STROKE 2024

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NATIONAL STROKE ASSOCIATION®

(/)

Stroke Treatments

If you are having a stroke it is important to get immediate medical attention—**Call 9-1-1**. The sooner you get treatment the better. Immediate treatment may help minimize the long-term effects of stroke and improve recovery outcomes.

Can Stroke Be Treated?

There are several treatment options for stroke depending on the cause of your stroke. If you are having an ischemic stroke or a stroke that is caused by a blood clot your healthcare professional may recommend drug treatment.

Drug Treatment

There is only one Food & Drug Administration (FDA) approved drug treatment for acute ischemic stroke. Tissue plasminogen activator (tPA) is given via intravenous therapy (IV) and works by dissolving the clot and improving blood flow to the part of the brain being deprived of blood flow. tPA should be given within three hours (and up to 4.5 hours in certain eligible patients)of the time symptoms first started.

Mechanical Devices

Some ischemic strokes are treated with small mechanical devices that remove or break up blood clots. If clot-busting drugs are ruled out, another option one of the many FDA approved mechanical devices. A surgeon inserts a small mechanical device into the blocked artery using a thin tube. Once inside, the tool traps the clot, and either breaks it up or the surgeon pulls it out of the brain, reopening the blocked blood vessel in the process.

A hemorrhagic stroke (sometimes called a bleed) occurs if an artery in your brain leaks blood or ruptures (breaks open). The first steps in treating a hemorrhagic stroke are to find the cause of bleeding in the brain and then control it. Some of the options for treatments include surgical clips or coils inserted in aneurisms (weaknesses in the blood vessel wall), controlling high blood pressure, and surgery to remove the bleeding vessel and blood that has spilled into the brain.

Medical advances have greatly improved survival rates and recovery from stroke during the last decade. Your chances of survival and recovery outcomes are even better if the stroke is identified and treated immediately.

HOW DID WE GET HERE?

t-PA

In 1995 published in the NEJM the Thrombolytic therapy trial for acute ischemic stroke utilizing t-PA was published.

The trial has 2 parts. Part 1 tested whether t-PA improved NIHSS by at least 4 points or had resolution of neurologic deficit within 24 hours. Part 2 used global test statistic to assess clinical outcome at 3 months according to mRS, Glasgow outcome scale, NIHSS, and Barthel index.

t-PA

Part One-No improvement

Part Two-All 4 outcome measures improved (global odds ratio for favorable outcome, 1.7; 95% confidence interval, 1.2 to 2.6) as compared with patients given placebo, patients given t-PA were 30% more likely to have minimal to NO disability at 3 months.

t-PA

These results in spite of 6.4% hemorrhage rate with t-PA vs 0.6% placebo

ECASS III

In 2008, European Cooperative Acute Stroke Study III demonstrated benefit of IV t-PA up to 4.5 hours, extending window of treatment.

ENDOVASCULAR TREATMENT FOR ACUTE ISCHEMIC STROKE

NEJM in 2013 published study comparing endovascular treatment alone vs. standard IV t-PA treatment of stroke within 4.5 hours onset.

ENDOVASCULAR TREATMENT FOR ACUTE ISCHEMIC STROKE

A total of 181 patients assigned to each treatment group. At 3 months there was no statistical difference in alive without disability, fatal or non-fatal intracranial hemorrhage, fatality rate.

ENDOVASCULAR TREATMENT FOR ACUTE ISCHEMIC STROKE

2 other studies of 2013, the IMSIII and the MR Rescue also failed to show benefit

No Harm, Just No Benefit


Mr. Clean

MR CLEAN (2014)

Question:

In the subset of patients with large proximal anterior circulation strokes, does inta-arterial intervention in addition to usual care offer improvement?

MR CLEAN (2014)

Bottom Line:
YES.

Patients with large proximal anterior circulation strokes, inta-arterial therapy within 6 hours improved functional independence at 90 days without increase ICH or mortality.

THE RIGHT QUESTION WAS ASKED!

MR CLEAN (2014)

Large artery occlusions of proximal anterior circulation (ICA, MI, M2, A1, AZ) account for about one-third of anterior ischemic strokes.

However, conventional IV t-PA is able to achieve recanalization in less than one-fifth of patients.

MR CLEAN (2014)

MR CLEAN randomized 500 patients with a radiographically confirmed proximal arterial occlusion in anterior circulation to treatment with IA intervention within 6 hours of symptoms vs. standardized care.

Both groups received IV t-PA.

MR CLEAN (2014)

MR CLEAN demonstrated that IA intervention arm had significantly improved 90 day outcomes (mRS) compared with usual care arm (OR 1.67, 95% CI 1.21-2.3).

No difference in ICH or mortality.

33% functional independence IA vs. 19% standard treatment

MR CLEAN (2014)

With this data, the other worldwide studies Canadian ESCAPE, Australia EXTEND-IA, Spain REVASCAT, and SWIFT PRIME were all terminated early due to their ethical clauses.

All showed identical results to MR CLEAN.

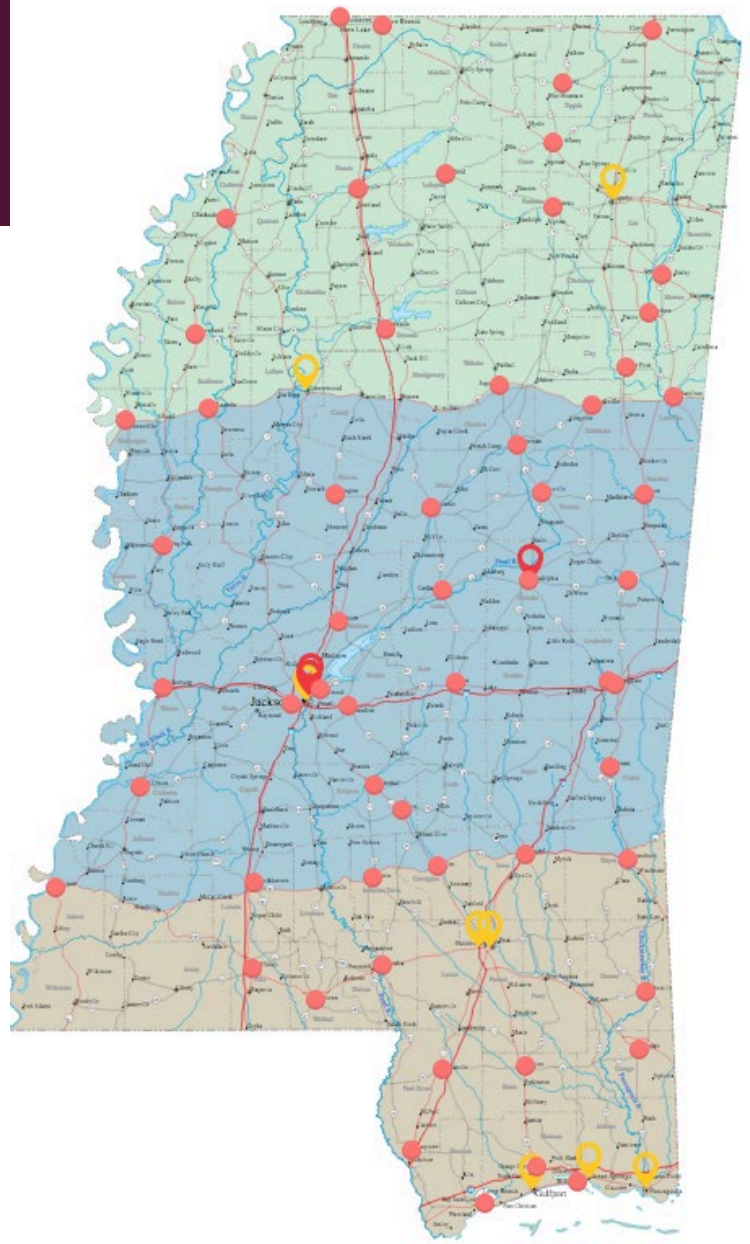
MR CLEAN (2014)

Thus, it became UNETHICAL to NOT treat with intervention.

OH BOY!

Game On…..

MS STROKE SYSTEM SETUP



EMS

STROKE LEVEL I REQUIREMENTS

- **Stroke Level I**
- Consists of a core team of personnel, infrastructure, and expertise to diagnose and treat stroke patients who require intensive medical, surgical, and interventional vascular care. The team consists of a neurologist, neurosurgeon, and endovascular specialists.
- Fully equipped Emergency Department (ED) for rapid diagnosis and treatment using standard CT imaging within 25 minutes and ability to have results reported within 45 minutes of test completion.
- Lab services available 24/7 with appropriate result reporting.
- Neurology, Neurosurgery, and Endovascular specialists available 24/7.
- Intensive Care capability available with critical care specialist available 24/7.
- Complete rehabilitation services (physical therapy, occupational therapy,
- and speech therapy) staffed by trained professionals and available for all
- patients within 24 to 48 hours of admission.
- Readily available for transfer of patient from field or lower care facility.
- Maintenance of adequate helicopter landing site on campus.
- Operating room and appropriate support staff available 24/7 for
- emergency surgery when necessary.
- Radiologic and diagnostic imaging with expedited reporting available 24/7,
- this should include angiography with endovascular capabilities.
- Must participate in the American Heart Association (AHA) “Get With The
- Guidelines ® - Stroke Registry. A multi-disciplinary quality improvement team, should meet at least quarterly to review data and lead quality improvement initiatives.
- Stroke Medical Education (CME) annually.
- Community and professional educational projects should be ongoing.

STROKE LEVEL 2 REQUIREMENTS

- **Stroke Level 2** -- (must have all of the requirements of Level I EXCLUDING endovascular capabilities)
- Consists of a core team of personnel, infrastructure, and expertise to diagnose and treat stroke patients who require intensive medical and surgical care.
- The team consists of a diagnostic radiologist, neurologist,
  and neurosurgeon. Fully equipped ED for rapid diagnosis and treatment using standard CT imaging within 25 minutes and ability to have results reported within 45 minutes of test completion.
- Lab services available 24/7 with appropriate result reporting.
- Radiology and Neurology specialists available 24/7.
- Intensive Care capability available with critical care specialist available 24/7.
- Complete rehab services (physical therapy, occupational therapy and
- speech therapy) staffed by trained professionals and available for all
- patients within 24 to 48 hours of admission.
- Readily available for transfer of patient from field or lower care facility.
- Maintenance of adequate helicopter landing site on campus.
- Operating room and appropriate support staff available 24/7 for
- emergency surgery when necessary.
- Radiologic and diagnostic imaging with expedited reporting available 24/7.
- Must participate in the AHA Get With The Guidelines ® - Stroke Registry. A
- multi-disciplinary quality improvement team should meet to review data and
- lead quality improvement initiatives at least quarterly.
- Stroke team members must document at least eight hours of CME
- annually.
- Community and professional educational projects should be ongoing.

STROKE LEVEL 3 REQUIREMENTS

- **Stroke Level 3** -- (must have the ability to diagnose and stabilize patient for transfer to Level 1 or 2 Referring Center)
- ED physician, other qualified physician, or physician extender available 24/7 to diagnose and initiate appropriate treatment.
- Rapid diagnosis and treatment using standard CT imaging within 25 minutes and ability to have results reported within 45 minutes of test completion.
- Lab services available 24/7 with appropriate result reporting.
- Acute stroke-trained providers should be available 24/7 to direct IV
- Alteplase (t-PA) administration.
- Transition plans must be established for rapid transfer of patient to Level 1
- or 2 Stroke Center. Factors that may necessitate transfer include:
  - Consider utilizing "Drip and Ship" after initiation of Alteplase if neurosurgery coverage is not available.
  - Patients with rapid clinical decline.
  - Patients without response to IV Alteplase or outside IV
  - Alteplase window who may benefit from neuro intervention.
  - Other factors as clinically necessary.
- Must participate in the Get With The Guidelines ® - Stroke Registry. A multi- disciplinary quality improvement team should meet to review data and lead quality improvement initiatives at least quarterly.
- Community and professional educational projects should be ongoing.

PROTOCOL

St. Dominic-Jackson Memorial Hospital

Title: Stroke Alert

Applies To: St. Dominic Hospital	Category: Clinical
Document Type: Procedure	Owner/Author: Wendy Barrilleaux, PT, DPT, NCS, Director, Comprehensive Stroke Center
Approved By: Cris Bourn, Ortho/Neuro Service Line Administrator	Date Approved: 06/08/2015
Date Authenticated By Policy Management Committee: 07/01/2015	Date(s) Reviewed* or Revised: 12/2010, 09/2011, 02/2012, 06/2015
Inception Date: 08/2010	

*Reviewed but not changed

Purpose:
To describe the procedure for activation and response to a stroke alert

Definitions:
1. **Acute stroke:** current or recent (within hours) loss of perfusion to vascular territory of the brain
2. **Last Known Well**: the time at which the patient was last known to be without the signs and symptoms of the current stroke or at his/her prior baseline
3. **Stroke Alert:** the term used for urgent notification that a patient has signs and symptoms of an acute stroke

Procedure:
1. ***"Stroke Alert"*** is initiated when a patient is found to have signs and symptoms of an acute stroke.

2. When the patient is in the Emergency Department, a clinician initiates a Stroke Alert when last known well is ≤ 8 hours from presentation to the Emergency Department.

3. If the patient is on the St. Dominic Hospital South Campus but not in critical care, any staff member initiates a PERT.
   3.1. A clinician on the PERT may initiate a Stroke Alert.

