ Drugs needed: tPA, hydralazine or labetalol
- ☐ Images needed:
  - Normal Head CT, RMCA cut off CTA
- ☐ Videos needed (alternatively can be described by the ED RN)
  - RMCA syndrome

CASE SCENARIO:

Case begins with resident being paged:
*"**ED CONSULT STAT:*** **66 yo M with acute confusion and dysarthria, history of cirrhosis, please eval**"

PART ONE: H&P
Daughter at bedside relays pass off

HISTORY
Daughter (frantic): "Oh, I'm so glad someone is here that might be able figure out what's going on!! When I left for the store this morning, he was totally normal. But when I came home, he was on the ground and couldn't find his glasses, which were literally right beside him. I couldn't get him up! So, I had to call EMS. Occasionally he'd be like this when he was drinking but I don't think he's had alcohol in over a year!! **But the doctor told me that because of his liver he might be at risk for confusion – do you think that's what's wrong with him??**

NEUROLOGY RESIDENT BEHAVIOR CHECKLIST:
- ☐ Interview patient
- ☐ Ask if patient hit head
- ☐ Confirm LSW time
- ☐ Review PMH
- ☐ Review medications
- ☐ Examine the patient for signs of trauma
- ☐ Ask for Vital Signs
- ☐ Ask for fingerstick glucose

Patient (drowsy): I don't know why I couldn't get up. Nothing's wrong with me. I just fell. I don't think I hit my head.

Resident should inquire more about patients history. But it not then offer:

Daughter: "Dad has high blood pressure, and **he's a diabetic – but he only takes insulin at night though**, he's got high cholesterol, and used to drink heavily although stopped drinking a year ago. He's taking something for blood pressure and high cholesterol, an aspirin, metformin and lantus. Maybe he forgot to take his blood pressure medication!! **Sometimes he's really confused if he has high blood pressure!"**

[if resident asks about LSW] "I left for the store at 11 AM, **that's about 2 hours ago.** I was only gone for an hour and a half so when I came back and found him like this I called 911."

[if resident asks about blood sugar] "I checked his blood sugar at home and it was 138."

[if resident asks about blood thinners] "Like something stronger than aspirin? No, he only takes a baby aspirin"

[if resident asks about any medications for cirrhosis]: "No, they had thought that maybe he'd need medications but then he stopped drinking and has been doing so well for the last year, so he's not on any medications for his liver."

[if residents seem not to see the R-MCA syndrome]: "I've noticed that he won't even look over at me when I'm on his left side."

PHYSICAL:
Vitals: HR 90 IRREGULAR, BP 198/87, Afebrile

GEN EXAM:
- No evidence of jaundice
- Irregular heart rate
- No nuchal rigidity

NEURO EXAM:
MS: If resident stands on the left side the patient will not respond look at them. Drowsy, agnostic to deficits. Can name and repeat. Speech is dysarthric.

CN:
- Does not count fingers on the left, does not describe the left side of the NIHSS picture
- Pupils round and reactive
- Gaze preference to the right, has to be heavily coached to look left
- Minor facial weakness, with delayed activation
- Dysarthric

Motor:
- Left arm and left leg drift, arm is weaker than leg

Sensory
- Will appreciate touch on the left, but with double stimuli extinguishes left side

NIHSS:
- Drowsy
- Can answer month and age
- Follows commands
- 1 - partial gaze palsy
    - The patient will require oculocephalic testing to confirm that they pass midline and do not have a forced gazed (score 2) deviation
- 1- partial hemianopia
    - Patient will count fingers in all four quadrants but extinguish when double stimuli
- 1- minor facial weakness
- 1- left arm drift
- 1- left leg drift
- No ataxia, patient will not attend to participate on the left
- 1- mild sensory loss
    - Patient will report being touched sometimes
- Language – follows commands, reads, describes only the Right side of the picture.
- 2- inattention

PART TWO: MANAGEMENT OF ACUTE STROKE

1) **Daughter:**
    a. If Neuro Resident doesn't recognize acute stroke, draw attention to the left side. "OMG, why isn't the left side strong? He is normally not like this!"
2) **Patient:**
    a. Continues to be agnostic to deficits

