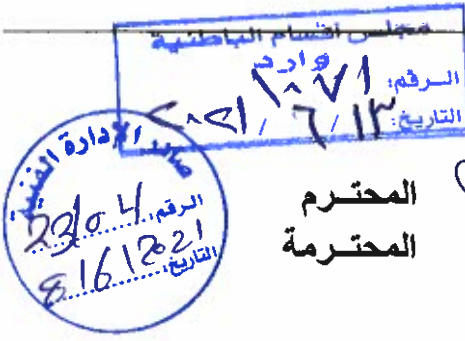


2021 / 6 / 2 م



مجلس أقسام التصوير الطبي
الرقم: ٢٦٣
التاريخ: ٢٠٢١ / ٦ / ١١

المحترم
المحترمة

السيد / الوكيل المساعد للشئون الفنية
بواسطة السيدة / رئيسة مجلس أقسام التصوير الطبي

تحية طيبة وبعد ،،

الموضوع : مقترح بروتوكول للبدء بخدمة علاج الجلطات الدماغية بالأشعة التداخلية

نقدم لكم مقترح بروتوكول للبدء بخدمة علاج الجلطات الدماغية بالأشعة التداخلية في قسم التصوير الطبي في مستشفى ابن سينا وذلك مبدئياً على نطاق محدود كما هو مبين في البروتوكول وحتى يتم التأكد من سلامة الخدمة حيث أنها تتطلب تضافر جهود عدة أقسام وخدمات طبية بدءاً من وصول المريض إلى المستشفى العام ثم نقله إلى مستشفى ابن سينا خلال ستة ساعات من بداية الأعراض .

وتفضلوا بقبول فائق الشكر والاحترام ،،،

رئيسة قسم التصوير الطبي - م. ابن سينا

د. لمياء الصراف

د. لمياء أحمد الصراف
الزمالة الأيرلندية / الزمالة الأمريكية
رئيسة قسم التصوير الطبي ابن سينا

بمعهد الجراحات
د. محمد عبد العزيز الجارالله
رئيس مجلس أقسام الباطنية
مركز صباح الأحمد للقلب
MP. EDCC ABIM. FACC

رئيس مجلس أقسام التصوير الطبي
2021 / 6 / 2

المرفقات :

- بروتوكول علاج الجلطات الدماغية بالأشعة التداخلية Pilot Study Protocol
- بروتوكول الأشعة Diagnostic Imaging Protocol For Acute Thrombotic Stroke within 6 Hours window.
- قائمة تفقدية Check List قامت بإعدادها الدكتورة / عذاري سالمين
- تعليمات الدخول للمستشفى لمرضى الجلطات الدماغية (مستشفى جابر الإحسان)
Jaber AlAhmed Hospital Admission orders

Annex



Diagnostic imaging protocol for acute thrombotic stroke within 6hr window

- Patients with acute neurological deficit suggestive of stroke within 6 hours of onset of symptoms (last seen well) should be imaged immediately with the stroke protocol:
 - **Non-enhanced CT (NECT)**
 - **CT angiography : from the arch of aorta to circle of Willis**
 - +/- CT perfusion : in centers which have the facility for CT perfusion, it is encouraged to do it in preparation for phase 2 of the mechanical thrombectomy service.

- Aim of imaging :
 - R/O hemorrhage and stroke mimics.
 - Calculate ASPECT score.
 - Detect candidates for IV thrombolysis (4.5 hrs time window).
 - Determine if candidate for endovascular thrombectomy interventional procedure : large vessel occlusion (ICA, M1, M2, Basilar artery)

- For non-kuwaitis, the study should not be delayed to get cashier stamp. Payment can be settled later.

- Imaging should not be delayed for pre-imaging renal function test. Point of care RFT maybe done.

- Imaging should not be delayed for allergy preparation. In case of known allergy : 200mg IV hydrocortisone prior to scanning.

- Consent for contrast: If next of kin is not available to sign the consent, then 2 treating physicians (senior registrar and above) can sign it.