4. If the patient is in critical care, a clinician initiates a Stroke Alert.

5. An Emergency Department physician initiates a Stroke Alert upon the arrival of the patient who has been transferred from another facility after receiving a tissue plasminogen activator (tPA).

6. An Emergency Department physician initiates a Stroke Alert when the patient arrives with symptoms of a wake-up stroke.

7. If the patient is at Dominican Plaza, Cancer Center, Behavioral Health Services North Campus and such locations that are not part of St. Dominic Hospital South Campus, 911 is called.

8. A Stroke Alert is initiated by using the PULSARA STOP STROKE app as outlined on Phase 1 Hyper-Acute Stroke order set and Wake Up Orders for Pt Outside of IV TPA Window.

9. This procedure is used 24 hours per day every day.

10. For additional information regarding the stroke alert team, contact the Stroke Program Coordinator or the nurse practitioner assigned to neurology.

Related Documents:
1. Acute Stroke Patient Transfers from Another Facility, St. Dominic Hospital procedure
2. Code 99, St. Dominic Hospital guideline
3. Patient Evaluation Response Team (PERT), St. Dominic Hospital guideline

References:
1. Phase 1 Hyper-Acute Stroke order set, https://www2.stdom.com/SSLWebPages/DoctorOrderForms/index.cfm
2. Wake Up Orders for Pt Outside of IV TPA Window order set, https://www2.stdom.com/SSLWebPages/DoctorOrderForms/index.cfm

PROTOCOL

ST. DOMINIC-JACKSON MEMORIAL HOSPITAL
JACKSON, MISSISSIPPI

Date & Time	**Acute Stroke Discharge Orders** Page 1 of 3
	1) General ☐ Discharge ☐ Discharge Diagnosis is in active Diagnosis list ☐ Discharge Diagnosis is not available in Diagnosis list ☐ Discharge Instructions: _____
	2) Condition at Discharge ☐ Good ☐ Fair ☐ Stable
	3) Diet ☐ Regular ☐ Coumadin diet ☐ Heart Healthy ☐ Heart Healthy ADA _____ ☐ Na restricted ☐ Other Diet _____
	4) Social Worker Consult: Please arrange for home services through primary care provider ☐ St Dominic's Outpatient 601-200-4920 ☐ PT ☐ OT ☐ ST ☐ Outpatient Rehab ☐ PT ☐ OT ☐ ST ☐ Home Health - Stroke - Transition of Care Program (Sign Face to Face form) ☐ PT ☐ OT ☐ ST ☐ RN ☐ Aide ☐ Home Health Other:_____ (Sign Face to Face form) ☐ PT ☐ OT ☐ ST ☐ RN ☐ Aide ☐ Home oxygen at __ L/min via cannula: ☐ continuous ☐ intermittent ☐ Durable Medical Equipment ☐ Other: _____

BOTTOM EDGE OF PATIENT LABEL

DOCTOR'S ORDERS

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JACKSON, MISSISSIPPI

Date & Time	**Acute Stroke Discharge Orders** Page 2 of 3
	5) Activity: ☐ As tolerated ☐ No lifting ☐ No Driving ☐ Other _____
	6) Schedule the following outpatient studies: ☐ INR ☐ CBC w/ diff ☐ BMP ☐ Radiology: ☐ Other: ☐ Other:
	7) Schedule follow-up appointment: ☐ With Primary care provider ☐ With neurologist _____ in _____ weeks. ☐ With Stroke clinic in 2 weeks ☐ With Stroke clinic in 2 weeks AND 90 days for patients who received IV TPA or Endovascular Stroke Treatment ☐ Other: _____ ☐ Other: _____
	8) Provide Stroke education: Stroke Risk Factors, Stroke Warning Signs and Symptoms; FAST; How to Activate EMS:911; Need for Follow up after Discharge; Prescribed Medications; Smoking Cessation; Diet Instructions Complete home assessment tool, obtain signatures and place on chart Provide individualized education for each risk factor Provide information regarding respite care
	9) Medications: ☐ Per Discharge medication reconciliation

BOTTOM EDGE OF PATIENT LABEL

DOCTOR'S ORDERS

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Date & Time	**Acute Stroke Discharge Orders** Page 3 of 3
	9) Core Measure Discharge Checklist ☐ NIHSS at discharge: _____ ☐ MRS at discharge: _____ ☐ Antithrombotic at discharge: • Yes • No, contraindicated, _____ ☐ If patient has Atrial Fibrillation/Atrial Flutter discharged on Coumadin? If not why? _____ ☐ LDL> 100 discharged on statin? If not why? _____ ☐ Hunt and Hess Score (SAH) ☐ ICH score (ICHs) ☐ Stroke education has been continuous throughout admission ☐ VTE prophylaxis has been continuous throughout admission

_____/_____ _____
Date **Time** **Physician Signature**

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DOCTOR'S ORDERS

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PROTOCOL

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JACKSON, MISSISSIPPI

Date & Time	**Post IA TPA - Mechanical Thrombectomy** Page 1 of 2
	1. Admit to ICU to Dr. _____ as inpatient
	2. Diagnosis:
	3. Vital signs with neuro checks: q15min x 2 hrs, q30min x 6hrs, q 1 x 24 hrs then routine
	4. Code Status:
	5. Consults:
	6. If arterial sheath is in place:
	A. Bed rest; keep _____ straight; HOB no higher than 30 degrees; may log roll PRN.
	B. Keep sheath dripping at TKO with 1000 units Heparin per 500 mL NS.
	C. Keep sheath pressure bag pumped to greater than 300 mmHg at all times.
	D. Change sheath flush bag PRN. Keep flush bag above heart level at all times including transport.
	No air in sheath flush line.
	E. Check _____ puncture site and distal pulses with vital sign checks.
	7. If arterial sheath recently removed:
	A. Bed rest; keep _____ straight; HOB no higher than 30 degrees; may log roll PRN.
	beginning 2 hrs after sheath out until _____
	B. Vital signs q 15 min x 2 hr, then q 30 min x 6 hrs, and then q 1 hr x 24 hrs then routine.
	C. Check _____ puncture site and distal pulses with vital sign checks until _____
	8. If arterial puncture site has been secured with Angio-Seal:
	A. Bed rest; keep _____ straight; HOB no higher than 30 degrees; may log roll PRN
	until _____
	B. Vital signs q 15 min x 2 hr, then q 30 min x 6 hrs, and then q 1 hr x 24 hrs then routine.
	C. Check _____ puncture site and distal pulses with vital sign checks until _____
	9. Foley to gravity. A-Line to monitor. Discontinue and A-Line in AM. Discontinue foley in a.m.
	10. Call physician for: Systolic blood pressure > _____ or < _____
	Diastolic blood pressure > _____ or < _____
	Pulse > _____ or < _____
	Resp distress
	New neurologic deficits, puncture site hematoma or bleeding and/or loss or decrease
	of pulses at or distal to puncture site.
	11. If bleeding or hematoma suspected, immediately hold pressure for 15 minutes and notify Physician at 6150

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JACKSON, MISSISSIPPI

Date & Time	**Post IA TPA - Mechanical Thrombectomy** Page 2 of 2
	Pharmacy Mnemonic: PIATPAMT
	12. Diet: ☐NPO until dysphasia screen passed
	13. IV:
	14. Lab:
	15. Studies:
	16. **Medication:** ***Administer medication utilizing range order guideline.***
	☐ IV Heparin 25,000 units in 250 mL 0.45% sodium chloride; Initiate Cardiac Heparin Order Set
	☐ IV Heparin 25,000 units in 250 mL 0.45% sodium chloride ; Begin at _____mL/hr. Check PTT at _____
	☐ Plavix (clopidogrel) 75 mg PO daily
	☐ Morphine sulfate _____mg IV q 2 hrs PRN severe pain (6 - 10 on the numeric pain intensity scale)
	☐ Norco -7.5 (hydrocodone/acetaminophen 7.5/325) one tab PO q 4 hrs PRN moderate pain (3.1 - 5.9 on the numeric pain intensity scale)
	☐ Tylenol ES (acetaminophen) 500 mg one tab PO q 6 hrs PRN mild pain (0.1 - 3 on the numeric pain intensity scale)
	Do not exceed 3 grams of acetaminophen in 24 hrs.
	If both selected, give Zofran first. If it is ineffective then give Phenergan.
	☐ Zofran (ondansetron) 4 mg IV q 6 hrs PRN nausea or vomiting
	☐ Phenergan (promethazine):
	☐ 12.5 IM q 6 hrs PRN nausea or vomiting (patient is less than or equal to 120lbs)
	OR ☐ 25 IM q 6 hrs PRN nausea or vomiting (patient is greater than 120lbs)
	☐ Restoril (temazepam) 15 mg PO q hs PRN insomnia
	☐ Maalox Plus (aluminum-magnesium hydroxide): ☐ 10 mL ☐ 20 mL PO q 6 hrs PRN indigestion
	☐ Milk of Magnesia concentrate (magnesium hydroxide) 10 mL PO daily PRN constipation
	☐ Colace (docusate) 100 mg PO bid
	☐ Pharmacy to identify and list home meds
	17. Notify attending physician of room# on arrival to ICU for further orders.

_____/_____ _____
Date **Time** **Physician Signature**

BOTTOM EDGE OF PATIENT LABEL

DOCTOR'S ORDERS

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PROTOCOL

ST. DOMINIC-JACKSON MEMORIAL HOSPITAL
JACKSON, MISSISSIPPI

Date / Time	**Ischemic Stroke (receiving r-tPA/Alteplase) Phase 2** Page 1 of 2 Pharmacy Mnemonic: ISTPAP1
	1. Admit to Neuro ICU as inpatient for Dr. _____
	2. CM: Stroke (Nursing order- do not delete)
	3. IV Access: Sodium Chloride 0.9% 1000ml at _____ml/hr
	4. Vital Signs and Neuro Checks: Measure blood pressure and perform neurological assessments every 15 minutes during and after IV TPA infusion for 2 hours, then every 30 minutes for 6 hours, then hourly until 24 hours after IV TPA treatment. Increase the frequency of blood pressure measurement if systolic blood pressure is >180mmHg or if diastolic blood pressure is > 105 mmHg. ☒ Continuous cardiac monitoring for 24 hrs *This vital sign order must be followed for 24 hours after its initiation. This order supersedes any other vital sign order placed before this order has been followed and completed.*
	5. Diet: Keep NPO until nursing swallow screening completed and passed
	6. Seizure Precautions
	7. ☐ Foley catheter to bedside drainage for strict I&O
	8. Fall Precautions
	9. Activity: Strict bed rest until rehab assessment, then activity level as directed
	10. Aspiration Precautions: Keep head of bed elevated 30-45 degrees at all times
	11. Notify MD of Neurological changes
	12. ☐ Initiate Glycemic Control orders
	13. O2 via nasal cannula and face mask to keep SPO_2 >94%
	14. Initiate and complete Pneumonia/Influenza Screen on transfer from ICU
	15. No routine needle venous or arterial punctures for 24 hours except for emergency and with MD Order
	16. **LABS: 24 hours post tPA infusion**
	☐ CBC w/diff in AM once ☐ Once daily x 3
	☐ PT/INR in AM once ☐ Once daily x 3
	☐ Basic Metabolic Profile in AM once ☐ Once daily x 3
	Fasting Lipid Profile in AM once
	Hgb A1C in AM once
	☐ UA STAT once ☐ Urine C&S STAT once
	☐ Other_____
	17. Consults: a. ☐Consult Nutrition Services for evaluation and dietary education – Stroke Patient b. Consult Speech Therapy – Stroke Patient – include cognitive screen c. ☐Consult Diabetic Nurse – (for diabetic patients only) d. ☐Consult Respiratory Therapy – Stroke Patient e. Consult Social Services and Case Manager for discharge planning and Smoking Cessation f. Consult Rehab Services: OT, PT, evaluate and treat - Stroke Patient OT:-include depression screen g. ☐Patient is ineligible to receive rehab services because symptoms resolved.
	18. Physician Consults: _____ ☐Level 1 ☐Level 2
	19. **Provide Stroke Education:** Individualized education regarding stroke Risk Factors, Stroke Warning Signs and Symptoms; FAST; How to Activate EMS:911; Need for Follow up after Discharge; Prescribed Medications; Smoking Cessation; Diet Instructions