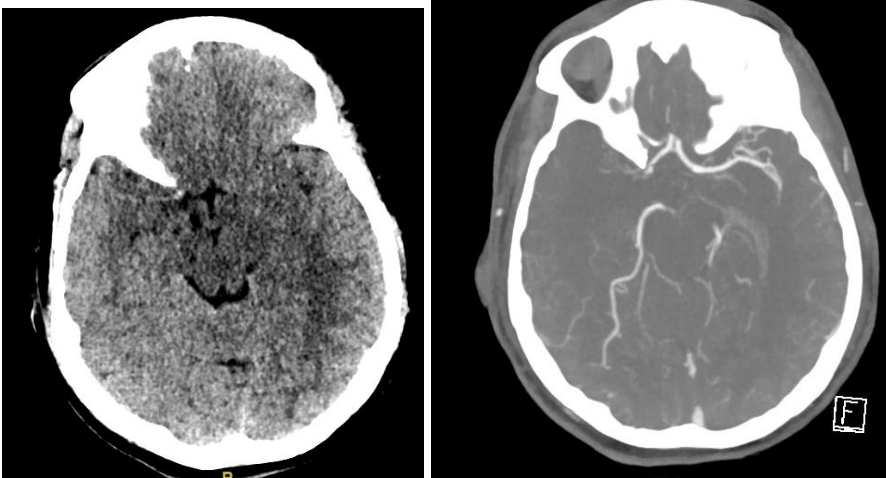
NEUROLOGY RESIDENT BEHAVIOR CHECKLIST:

- ☐ Recognize an acute R-MCA syndrome
- ☐ Use NIHSS cards to document a full NIHSS scale (totals 8)
    - 1 - partial gaze palsy

        - The patient will require oculocephalic testing to confirm that they pass midline and do not have a forced gazed (score 2) deviation
    - 1- partial hemianopia
        - Extinguishes to double simultaneous stimuli
    - 1- minor facial weakness
    - 1- left arm drift
    - 1- left leg drift
    - 1- mild sensory loss
    - 2- inattention

- ☐ If not already established – document LSW and confirm not on a/c
- ☐ Activate an “ED2CT” by alerting the ED
- ☐ Confirm glucose if hasn’t been done already
- ☐ Send CBC, Coags, BMP, troponins STAT
- ☐ Ask that the patient be hooked up to the monitor
- ☐ Note that BP > 185/110
- ☐ Start antihypertensive for goal BP< 185/110
- ☐ Note irregular HR if not noted before
- ☐ Review contraindications for tPA with daughter
- ☐ Transport patient to the “ED Scanner” and request both a NCHCT **and CTA H&N, CTP may also be included.**

3) **Data to be given as resident meets behavioral objectives:**
    a. **TPA SCREENING:**
        i. Daughter will answer no to all tPA screening questions except will report “last year he had a problem with his platelets.”
    b. **CT SCAN DATA:**



    c. **LAB DATA:**
        i. BMP WNL
        ii. CBC with PLTs of 276,000
        iii. INR 1.1
    d. **PATIENT DATA:**
        i. SBP will still be greater than >185 despite whatever medication is initially given.

NEUROLOGY RESIDENT BEHAVIOR CHECKLIST:

- ☐ Recognize there is no bleed on CT scan
- ☐ Recognize acute R M1 cut off
- ☐ Page the endovascular team given LVO

- ☐ Obtain weight
- ☐ Obtain blood glucose
- ☐ Given history of coagulopathy, review lab data and confirm that INR <1.7 and plts >100,000
- ☐ Continue to give anti-hypertensives until BP<185/110
- ☐ Confirm still within the window for tPA
- ☐ Dose tPA (0.9mg/kg with 10% of the dose given over 1 min and the rest infused over an hour)
- ☐ Correctly instruct the nurse on how frequently to measure BP (every 15mins for the first 2 hours)
- ☐ Correctly instruct the nurse for the target BP (<180/105)