- Post procedure imaging (next day either in Ibn Sina hospital or mother hospital):
 - NECT
 - CTA

السيد رئيس مجلس الامم الاستشارية
دكتور عبد البروكو
دكتور محمد بن فراج الطبري
رئيس دائرة الصحة العامة للشؤون الصحية

Dr. Lamyia AlSarraf
Consultant Neuroradiologist
Head of Medical Department
Ibn Sina Hospital

د. لمياء احمد الصارح
مستشارة الاشعة العصبية
رئيسة قسم الاشعة العصبية
في مستشفى ابن سينا

Acute ischemic stroke thrombectomy service Pilot study protocol

Background and purpose:

The aim of this document is to describe the steps required to establish an endovascular thrombectomy service in Kuwait. At the moment, due to lack of comprehensive stroke center in Kuwait, we advocate the start of the service in a "drip and ship" model. Ibn Sina hospital is equipped to be a hub for endovascular thrombectomy service as it is the only center in Kuwait with neurointerventional radiology unit as well as neurosurgical coverage

Protocol/Recommendations

Imaging

- Primary stroke centers need to be defined. Initial phase to include Al-Amiri, Alfarwaniya and Alsabab hospitals
- The emergency department of primary stroke center receives patients with acute stroke
- Stroke protocol is activated by a neurologist with complete assessment and NIHSS, followed by full stroke imaging protocol
- Aim of imaging:
 - Rule out hemorrhage and mimics of stroke
 - Calculate ASPECT score
 - Detect candidates for IV thrombolysis (4.5 (±9) h time window)
 - Determine if candidate for endovascular thrombectomy (0-6 h time window)
- Imaging protocol
 - Non-contrast CT head
 - CT angiography arch to vertex (neck and COW)
 - +/- CT perfusion
- Imaging should not be delayed for pre-imaging renal function test or allergy preparation. Point of care RFT may be done.
- Stroke analysis softwares are needed for faster and more accurate triaging of candidates for endovascular thrombectomy.

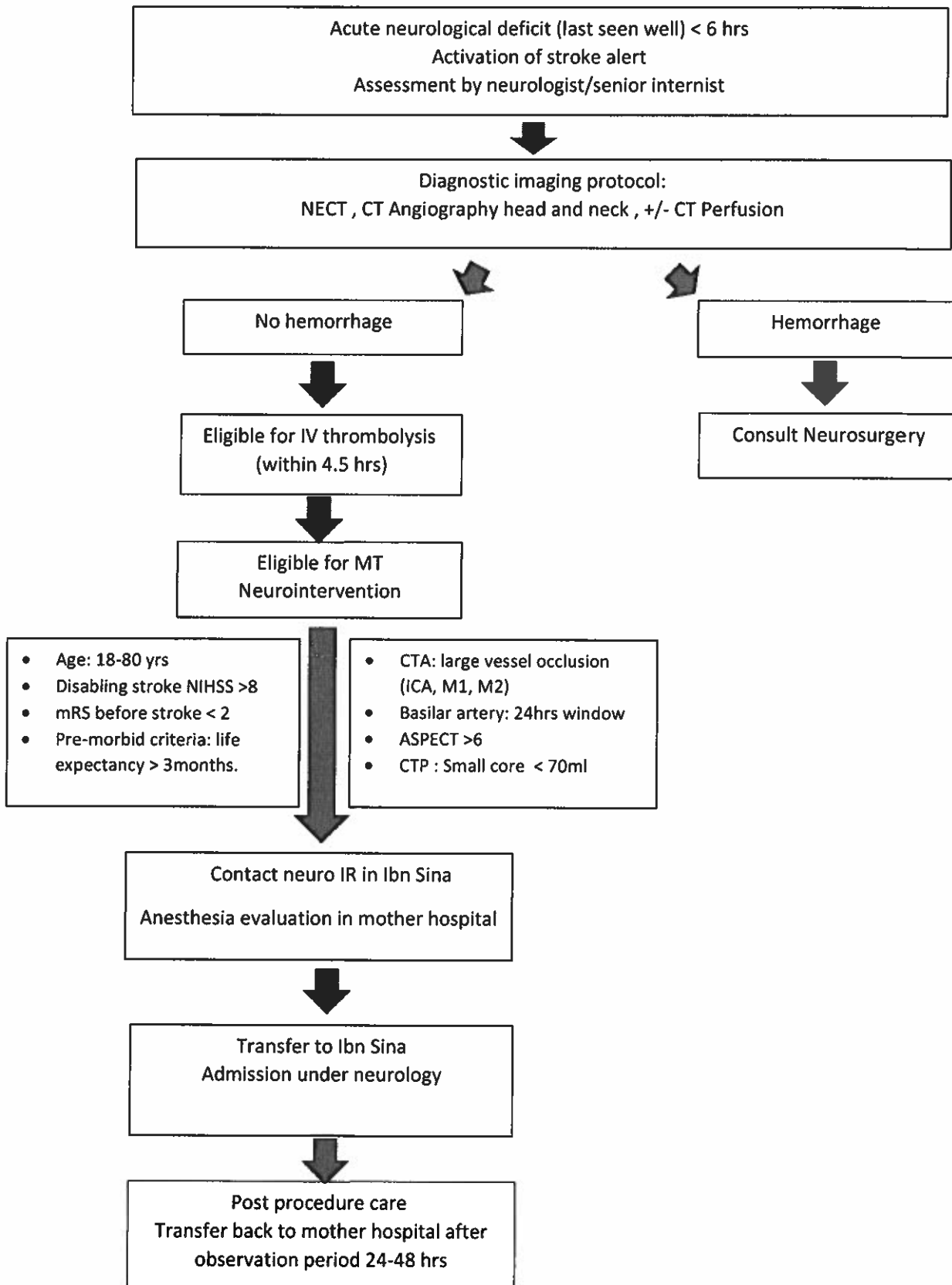
- IV tpa given at the discretion of treating neurologist.
- Neurointerventional radiologist is contacted to discuss the case. Once a patient has been determined to be candidate for endovascular thrombectomy (see inclusion and exclusion criteria), immediate transfer to Ibn Sina hospital is arranged. Neurologist oncall in Ibn Sina is contacted to arrange admission.
- Obtain consent. A dedicated consent for stroke patients includes :
tPA, consent for contrast , consent for transfer and thrombectomy.