DOCTOR'S ORDERS

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JACKSON, MISSISSIPPI

	Ischemic Stroke (receiving r-tPA/Alteplase) Phase 2 Page 2 of 2	
	20. Complete and document NIHSS 24 hours post-tPA or endovascular procedure.	
	21. Diagnostics: *Indication needed to process order	
	☐ MRI Brain & MRA Brain and Neck without contrast: *Indication_____	
	☐ MRI Brain without contrast, without MRA *Indication_____	
	CT of Brain without contrast for stroke, *Indication post tPA in 24 hrs	
	☐ CTA brain and neck for *Indication_____	
	☐ Echocardiogram *Indication _____	
	☐ Carotid Duplex Ultrasound for * Indication_____	
	☐ Other _____ *Indication_____	
	22. Blood Pressure Management:	
	Systolic Blood Pressure greater than or equal to **220** **OR** Diastolic Blood Pressure greater than **120** on 2 or more consecutive BP checks at least 10 minutes apart	**1. Notify MD IMMEDIATELY** **2.** Give Labetalol 10mg IV over 1-2 minutes every 4 hr PRN other (see comment) **3.** Continuous blood pressure monitoring **4. HOLD LABETALOL FOR ACUTE ASTHMA OR CHF EXACERBATION OR FOR HEART RATE LESS THAN 50 OR FOR RHYTHM OF 2ND OR 3RD DEGREE HEART BLOCK.**
	Initial Diastolic Blood Pressure > **140**	**1. Notify MD immediately** **2**. Begin Nicardipine 20 mg in 200ml sodium chloride IV infusion at_____. Increase by 2.5 mg/hr every 15 minutes for MAP of _____. Max rate is 15 mg/hr **3.** Continuous Blood Pressure Monitoring
	Medications: tPA completion date/time:_____ **DO NOT ADMINISTER WITHIN 24 HOURS OF COMPLETING r-TPA INFUSION :** **ASPIRIN** **HEPARIN** **TICLOPIDINE (TICLID)** **WARFARIN (COUMADIN)** **CLOPIDOGEL (PLAVIX)** **AGGRENOX (DIPYRIDAMOLE–ASPIRIN)** **NON STEROIDAL ANTI INFLAMMATORIES** **ANTI PLATELETS OR ANTI COAGULANTS** **ANTIPLATELET THERAPY AFTER FIRST 24 HOURS** ☐ Aspirin 81 mg po daily ☐ Aspirin 325 mg po daily ☐ Plavix (clopidogrel) 75 mg po daily ☐ Aggrenox (25mg aspirin/200mg dipyridamole) one cap po BID ☐ Warfarin (coumadin) _____mg po Daily ☒ Coumadin Education (if applicable) ☐ Ativan (lorazepam) 1 mg IV 30min prior to imaging procedure for agitation. May repeat x _____ ☐ STATIN: **(Consider STATIN for LDL ≥ to 100mg/dL; For Diabetic patients LDL > 70)** ☐ Laxative: ☐ Nausea/Vomiting: If IV and PO are selected, give by the oral route unless patient is unable to take PO meds. If unable to take PO meds, give by the IV route. ☐ Zofran (ondansetron) 4m IV every 6hrs PRN vomiting (Give 4mg IV Push over 2 to 5 minutes) ☐ Zofran (ondansetron) 4mg PO every 6hrs PRN vomiting ☐ Tylenol (acetaminophen) 325mg two tablets PO q 6 hrs PRN temp > 100.4° or for headache not to exceed 3 grams in 24hr. If PO and PR are selected, give by the oral route unless patient is unable to take PO meds. If unable to take PO meds, administer suppository per rectum. ☐ Tylenol (acetaminophen) 650 mg suppository per rectum q 6 hrs PRN temp > 100.4° or for headache not to exceed 3 grams in 24hr	

_____/_____ _____
Date **Time** **Physician Signature**

DOCTOR'S ORDERS

BOTTOM EDGE OF PATIENT LABEL

REV 05/19; SD40-3

PROTOCOL

ST. DOMINIC-JACKSON MEMORIAL HOSPITAL
JACKSON, MISSISSIPPI

TIA or Ischemic Stroke (Non r-tPA/Alteplase) Phase 2

Page 1 of 2

Pharmacy Mnemonic: ISNOTPA1

Date & Time

1. Admit to _____

2. CM: Stroke (Nursing order - do not delete)

3. IV Access: ☐ INT ☐ Sodium Chloride 0.9% 1000ml at _____ml/hr

4. Vital Signs and Neuro Checks:
For ICU patients; 15 min x4, 30 min x 2, 2 hrs x 24, then routine or more often as needed.
For non ICU patients; Every 1 hr x 4 hrs then every 4 hours or more often as needed.
☒ Continue cardiac monitoring

5. Diet: Keep NPO until nursing swallow screening completed

6. Seizure Precautions

7. Obtain post void residual

8. Fall Precautions

9. Activity:
Strict bed rest until rehab assessment, then activity level as directed
No lifting or pulling of shoulder on affected side, HOB elevated 30 degrees, Turn every 2 hours

10. Aspiration Precautions: Keep head of bed elevated 30-45 degrees at all times

11. Notify MD of Neurological changes

12. ☐ Initiate Glycemic Control Orders

13. O2 via nasal cannula and face mask to keep SPO2 >94%

14. Initiate and complete Pneumonia/Influenza Screen on admission or on transfer from ICU

15. DVT Prophylaxis: Place SCD's until ambulatory

16. LABS: (Do not repeat if done in ED)

☐ CBC w/diff STAT once ☐ Once daily x 3
☐ PT/INR STAT once ☐ Once daily x 3
☐ Basic Metabolic Profile STAT once ☐ Once daily x 3
☐ Fasting Lipid Profile STAT once
☐ Hgb A1C STAT once
☐ UA STAT once ☐ Urine C&S STAT once
☐ Other_____

17. Consults:
a. ☐ Consult Nutrition Services for evaluation and dietary education – Stroke Patient
b. Consult Speech Therapy – Stroke Patient - include cognitive screen
c. ☐ Consult Diabetic Nurse – (for diabetic patients only)
d. ☐ Consult Respiratory Therapy – Stroke Patient
e. Consult Social Services and Case Manager for discharge planning and Smoking Cessation
f. Consult Rehab Services: OT, PT, evaluate and treat - Stroke Patient OT: -include depression screen
g. ☐ Patient is ineligible to receive rehab services because symptoms resolved.

18. Physician Consults: _____ ☐ Level 1 ☐ Level 2

DOCTOR'S ORDERS
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JACKSON, MISSISSIPPI

TIA or Ischemic Stroke (Non r-tPA/Alteplase) Phase 2

Page 2 of 2

Pharmacy Mnemonic: ISNOTPA2

19. Provide Stroke Education: Stroke Risk Factors, Stroke Warning Signs and Symptoms; FAST; How to Activate EMS:911; Need for Follow up after Discharge; Prescribed Medications; Smoking Cessation; Diet Instructions

20. Diagnostics: *Indication needed to process order ☐ Indicate risk factors

☐ MRI Brain & MRA Brain and Neck without contrast: *Indication_____
☐ MRI Brain without contrast, without MRA *Indication_____
☐ CT of Brain without contrast for stroke, *Indication _____
☐ CTA brain and neck for *Indication_____
☐ Carotid Duplex Ultrasound for * Indication_____
☐ Echocardiogram *Indication _____
☐ Other *Indication_____

21. Blood Pressure Management

Systolic Blood Pressure greater than or equal to **220** **OR** Diastolic Blood Pressure greater than **120** on 2 or more consecutive BP checks at least 10 minutes apart	**1. Notify MD IMMEDIATELY** **2.** Give Labetalol 10mg IV over 1-2 minutes every 4 hr PRN other (See comment) **3.** Continuous blood pressure monitoring **4. HOLD LABETALOL FOR ACUTE ASTHMA OR CHF EXACERBATION OR FOR HEART RATE LESS THAN 50 OR FOR RHYTHM OF 2ND OR 3RD DEGREE HEART BLOCK.**
Initial Diastolic Blood Pressure > **140**	**1. Notify MD immediately** **2.** Begin Nicardipine 20 mg in 200ml sodium chloride IV infusion at_____. Increase by 2.5 mg/hr every 15 minutes for a MAP of_____. Max rate is 15 mg/hr **3.** Continuous Blood Pressure Monitoring

22. Medications: **Do not to exceed 3 grams of acetaminophen in 24 hours**

☐ ANTIPLATELET THERAPY ☐ Not indicated due to _____
☐ Aspirin 81 mg po daily
☐ Aspirin 325 mg po daily
☐ Plavix (clopidogrel) 75 mg po daily
☐ Aggrenox (25mg aspirin/200mg dipyridamole) one cap po BID
☐ Warfarin (coumadin) _____mg po Daily ☒ Coumadin Education (if applicable)
☐ Ativan (lorazepam) 1 mg IV 30min prior to imaging procedure for agitation. May repeat X _____
☐ STATIN: _____
(Consider STATIN for LDL ≥ to 100mg/dL; For Diabetic patients LDL > 70)
☐ Laxative of choice
☐ Nausea/Vomiting: If IV and PO are selected, give by the oral route unless patient is unable to take PO meds. If unable to take PO meds, give by the IV route.
☐ Zofran (ondansetron) 4mg IV every 6hrs PRN nausea\vomiting (Give over 2 to 5 minutes)
☐ Zofran (ondansetron) 4mg PO every 6hrs PRN nausea\vomiting
Temp > 100.4° or Headache:
☐ Tylenol (acetaminophen) 325mg two tablets PO q 6 hrs PRN. If PO and PR are selected, give by the oral route unless patient is unable to take PO meds. If unable to take PO meds, administer suppository per rectum.
☐ Tylenol (acetaminophen) 650 mg suppository per rectum q 6 hrs PRN temp > 100.4° or for headache

_____/_____ _____
Date **Time** **Physician Signature**

DOCTOR'S ORDERS

BOTTOM EDGE OF PATIENT LABEL

REV 02/16; SD40-3

PROTOCOL

ST. DOMINIC-JACKSON MEMORIAL HOSPITAL
JACKSON, MISSISSIPPI

Date / Time	**Initial Acute Stroke Orders** Page 1 of 1 **Phase 1 Hyper-Acute Stroke** Pharmacy Mnemonic: ISTROKE1	
	1. Vital Signs/Neuro checks every 15 min x 4, every 30 min x 2, then every 2 hrs x 24 hrs then routine. More often as needed. Notify MD of any Neurological changes. ☒*This vital sign order must be followed for 24 hours after its initiation. This order supersedes any other vital sign order placed before this order has been followed and completed.*	
	2. Oxygen 2L Nasal Cannula or mask to keep O_2 sat ≥ 94 %	
	3. Continuous cardiac monitoring	
	4. 12 lead EKG	
	5. IV access: ☐ INT ☐ Sodium Chloride 0.9% 1000 ml at_____ ml/hr	
	6. Nurse to complete NIH Stroke Scale immediately upon arrival and place in progress notes.	
	7. Diet: NPO until swallow screen completed and passed	
	8. Precautions: ☒ Strict bedrest ☒ Keep head of bed elevated 30-45 degrees at all times.	
	9. (a.) Use PULSARA app to activate team	
	10. ☐Insert foley catheter for strict I/O prior to r tPA	
	11. **CM**: Stroke Patient (Nursing order-do not delete)	
	12. **LABS:**	
	☐ CBC w/diff STAT once	
	☐ Blood Alcohol once STAT	
	☐ Accucheck glucose STAT once	
	☐ Cardiac marker (troponin) once STAT	
	☐ CMP STAT once	
	☐ Serum Pregnancy Test STAT once (from menarche to menopause unless history of BTL or hysterectomy)	
	☐ PT/INR STAT once	
	☐ Urine Drug Screen once STAT	
	☐ PTT STAT once	
	☐ UA once STAT	
	13. Portable chest x-ray Indication:_____	
	14. ☐ Initiate Glycemic Control protocol	
	15. **DIAGNOSTICS:** CT Head without contrast Stroke Protocol STAT once **Indication:** Sudden onset of: ☐Dizziness ☐Weakness ☐Confusion ☐Difficulty Speaking ☐Visual Disturbance ☐Severe Headache ☐Numbness ☐Difficulty walking	
	16. **Blood Pressure Management:**	
	Systolic Blood Pressure ≥ **220** **OR** Diastolic Blood Pressure > **120** on 2 or more consecutive BP checks at least 10 minutes apart	**1. Notify MD IMMEDIATELY** **2.** Give Labetalol 10mg IV over 1-2 minutes every 4 hr PRN other (see comments) **3.** Continuous blood pressure monitoring **4. HOLD LABETALOL FOR ACUTE ASTHMA OR CHF EXACERBATION OR FOR HEART RATE LESS THAN 50 OR FOR RHYTHM OF 2ND OR 3RD DEGREE HEART BLOCK.**
	Initial Diastolic Blood Pressure > **140**	**1. Notify MD immediately** **2**. Begin Nicardipine 20 mg in 200ml sodium chloride IV infusion at_____. Increase by 2.5 mg/hr every 15 minutes for a MAP of_____. Max rate is 15 mg/hr. **3.** Continuous Blood Pressure Monitoring

_____/_____
Date Time Physician Signature

DOCTOR'S ORDERS

ST. DOMINIC-JACKSON MEMORIAL HOSPITAL
JACKSON, MISSISSIPPI

BOTTOM EDGE OF PATIENT LABEL REV 02/19; SD40-3

NIHSS - 3 Columns

CATEGORY	DESCRIPTION	INITIAL SCORE	HANDOFF #1	HANDOFF #2	24 HOUR
LOC	0=alert 1=drowsy 2=stuporous 3=coma				
LOC-Questions *month *age	0=answers both correctly 1=answers one correctly 2=both incorrect				
LOC-Commands *open / close eyes *squeeze / let go	0=obeys both correctly 1=obeys one correctly 2=both incorrect				
Best Gaze- Horizontal eye movement	0=normal 1=partial gaze palsy 2=forced deviation				
Visual Field- Finger count / moving fingers	0=no visual loss 1=partial hemianopia 2=complete hemianopia 3=bilateral hemianopia				
Facial Palsy *show teeth *raise eyebrows	0=normal 1=minor 2=partial 3=complete				
Motor- elevate arm to 90 degrees *hold 10 seconds RIGHT arm	0=no drift 1=drift 2=can't resist gravity 3=no effort against gravity 4=no movement				
LEFT arm	See above				
Motor- elevate leg to 30 degrees *hold 5 seconds RIGHT arm	0=no drift 1=drift 2=can't resist gravity 3=no effort against gravity 4=no movement				
LEFT arm	See above				
Limb Ataxia *finger to nose *heel to shin	0=absent 1=present in one limb 2=present in both limbs				
Sensory	0=normal 1=partial loss 2=severe loss				
Language *describe picture *name objects *read sentences	0=normal 1=mild ot mod aphasia 2=severe aphasia 3=mute				
Dysarthria *read or repeat word list	0=normal 1=mild to moderate dysarthria 2=near unintelligible NT=intubated				
Extinction / Inattention	0=no neglect 1=partial neglect 2=complete neglect				
	TOTAL SCORE				
	Nurse Signature / Date / Time:				
	Nurse Signature / Date / Time:				

NIHSS - 3 Columns

bottom edge of patient label here
SD650-7

ST. DOMINIC-JACKSON MEMORIAL HOSPITAL
JACKSON, MISSISSIPPI

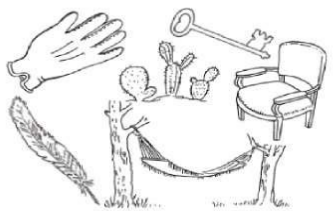
You know how.