<u>PART THREE: MANAGEMENT OF WORSENING SYMPTOMS AFTER TPA</u>

1) **Daughter:**
    a. Notice that her father isn't moving the left side at all, create panic about this
2) **Patient:**
    a. Will develop left arm plegia and complete neglect of the left with a forced rightward gaze deviation.
    b. VITALS: HR: 86, BP: 95/75, SpO2 99%
    c. If resident chose to give nicardipine, then shutting off the drip results in significant improvement of exam as BP climbs >140.
    d. If resident doesn't notice blood pressure, it will continue to drop

NEUROLOGY RESIDENT BEHAVIOR CHECKLIST:

- ☐ Consider the differential for a rapidly worsening neurologic exam after tPA – tPA associated hemorrhage vs. blood pressure dependent exam
- ☐ Halt tPA infusion while cause of neurologic worsening is being evaluated
- ☐ Resident preforms repeat Neuro exam
- ☐ Request or review CBC, PT (INR), aPTT, fibrinogen level, and type and cross-match for possible tPA related bleed
- ☐ Repeat non-con Head CT (no blood seen, the same scan is shown)
- ☐ Recognize low BP
    a. Turn off nicardipine
    b. Or give 1L bolus of fluid
    c. Pressor can be started if resdients have confirmed no hemorrhage on non con Head CT

Case ends with correction of BP, or if not corrected after the patient is rescanned the Endovascular fellow will arrive and ask for pass-off of the case.

COMPREHENSIVE BEHAVIORAL CHECKLIST

- [ ] Interview patient
- [ ] Ask if patient hit head
- [ ] Confirm LSW time
- [ ] Review PMH
- [ ] Review medications
- [ ] Examine the patient for signs of trauma
- [ ] Ask for Vital Signs
- [ ] Ask for fingerstick glucose
- [ ] Recognize an acute R-MCA syndrome
- [ ] Use NIHSS cards to document a full NIHSS scale (totals 8)
    - 1 - partial gaze palsy
        - The patient will require oculocephalic testing to confirm that they pass midline and do not have a forced gazed (score 2) deviation
    - 1- partial hemianopia
        - Extinguishes to double simultaneous stimuli
    - 1- minor facial weakness
    - 1- left arm drift
    - 1- left leg drift
    - 1- mild sensory loss
    - 2- inattention
- [ ] If not already established – document LSW and confirm not on a/c
- [ ] Activate an ED2CT by alerting the ED
- [ ] Confirm glucose if hasn't been done already
- [ ] Send CBC, Coags, BMP, troponins STAT
- [ ] Ask that the patient be hooked up to the monitor
- [ ] Note that BP > 185/110
- [ ] Start antihypertensive for goal BP< 185/110
- [ ] Review contraindications for tPA with daughter, making sure to include signs/symptoms of infections that might be indicative of endocarditis
- [ ] Transport patient to the "ED Scanner" and request both a NCHCT and CTA H&N
- [ ] Recognize there is no bleed on CT scan
- [ ] Recognize acute R M1 cut off
- [ ] Obtain weight
- [ ] Obtain blood glucose
- [ ] Given history of coagulopathy, review lab data and confirm that INR <1.7 and plts >100,000
- [ ] Continue to give anti-hypertensives until BP<185/110
- [ ] Confirm still within the window for tPA
- [ ] Dose tPA (0.9mg/kg with 10% of the dose given over 1 min and the rest infused over an hour)
- [ ] Correctly instruct the nurse on how frequently to measure BP (every 15mins for the first 2 hours)
- [ ] Correctly instruct the nurse for the target BP (<180/105)
- [ ] Recognize the need to page the endovascular team
- [ ] Consider the differential for a rapidly worsening neurologic exam after tPA – tPA associated hemorrhage vs. blood pressure dependent exam
- [ ] Halt tPA infusion while cause of neurologic worsening is being evaluated
- [ ] Resident preforms repeat Neuro exam
- [ ] Request stat non contrast head CT
- [ ] Request or review CBC, PT (INR), aPTT, fibrinogen level, and type and cross-match for possible tPA related bleed
- [ ] Recognize low BP (Turn off nicardipine or give 1L bolus of fluid; Should NOT give a pressor until a bleed is exonerated)
- [ ] Provide signout to neuro interventional team