	<p>If Next of Kin is not available to sign the procedure, then 2 treating physicians (senior registrar and above) can sign. The consent is co-signed by interventional radiologist once patient arrives.</p>
Anesthesia	<ul style="list-style-type: none"> ● Prior to transfer, anesthesia doctor in the referring hospital should perform a quick and proper assessment and optimize as much as possible within the available time frame. That includes: <ul style="list-style-type: none"> ○ fill out the anesthesia sheet ○ obtain anesthesia consent as an emergency procedure ○ contact anesthesia doctor oncall in Ibn sina hospital to handover.
Transfer	<ul style="list-style-type: none"> ● Dedicated ambulance should be allocated for such transfer. Transfer team in the ambulance to include one doctor (preferably anesthetist) and one nurse. ● The patient is received by neurologist oncall once arrived in Ibn sina hospital and immediately shifted to the Angiography suite. Specific tasks include: re-assess NIHHS score prior to the procedure, enter requests for Angio/thrombectomy , and post op imaging, and complete admission papers.
Procedure	<ul style="list-style-type: none"> ● The procedure is prioritised over others. ● Neurointerventional team (neurointerventional radiologist, technologist, nurse) are ready to perform Mechanical thrombectomy under GA. ● Anesthesia to implement safe GA protocol for acute stroke patients i.e. blood pressure target to remain above 140/90, management of rapid Afib, seizure/agitation... etc, according to the patient's co-morbidities.
Post procedure	<ul style="list-style-type: none"> ● Post procedure care: <ul style="list-style-type: none"> ○ Admission of the patient under neurology service in Ibn Sina for 24-48 hrs according to the following scenarios: <ul style="list-style-type: none"> ▪ Low risk patient : to be admitted to HDU (high dependency unit) in the neurology ward. ▪ High risk patient (Progressive worsening consciousness level, need for intubation and ventilation, hemodynamic instability) : ICU. ▪ In case of non-availability of beds in Ibn Sina : the patient to be shifted back to referring hospital once stabilised after the procedure with the accompanying doctor for further management. ○ Protocol for post procedural anticoagulants and antiplatelets to be decided by neurologist and interventional radiologists according to each case. ○ Follow up imaging: NCCT + CTA the next day. ○ SLP for swallow assessment. ● Once the observation period for re-bleed has ended and the patient is stable, he/she will be shifted to mother hospital for continued treatment.