Down to earth.

I got home from work.

Near the table in the dining room.

They heard him speak on the radio last night.



MAMA

TIP – TOP

FIFTY – FIFTY

THANKS

HUCKLEBERRY

BASEBALL PLAYER

PROTOCOL

ST. DOMINIC-JACKSON MEMORIAL HOSPITAL
JACKSON, MISSISSIPPI

Date / Time	**Stroke Orders for Pt Outside of IV TPA Window** **Includes Wake-Up Stroke and Unknown Last Known Well**
	Page 1 of 1
	1. Vital Signs/Neuro checks every 1 hour x 4 hours or more often as needed. Notify MD of any Neurological changes.
	2. Oxygen 2L Nasal Cannula or mask to keep O_2 sat > 94 %
	3. Continuous cardiac monitoring 4. 12 lead EKG
	5. IV access: ☐ INT ☐ Sodium Chloride 0.9% 1000 ml at_____ ml/hr
	6. Nurse to complete NIH Stroke Scale immediately upon arrival and place in progress notes.
	7. Diet: Keep NPO until nursing swallow screening completed and passed
	8. Precautions: ☒ Strict bedrest ☒ Keep head of bed elevated 30-45 degrees at all times.
	9. Use PULSARA app to activate team. Nurse Practitioner to contact Interventionalist.
	10. **CM**: Stroke Patient (Nursing order-do not delete)
	11. **LABS:**
	☐ CBC w/diff STAT once
	☐ Blood Alcohol once STAT
	☐ Accucheck glucose STAT once
	☐ Cardic marker (troponin) once STAT
	☐ CMP STAT once
	☐ Serum Pregnancy Test STAT once (from menarche to menopause unless history of BTL or hysterectomy)
	☐ PT/INR STAT once
	☐ Urine Drug Screen once STAT
	☐ PTT STAT once
	☐ UA once STAT
	12. Portable chest x-ray Indication:_____
	14. ☐Initiate Glycemic Control protocol
	15. **DIAGNOSTICS:** ED staff to transport patient to Radiology. CT Stroke Protocol STAT. ☐ MRI diffusion / FLAIR / T1 **Indication:** Sudden onset of: ☐Dizziness ☐Weakness ☐Confusion ☐Difficulty Speaking ☐Visual Disturbance ☐Severe Headache ☐Numbness ☐Difficulty walking
	16. **Blood Pressure Management:**
	Systolic Blood Pressure ≥ **220** **OR** Diastolic Blood Pressure > **120** on 2 or more consecutive BP checks at least 10 minutes apart **1. Notify MD IMMEDIATELY** **2.** Give Labetalol 10mg IV over 1-2 minutes x1. May not repeat. **3.** Continuous blood pressure monitoring **4. HOLD LABETALOL FOR ACUTE ASTHMA OR CHF EXACERBATION OR FOR HEART RATE LESS THAN 50 OR FOR RHYTHM OF 2ND OR 3RD DEGREE HEART BLOCK.**
	Initial Diastolic Blood Pressure > **140** **1. Notify MD immediately** **2.** Begin Nicardipine 20 mg in 200ml sodium chloride IV infusion at_____. Increase by 2.5 mg/hr every 15 minutes for MAP of_____. Max rate is 15 mg/hr. **3.** Continuous Blood Pressure Monitoring
	Based on Findings: **No Intervention Indicated:** Return patient to ED for routine care **Intervention Indicated:** Prepare patient for procedure Transfer patient care to IR team Obtain consent IR Physician to call intensivist/hospitalist to transfer care for admission

_____/_____
Date Time **Physician Signature**

DOCTOR'S ORDERS
*** SD40-3***

BOTTOM EDGE OF PATIENT LABEL

REV 02/19; SD40-3

ST. DOMINIC-JACKSON MEMORIAL HOSPITAL
JACKSON, MISSISSIPPI

NIHSS - 3 Columns

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LEFT arm	See above				
Motor- elevate leg to 30 degrees *hold 5 seconds RIGHT arm	0=no drift 1=drift 2=can't resist gravity 3=no effort against gravity 4=no movement				
LEFT arm	See above				
Limb Ataxia *finger to nose *heel to shin	0=absent 1=present in one limb 2=present in both limbs				
Sensory	0=normal 1=partial loss 2=severe loss				
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Dysarthria *read or repeat word list	0=normal 1=mild to moderate dysarthria 2=near unintelligible NT=intubated				
Extinction / Inattention	0=no neglect 1=partial neglect 2=complete neglect				
TOTAL SCORE					
Nurse Signature / Date / Time:					
Nurse Signature / Date / Time:					

NIHSS - 3 Columns

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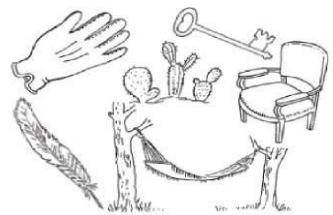
SD650-7

ST. DOMINIC-JACKSON MEMORIAL HOSPITAL
JACKSON, MISSISSIPPI



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MAMA

TIP – TOP

FIFTY – FIFTY

THANKS

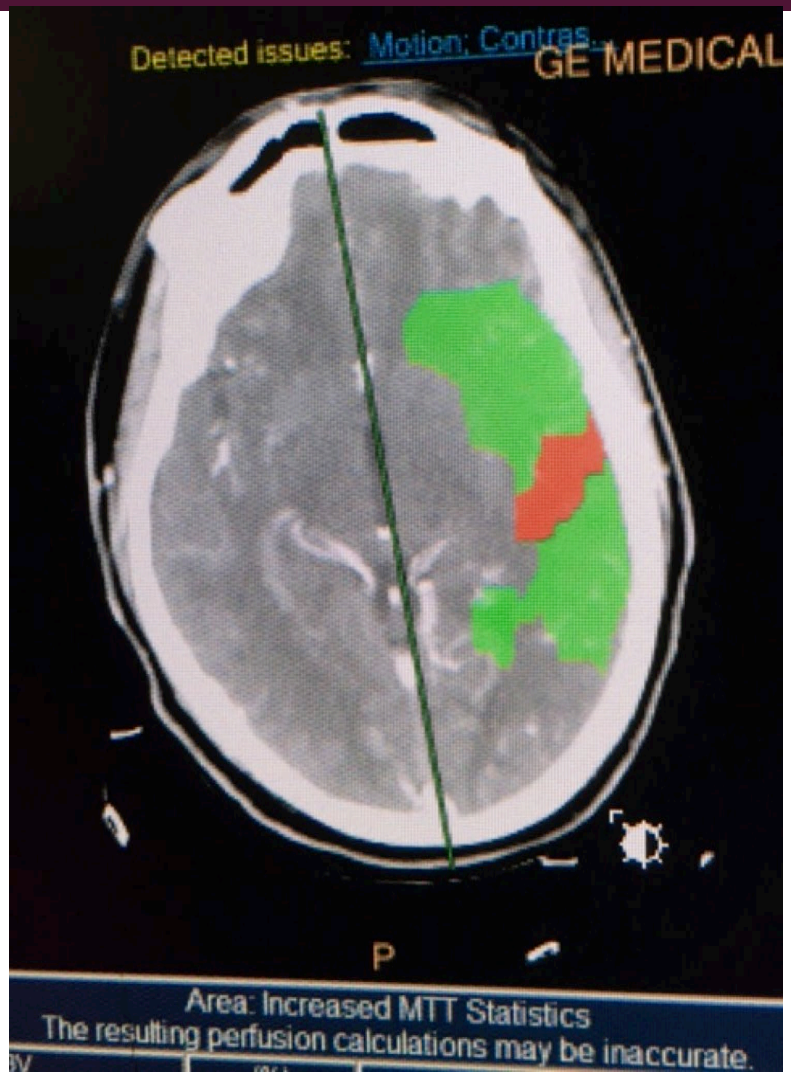
HUCKLEBERRY

BASEBALL PLAYER

PROTOCOL

CASE STUDIES

ANTERIOR CIRCULATION ISCHEMIC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GE MEDICAL
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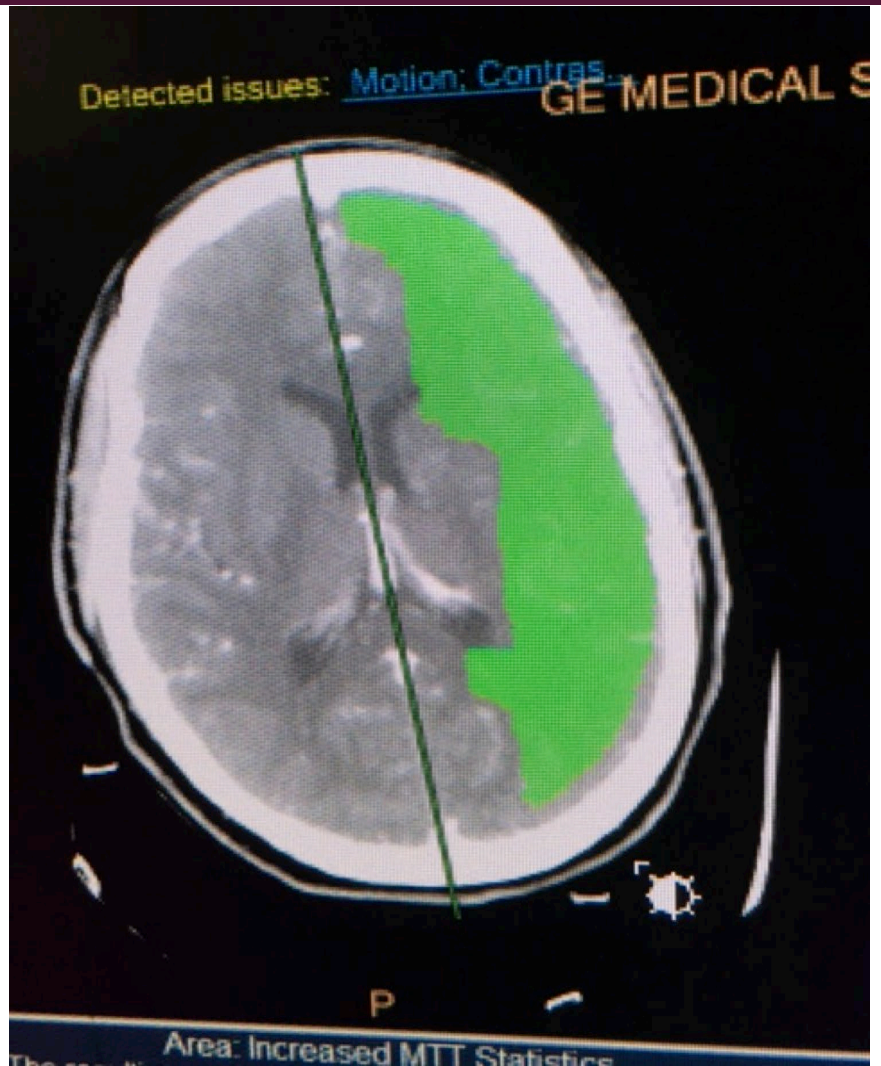
Area: Increased MTT Statistics
The resulting perfusion calculations may be inaccurate.


Detected issues: Motion; Contras
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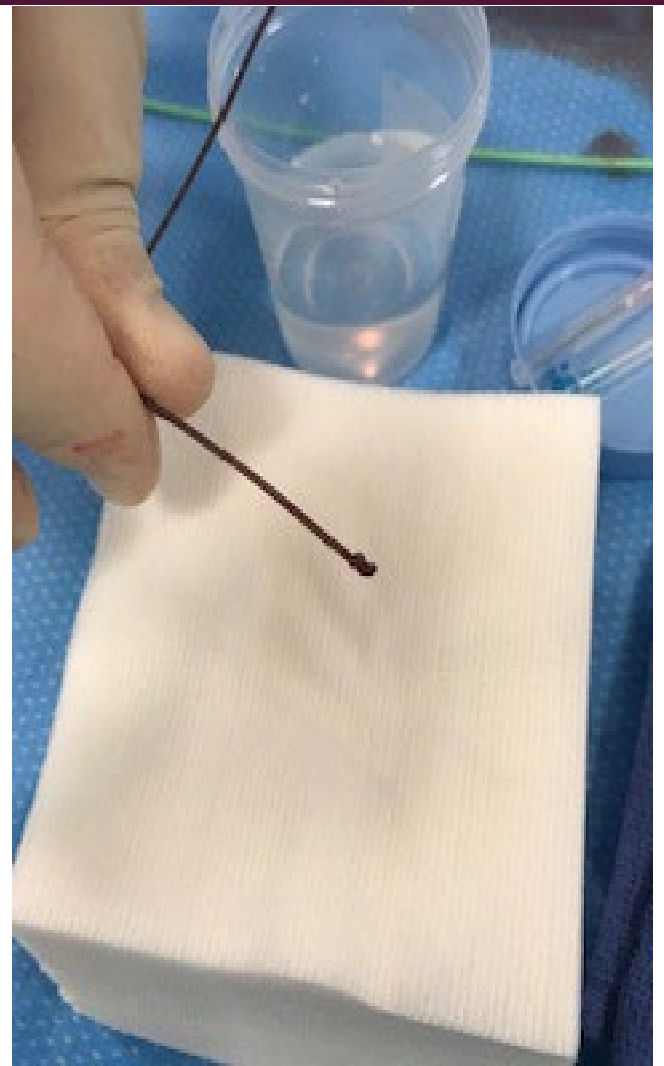
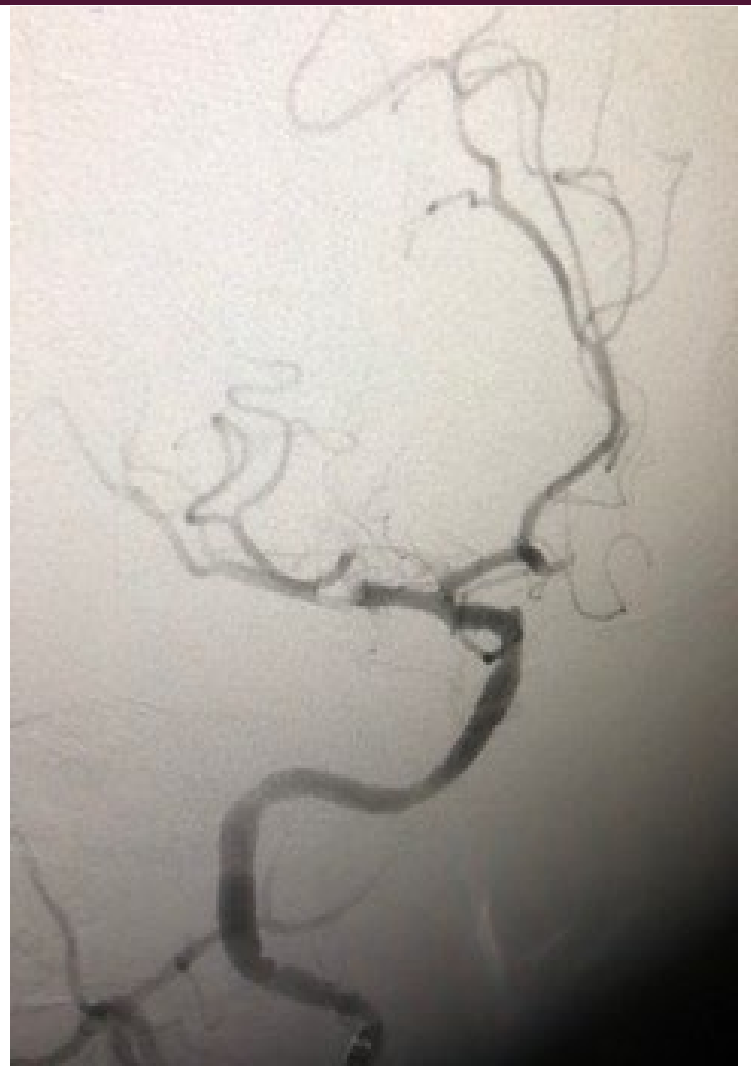
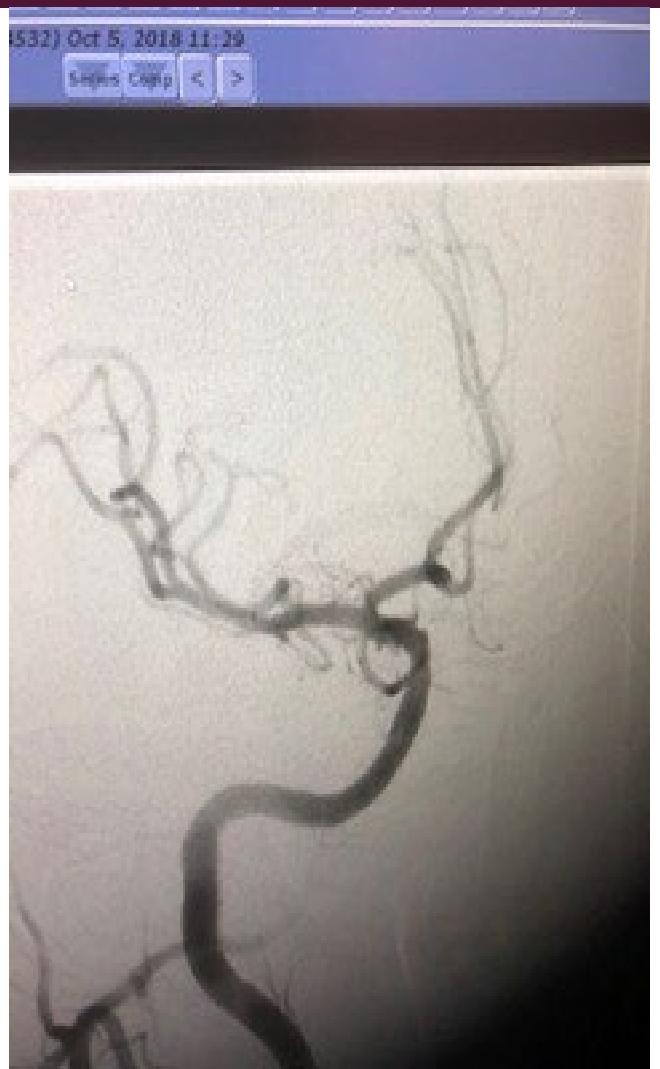
Area: Increased MTT Statistics