Inclusion and Exclusion Criteria	<ul style="list-style-type: none"> ● Inclusion criteria <ul style="list-style-type: none"> ○ Ischemic stroke with NIHSS \geq 8 ○ ASPECT score \geq 6 ○ Large vessel occlusion: ICA, M1 or M2, basilar artery. ○ Time window between 0 – 24 h for posterior circulation. ○ Basilar artery occlusion can be considered case based. ○ mRS before stroke < 2. ○ Premorbid condition criteria: life expectancy greater than 3 months. ○ Age 18-80 yrs ● Exclusion criteria <ul style="list-style-type: none"> ○ ASPECT < 5 anterior circulation ○ Extensive brainstem lesion ○ Neurologic improvement following IV therapy (patient then will have repeated CTA and neurologic monitoring in case of deterioration) ○ Previous high level of dementia or high level of dependency
---	--

This document was Prepared by	Dr. Lamyia Alsarraf	Head of medical imaging department	د. لمياء احمد الصراف الزمالة الأجنبية / الزمالة الأمريكية رئيس قسم التصوير الطبي ابن سينا
Contributions from	Dr. Petar Bosnjakovic/ Dr. Lazar Lazovic	Interventional neuroradiology unit	Dr. Petar Bosnjakovic Consultant Interventional Radiology د. بيتار بوسنجاكوفيك استشاري أشعة تدخيلية DR. LAZAR LAZOVIC Senior Registrar
Contributions from	Dr. Athary Salmeen	Neurology specialist	د. عذاري خالد IBN SINA HOSPITAL Dr. Athary Salmeen stroke neurologist, FRCP senior registrar neurology Jaber Al-Jaber Hospital
Contribution from and Approved by	Dr. Ahmad butaiban	Head of anesthesia and ICU department	
Approved by	Dr. Reyad Khan	Head of neurology department	د. رياض احمد خان رئيس قسم أمراض الجهاز العصبي مستشفى ابن سينا
Approved by	Dr. Abbas Ramadhan	Director of Ibn Sina hospital	دكتور عباس رمضان مستشفى ابن سينا مستشفى ابن سينا التخصصية

Acute Stroke Algorithm (onset less than 6 hrs)



References

Guidelines for the early management of patients with acute ischemic stroke: 2019 Update to the 2018 guidelines for the early management of acute ischemic stroke: a guideline for healthcare professionals from the American Heart Association/American Stroke Association. Williams. Powers et al. stroke. Dec 2019. Vol 50. Issue 18

Stroke mechanical thrombectomy. Building thrombectomy systems of care in your region; why and how. A white paper. Society of vascular and interventional neurology. Oct 2020

Time is brain-quantified. Jeffrey L. Saver. Stroke. Volume 37. Issue 1, 1 January 2006

Canadian Stroke Best Practice recommendation. Acute stroke management: prehospital, emergency department, and acute inpatient stroke care. Boulanger JM et al. July 2018

Indications for thrombectomy in acute ischemic stroke from emergent large vessel occlusion. Report of the SNIS standards and guidelines committee. Mokin et al, 2019

European Stroke Organization guidelines on intravenous thrombolysis for acute ischemic stroke. Berge et al. 2020

ESO-ESMINT guidelines on mechanical thrombectomy in acute ischemic stroke. Turc et al. 2019

Name:
Civil ID:

Home hospital:
Neurologist name/ number:

Check List
Focal Neurological Deficit with Last Seen Well Within 6 Hours

- Vitals: BP: _____ P: _____ regular irregular T: _____ SPO2: _____
- Glucose check: _____ mmol/L
- Blood work: CBC, RFT, coagulation profile, troponin
- ECG
- x2 IV large bore

All patients

Last seen well (time and date of onset) :

- History
 - Age: _____ years
 - Risk factors :
 - Pre-morbid mRS:
 - Life expectancy > 3 months Yes No
- Examination
 - NIHSS: _____
- CT head non contrast CTA arch to vertex

IV thrombolysis

0 – 4.5 h

4.5 – 6 h

- | | |
|---|--|
| <ul style="list-style-type: none"> • See IV thrombolysis order sheets (<i>IV tpa is not contraindication to proceed with mechanical thrombectomy</i>) • Consent | <ul style="list-style-type: none"> • Can apply EXTEND trial (9 hour window based on CT perfusion if no planned thrombectomy) • Consent |
|---|--|