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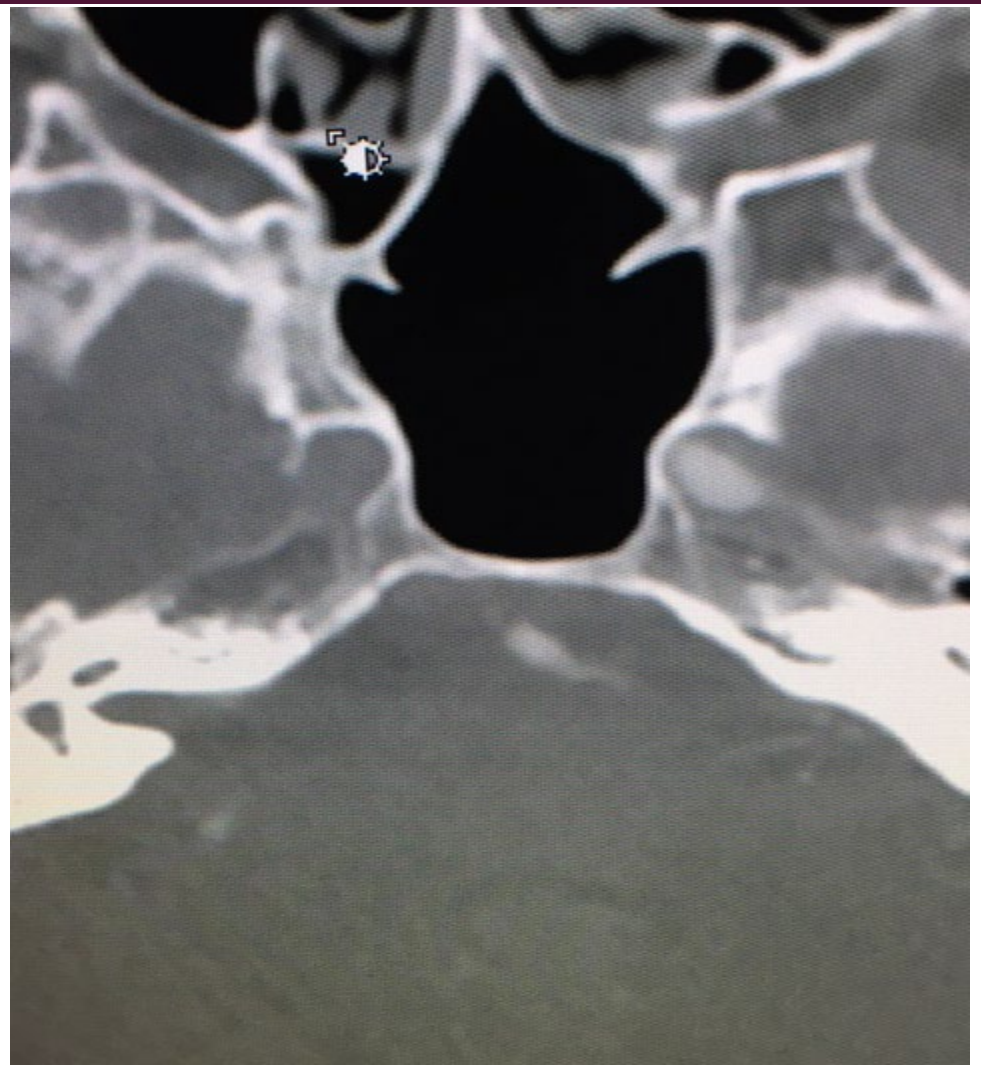
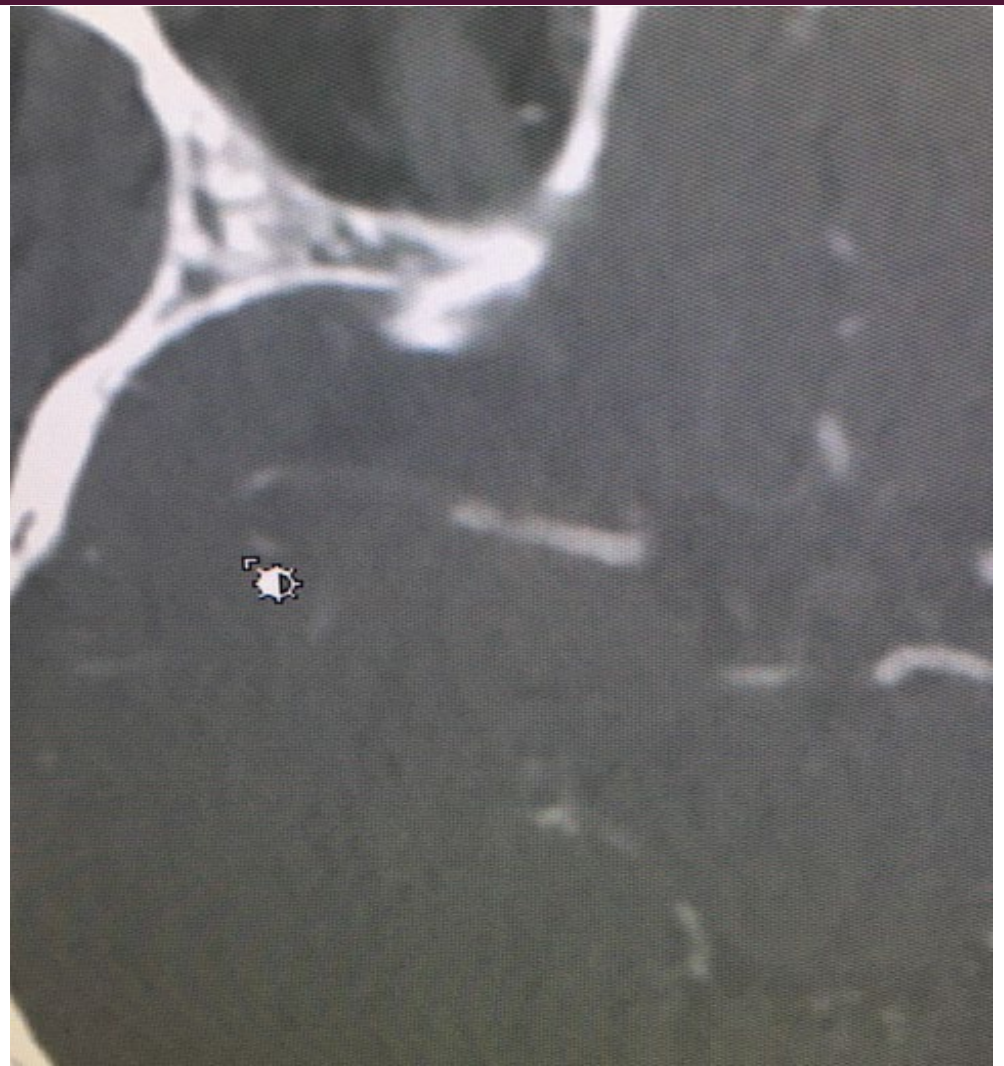
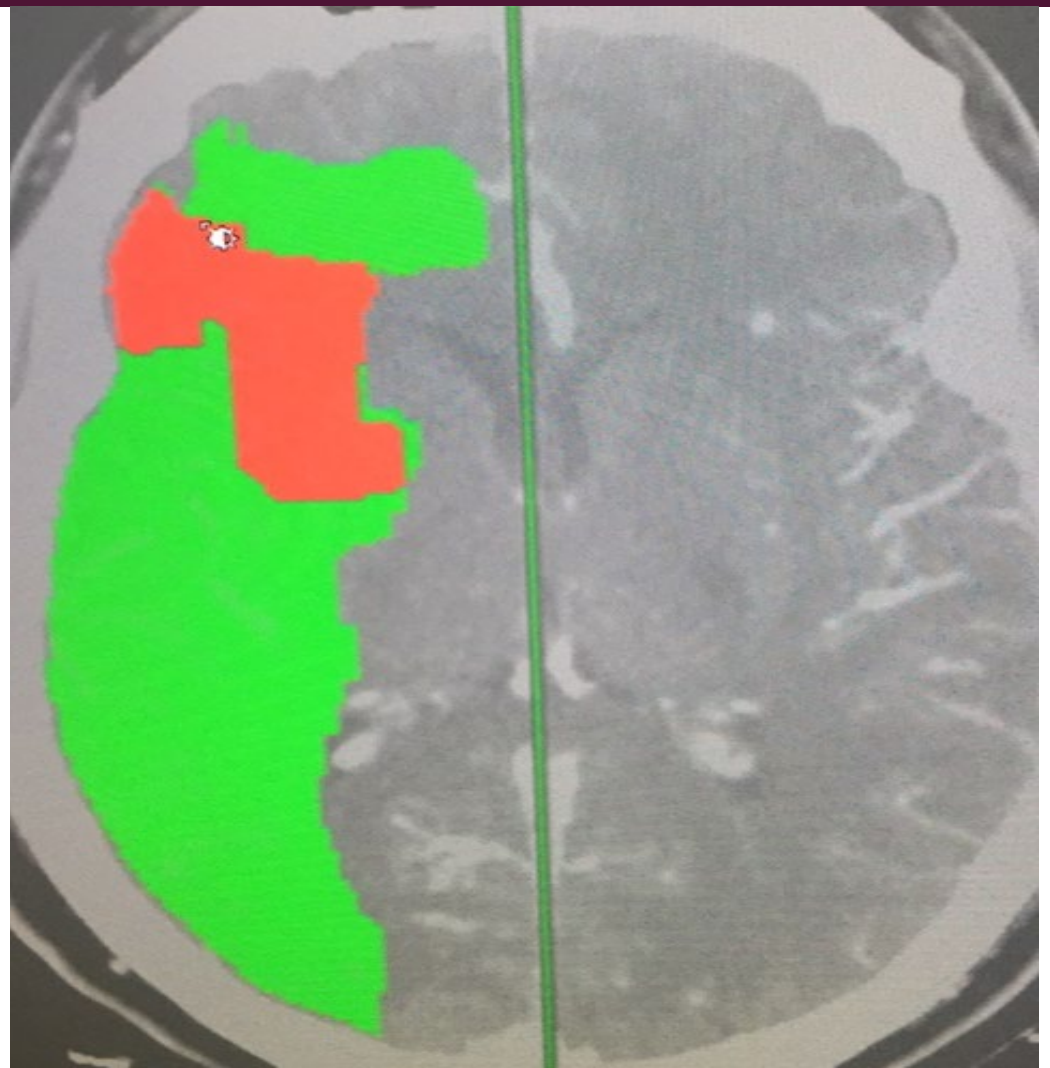
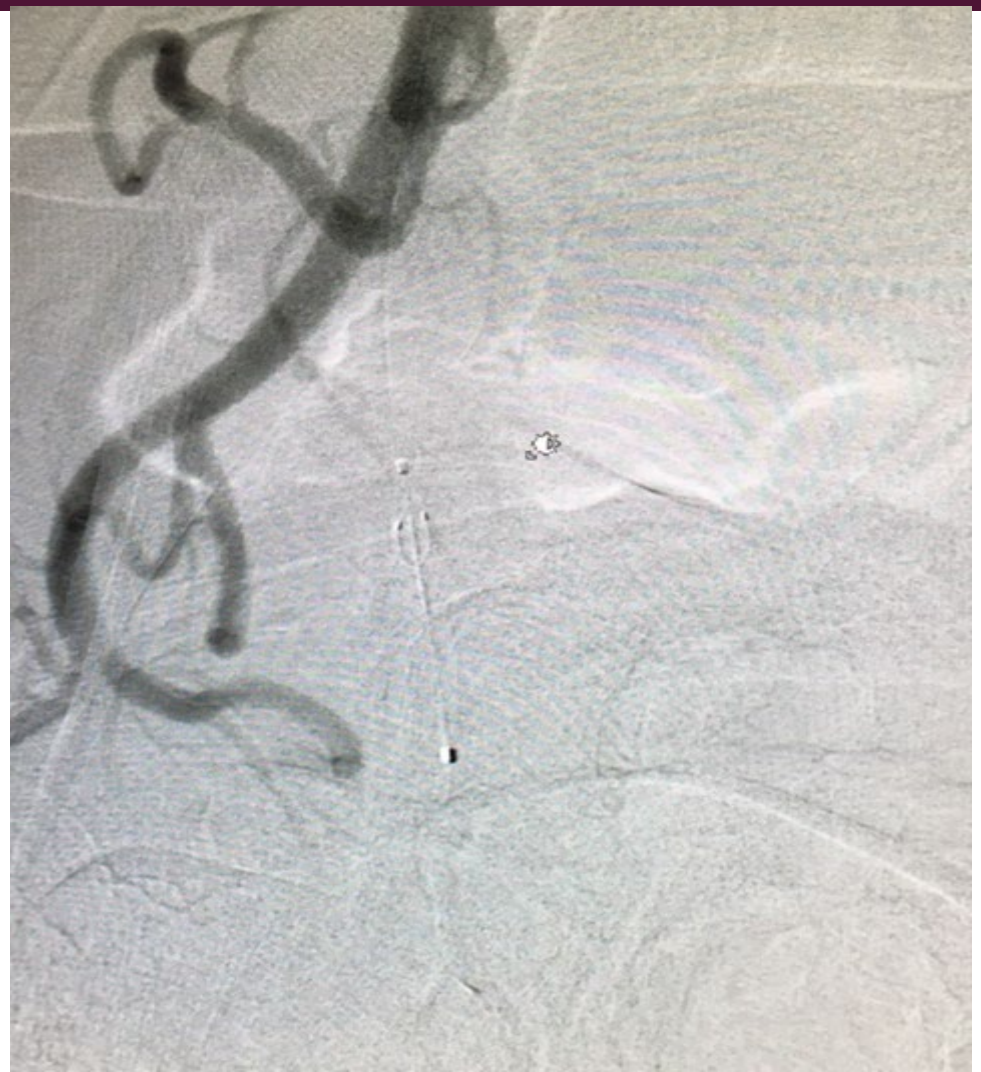
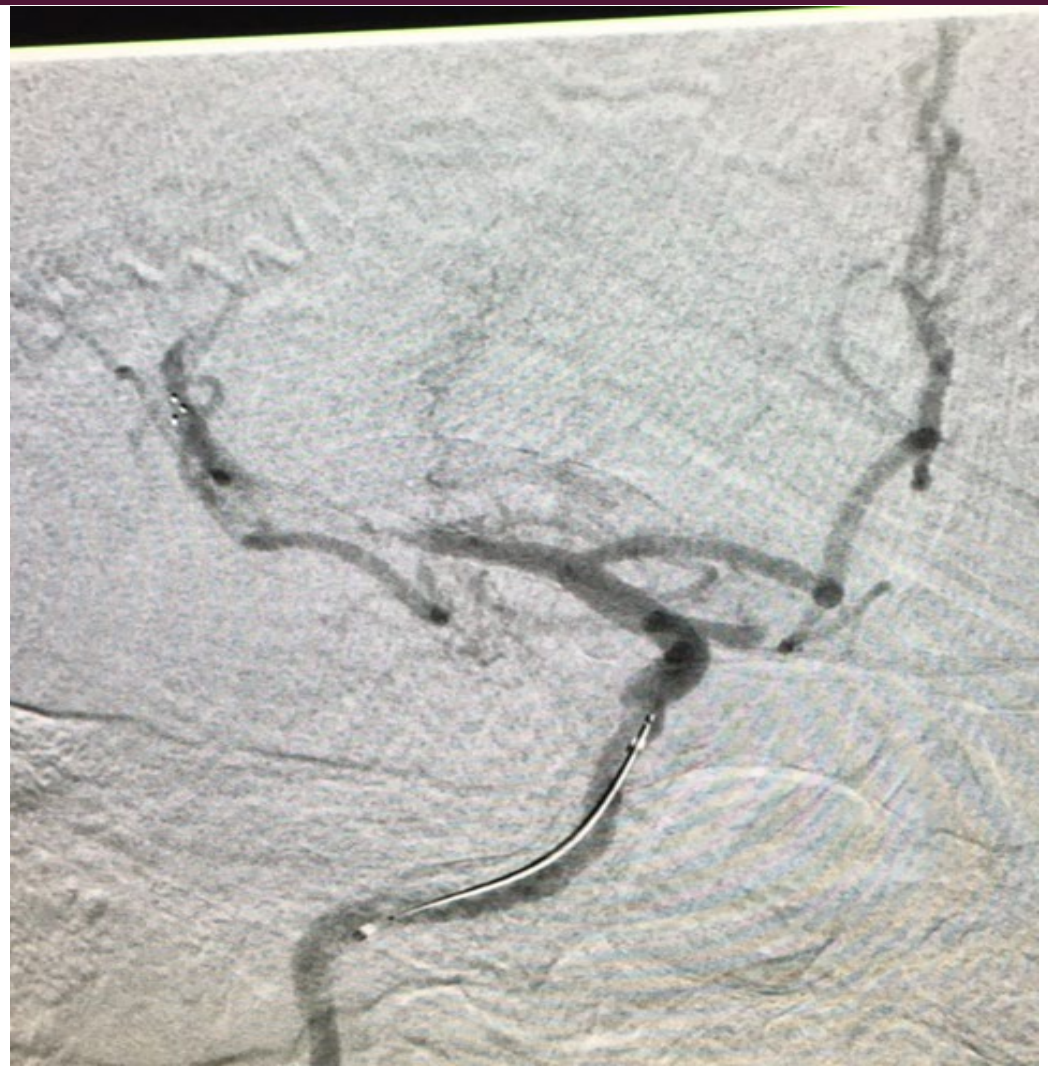
POSTERIOR CIRCULATION ISCHEMIC

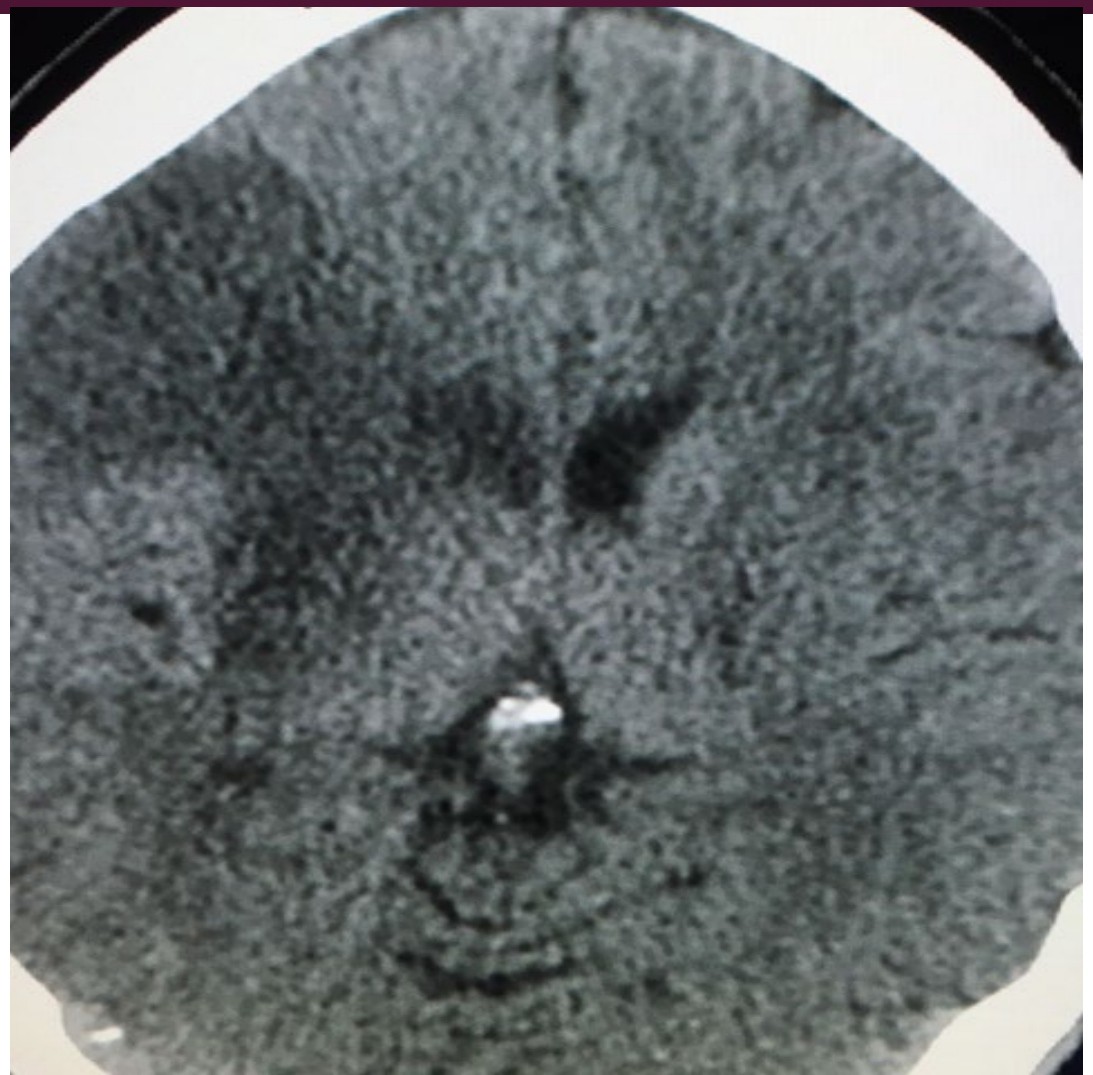


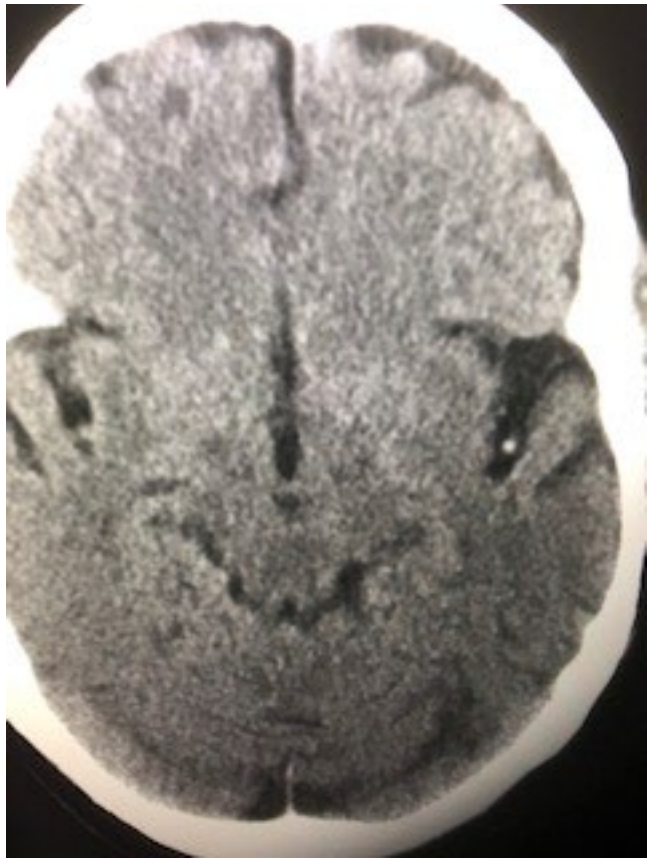


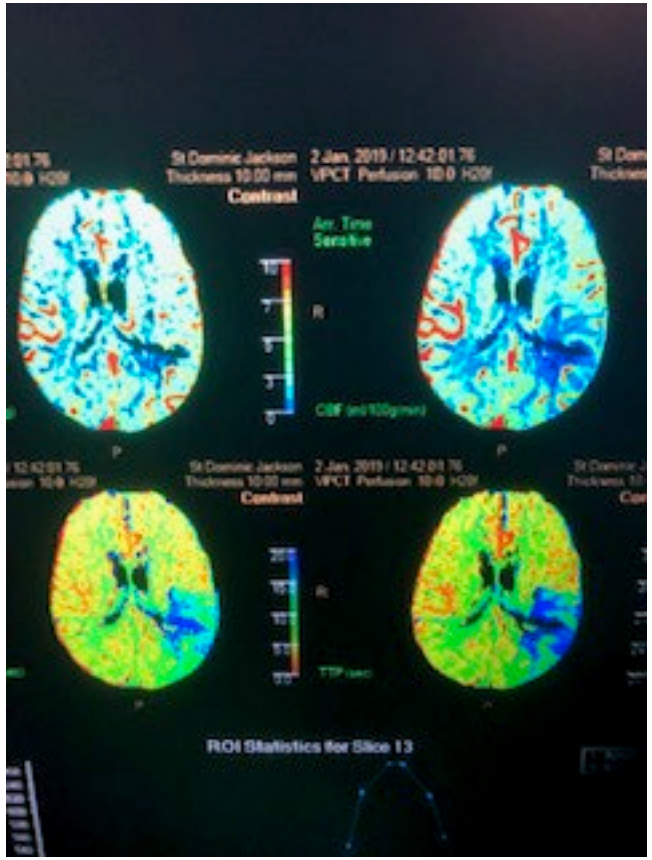








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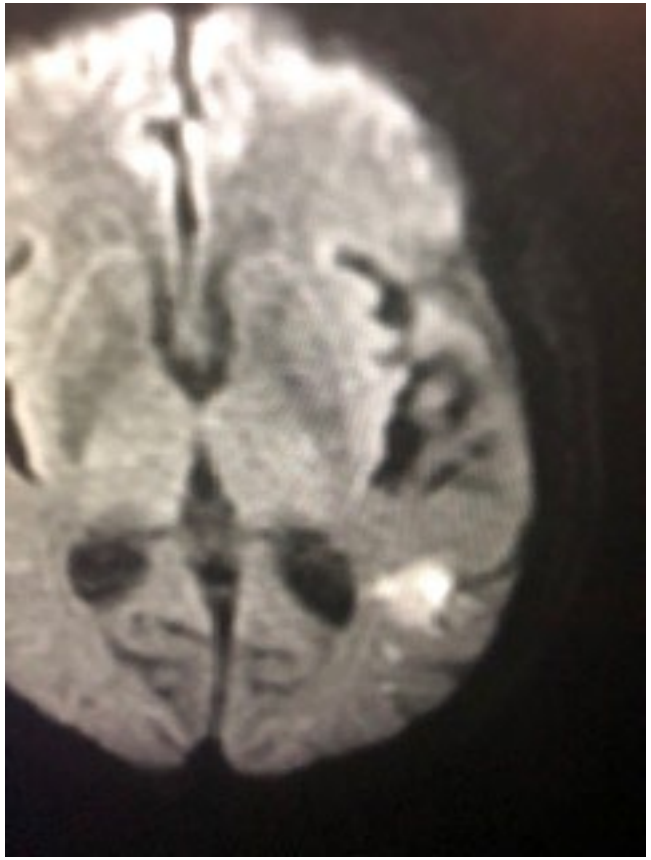
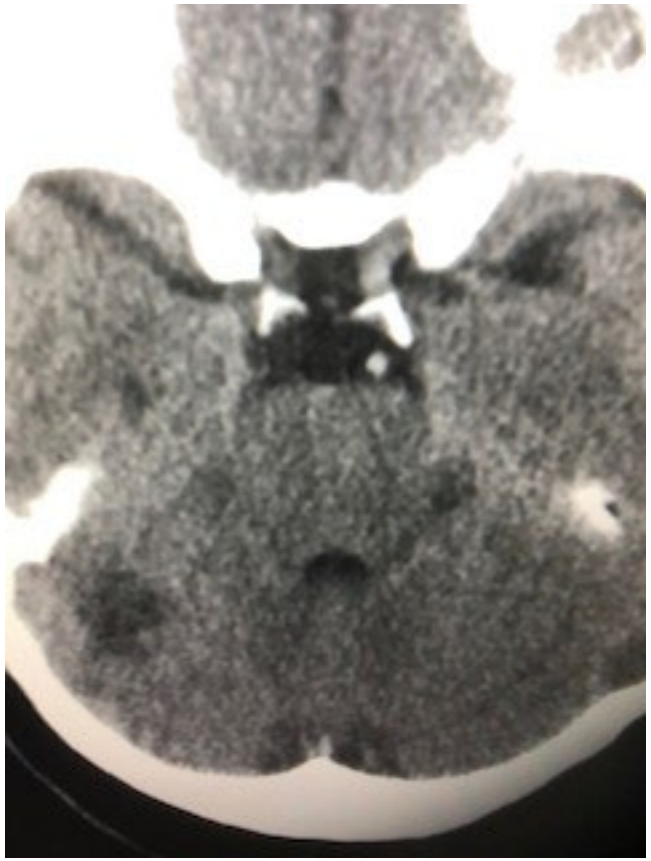
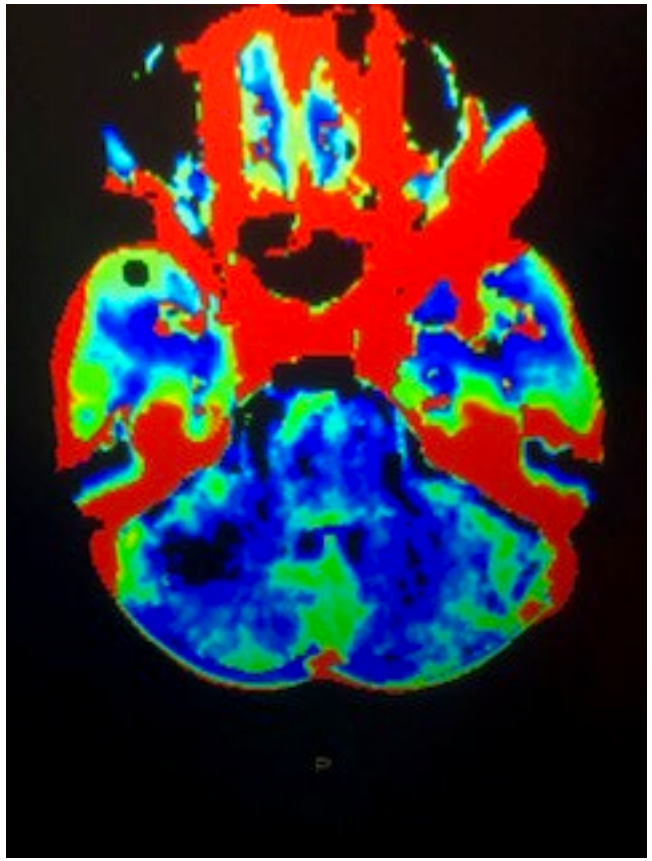
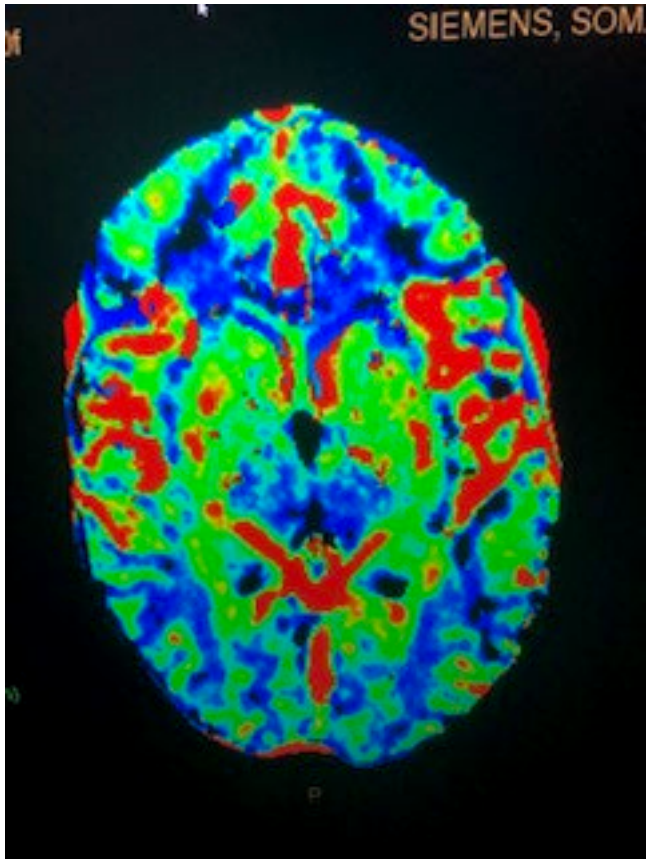
ROI Statistics for Slice 13





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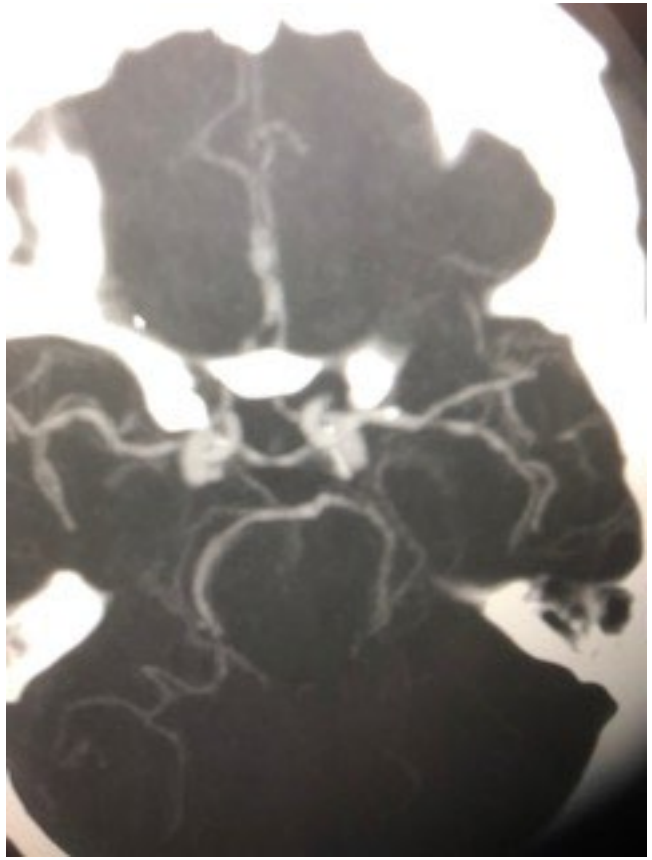