Performance measures (hr and date dd/mm/yyyy)

- Time of ED arrival: _____
- Neurology contact time: _____
- Radiology contact time: _____
- Neuroimaging completion time: _____
- Door to needle (time of tpa initiation) : _____

Mechanical thrombectomy

A. Pre-procedure

Age 18-80 yrs
 mRS < 2
 NIHSS ≥ 6
 Last seen well 0 – 6 h (*24h for basilar artery occlusion*)
 Imaging: ASPECTS ≥ 8 on NCCT and large vessel occlusion (M1, M2, intracranial ICA, basilar artery)
 Contact IR ibn Sina
 Contact anesthesia
 Contact ambulance
 Consent (contrast, thrombolysis, mechanical thrombectomy, anesthesia)
 Prepare for transfer: accompanied nurse, doctor, connected to telemetry, stroke kit

Name:
Civil ID:

Home hospital:
Neurologist name/ number:

B. Intra-procedure	<p>Performance measures (hr and date dd/mm/yyyy)</p> <ul style="list-style-type: none">• Ibn Sina contact time: _____• Femoral puncture time: _____• Recanalization time: _____• mTICI score <input type="checkbox"/>3 <input type="checkbox"/>2b <input type="checkbox"/>2a <input type="checkbox"/>1 <input type="checkbox"/>0• NIHSS post procedure: _____
C. Post-procedure (see index)	<p><u>Watch for</u></p> <ul style="list-style-type: none">• Contrast allergy• Airway control, oxygenation and sedation• Hypertension and blood pressure variability• Arterial access site complications• Vessel injury, vasospasm, device retention• Temperature dysregulation, arrhythmias <p><u>Watch for</u></p> <ul style="list-style-type: none">• Contrast allergy• Airway control, oxygenation and sedation• Hypertension and blood pressure variability• Arterial access site complications• Re-occlusion• Hemorrhage and edema• Temperature dysregulation, arrhythmias• Infection, stress ulcers, pressure ulcers, peripheral venous thrombosis, fall risk• Timing of extubation, tracheostomy, PEG• Prognosis and rehabilitation <p>Complete admission sheet (see index)</p> <p>Transfer back to mother hospital</p> <p>Performance measures</p> <ul style="list-style-type: none">• NIHSS after 24h: _____• CT non contrast 24 h: <input type="checkbox"/> Symptomatic SAH/ICH <input type="checkbox"/> Asymptomatic SAH/ICH <input type="checkbox"/> No bleed• CT angiography

Thrombotic Stroke admission orders:
Date: _____ Neurology responsible: _____ Medical team responsible: _____
Time patient was last seen well: _____ Time of alteplase (tpa administration): _____ NIHSS score: _____
Diet <input type="checkbox"/> Swallow assessment after 3 hours of thrombolysis (or in morning) <input type="checkbox"/> NPO until completion of dysphagia screen ○ See intravenous fluids for maintenance hydration <input type="checkbox"/> If pass swallow assessment <input type="checkbox"/> Diet as tolerated: type: _____ <input type="checkbox"/> Nutritionist consult for diet modification for secondary prevention
Activity <input type="checkbox"/> Bed rest for 24 hours post thrombolysis <input type="checkbox"/> Head of bed 0 (ischemic stroke/TIA and not at risk of aspiration or desaturation) <input type="checkbox"/> Head of bed 30 degrees (refractory high blood pressure, large completed ischemic stroke, elevated intracranial pressure)
Consult <input type="checkbox"/> Allied health: physiotherapist, occupational therapist, speech language pathologist – after 12 – 24 hours of alteplase <input type="checkbox"/> Pharmacist <input type="checkbox"/> Nurse educator <input type="checkbox"/> Other service _____
Monitor <input type="checkbox"/> Admit patient to ICU <input type="checkbox"/> Connect patient to telemetry <input type="checkbox"/> Oxygen PRN to keep saturation <input type="checkbox"/> 92% or above <input type="checkbox"/> 88-92% <input type="checkbox"/> At initiation of alteplase administration: ○ Vital signs q15min for 2 hours ○ Vital signs q30 min for 6 hours ○ Vital signs q1h until 24 hour post-treatment ○ Neurovital signs q1h for 6 hours (include assessment for angioedema) then q2h for 6 hours <input type="checkbox"/> Notify physician immediately if ○ Neurological deterioration: decrease level of consciousness, new headache, acute hypertension, nausea and vomiting, and/or worsening neurological deficits ○ Evidence of angioedema ○ Evidence of bleeding ○ New fever above 38.3 degrees c <input type="checkbox"/> Check capillary blood glucose ○ Q4h for 24 h then reassess
Laboratory <input type="checkbox"/> Hot stroke panel completed <input type="checkbox"/> Other laboratory investigations ○ Repeat CBC, RFT daily x3 days ○ Repeat troponin q8h x2 ○ Lipid profile ○ HbA1c ○ Bone profile ○ CK ○ ESR ○ CRP ○ Urine analysis and culture ○ Blood culture (repeat q__ h intervals) x ____ times