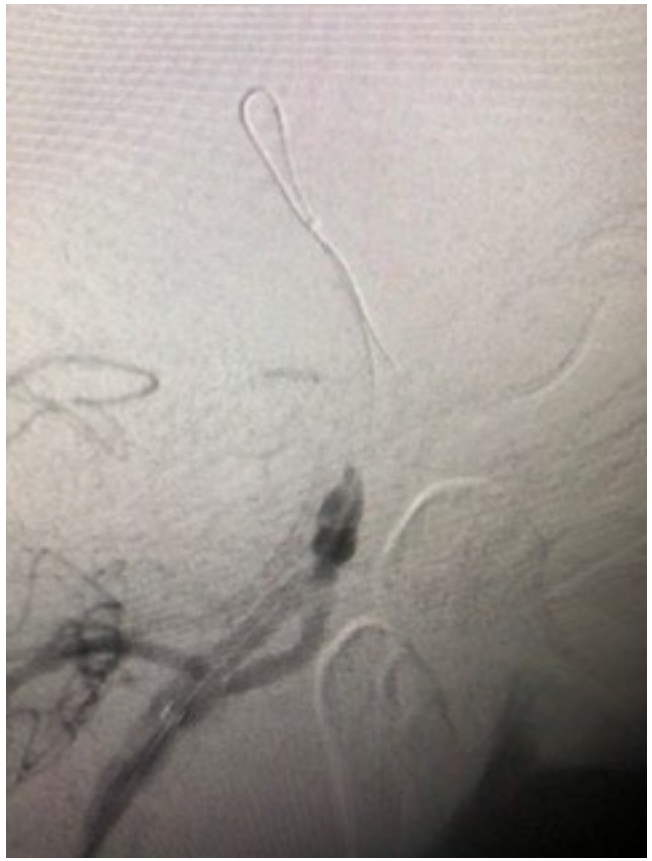

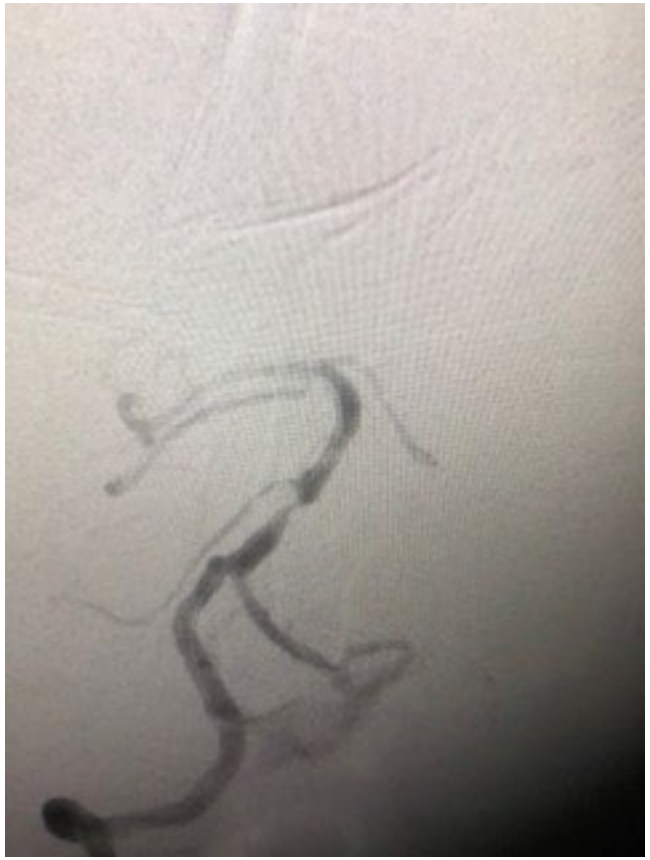

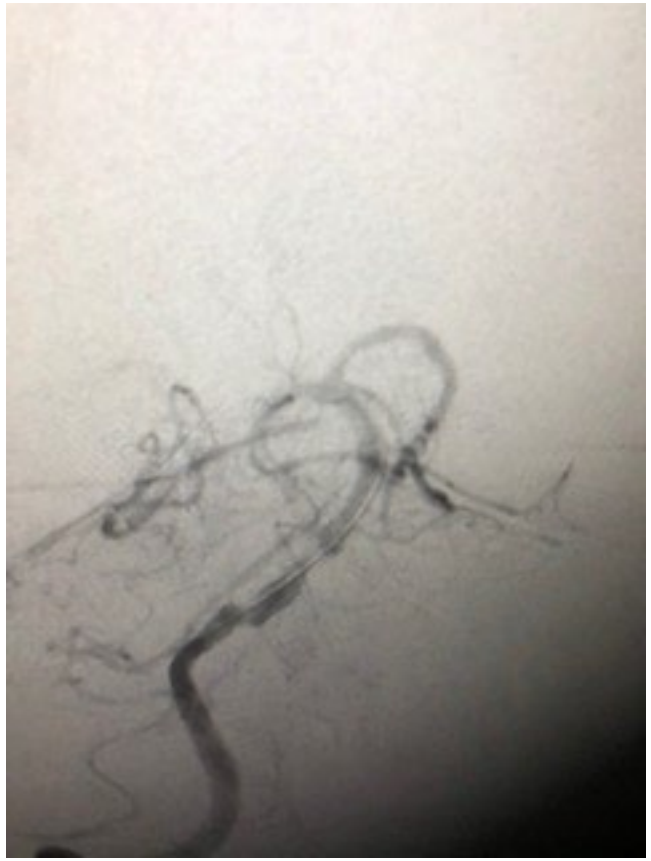


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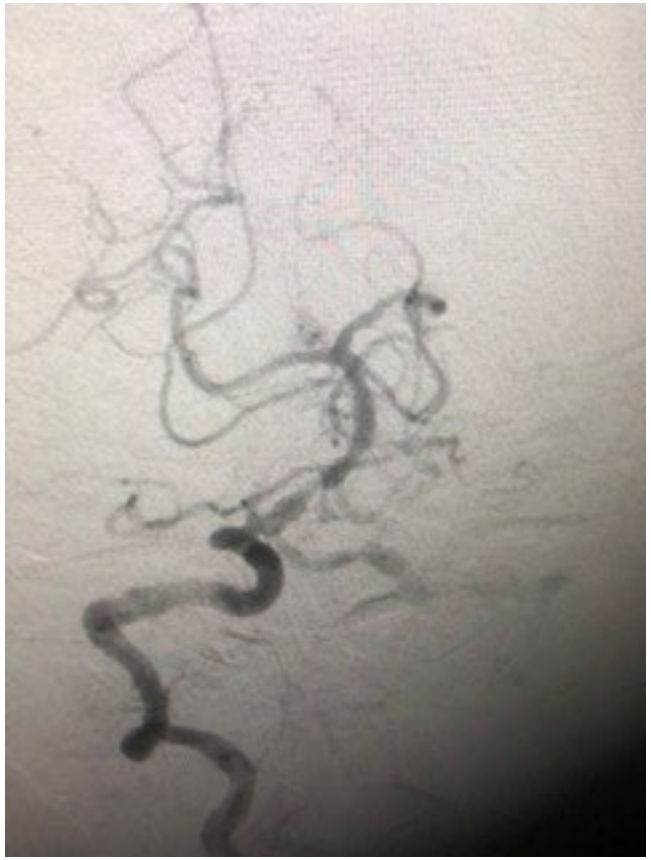

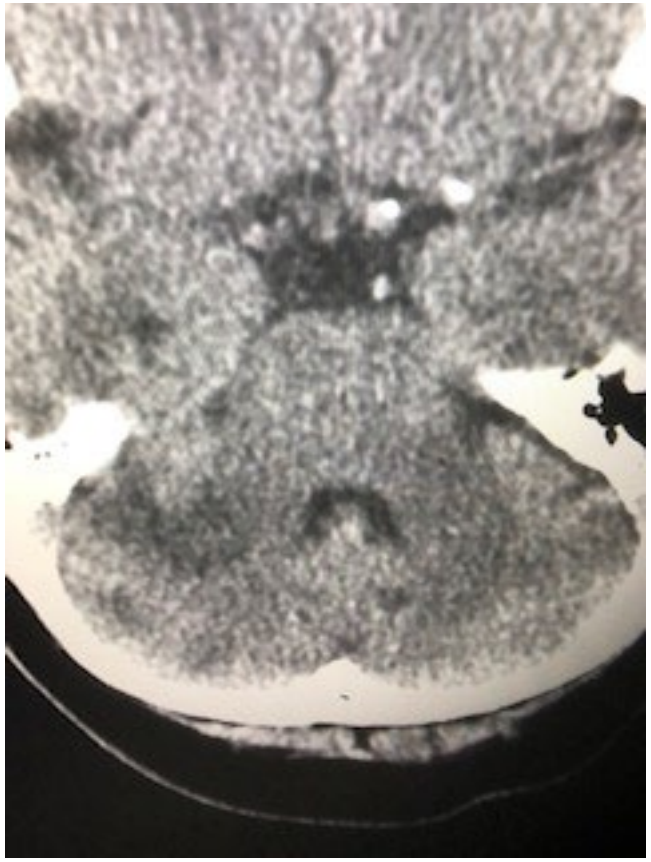

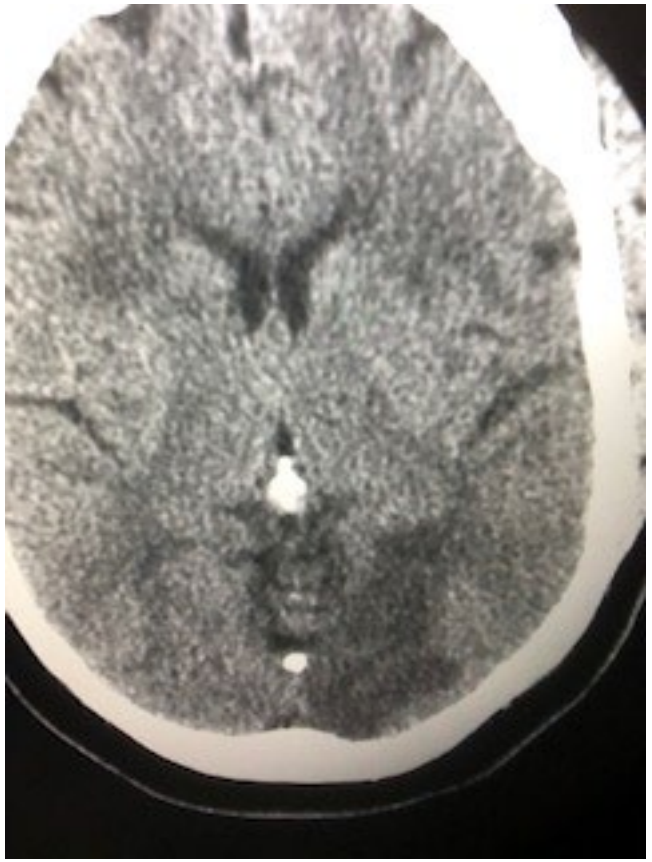

DAWN

DAWN

What about beyond 6 hours?

DAWN Study published 2018 addressed that question.

DAWN

206 patients were studied. Patients had occlusion of intracranial internal carotid artery or proximal middle cerebral artery. Last know well was 6-24 hours. Patients had mismatch between the severity of clinical deficit and infarct volume. Patients randomly assigned to thrombectomy plus standard care or standard care. Endpoint mRS at 90 days.

DAWN

The results again were astonishing. The rate of functional independence was 49% thrombectomy group vs. 13% controlled. (Adjusted difference 2, 95% credible interval 1.1 to 3)

No difference in hemorrhage or morality.

RECENT ENDOVASCULAR TRIALS REVIEW

- In 2015 the HERMES meta-analysis of the 2010-2014 Endovascular acute ischemic trials was published. These studies powerfully concluded Endovascular treatment was superior to standard treatment up to 12 hours after symptoms onset. Dramatic improvement of MRS at 90 days.

- In 2018 DAWN trial proved the improvement extended to 24 hours.

- These studies were of anterior circulation strokes with NIHSS>6 and CT ASPECTS >6. DAWN study also included CT perfusion data.

NEW TRIALS

Large Ischaemic Core Strokes

A prespecified secondary analysis of the SELECT study reviewed ASPECTS <5 and core of >50 cm^3 on CT perfusion. 31% of patients in EVT group achieved independence at 90 days vs 14% of medical treated group.

More studies TESLA (aspects 2-5 within 24 hours) and TENSION (aspects 3-5 within 12 hours), SELECT 2 (aspects 3-5, core >50cm^3) and others have confirmed this data.

Posterior Circulation

Initial trial BASICS revealed slightly favorable outcomes of EVT vs medical management. The BAOCHE and ATTENTION trials did reveal substantial benefit with BAOCHE trial stopped due to interval analysis strongly favoring EVT.

EVT data at 90 days was MRS 0-3 46% and mortality 37%. Bad disease.

Mild stroke with Proximal Occlusion

LVO but mild NIHSS of 0-5

No randomized data. Outcomes observational appear to be similar in medical and EVT groups.

TANDEM LESIONS

No randomized study.

Newer data from EVT studies shows the use of extracranial stenting (with need of antiplatelets) is associated with better reperfusion without excess risk of sICH mortality when compared to original HERMES data.

Distal Medium-Vessel Occlusion

Meta-analysis of HERMES data confirms proximal M2 segment occlusions benefit from EVT.

No randomized data for anterior cerebral, M3, PCA.

QUESTION

What is the time frame for IR Stroke Treatment?

ANSWER

- ☐ 4 Hours
- ☐ 8 Hours
- ☐ 24 Hours

CORRECT ANSWER

- ☐ 4 Hours
- ☐ 8 Hours
- ☑ 24 Hours