○ Others

Diagnosics

- Repeat non-contrast CT head within 12 – 24 hours of tpa administration
 - Indication: follow up post tpa stroke
- CTA arch to vertex (if not performed on admission or repeated for specific indication)
- MRA time of flight arch to vertex (if CTA not performed and patient unable to receive contrast for renal impairment or other reason)
- Carotid duplex ultrasound through vascular lab (patient has ischemic stroke/TIA and is unable to receive CTA contrast due to renal impairment or other reason)
- ECG daily x 3 days (if not known Afib with high suspicion for cardioembolic source)
- 24-hour Holter (if not known Afib)
- Transthoracic echocardiogram
 - With bubble study if ≤ 55 years old, embolic stroke, no significant aortic arch/carotid atherosclerotic disease
- CXR

Treatment

Avoid placement of urinary catheter during alteplase infusion and for 30 minutes post infusion
If patient unable to void within 6 hours, insert Foley's catheter
For residual over 400 ml, insert Foley's catheter

Intravenous

If patient receiving sodium chloride 0.9% infusion for CTA with renal insufficiency, physician to reassess IV fluid regimen once infusion completed

Patients who are NPO should be receiving maintenance hydration

- Sodium chloride 0.9% IV ____ ml/h
- Potassium chloride ____ mmol in sodium chloride 0.9% ____ ml IV at ____ ml/h
- _____ at _____ ml/h
- Saline lock IV
- Physician to reassess IV hydration after 24 hours

Medications

If post-thrombolysis blood pressure targets are not met on available medication regimen, consider possibilities of post-thrombolysis hemorrhage or urinary retention

If systolic BP > 180 mmHg OR diastolic BP > 105 mmHg

- Labetalol 10 mg IV; then labetalol 10-20 mg IV q10min PRN (max dose 300 mg/24h)
 - Contact physician if BP not controlled after 3 doses
 - HOLD labetalol if heart rate less than 60 bpm
 - Vital signs and neurovital signs q15min until 4 hours after BP controlled
- Hydralazine 5-10 mg IV a15min PRN
 - Contact physician if BP not controlled after 3 doses
 - Monitor BP 15 and 30 minutes after each dose of hydralazine
 - Vital signs and neurovital signs q15min until 4 hours after BP controlled
- Other BP medications: _____

Statin

- Atorvastatin ____ mg PO daily

No antiplatelet or anticoagulant. To be reassessed after CT head has been repeated

Venous thromboembolism prophylaxis

- Intermittent pneumatic compression

Other Medications

- Nicotine replacement therapy
- Acetaminophen 500 – 1000 mg PO q6h for pain or fever (maximum 4g/24h)
- Ondansetron 4 – 8 mg PO/IV PRN q8h
- Neuroscience bowel protocol:
 - Bisacodyl 10 mg PO/NO daily – hold if diarrhea present
 - If no bowel movement after 24 hours, PEG 17 g PO/NG qHS PRN
 - If no bowel movement after 48 hours, glycerin SUPP 1 rectally PRN
 - If no bowel movement after 72 hours, give phosphate enema (fleet enema equiv) – one rectally PRN
- Complete home medication re-order
 - Evaluate blood pressure medications and need to hold