Suspected Stroke Algorithm

Care Goals:
- Early neuroprotection
- Imaging within 1 hour

Inclusion Criteria:
Patients with signs and symptoms concerning for an acute focal neurologic deficit (see screening questions to the right).

Exclusion Criteria:
Neonates <28 days

***CT imaging for stroke**

Consider head CT +/- CTA head/neck for:
- MRI contraindicated based on MR screening results and/or knowledge of patient-specific contraindications
- Concern for intracranial hemorrhage or increased ICP
- Patient not stable for or unable to tolerate MRI
- MRI not readily available

Epic Order "CT HEAD WO CONTRAST" +/- "CTA HEAD NECK W/WO CONTRAST"

Sickle Cell Disease:
SCD increases the risk of arterial stroke and venous sinus thrombosis. Children with SCD presenting with focal deficits or first-time seizure should be urgently screened for stroke with MRI per pathway. Emergent treatment is an exchange transfusion and should be discussed with hematology and neurology.

Add the following to initial workup:
- **URGENT hematology consult**
- **CBC**
- **hemoglobin electrophoresis**
- **type/screen**

Hemophilia:
If hemophilia with neurologic concern, administer factor replacement STAT (home supply if available), obtain head CT, urgent hematology consult

Do You Suspect Stroke??

Rapid Stroke Screen (BE-FAST)	High risk conditions with any new neurologic symptoms:
B- Balance (Gait disturbance? Unilateral leg weakness?) **E**- Eyes (acute vision loss/field cut, diplopia) **F**- Face (drooping on one side, asymmetric smile) **A**- Arm (one arm weak or numb? Does one arm drift?) **S**-Speech (Slurred? Difficult to understand?) **T**- Time (last known normal <24 hours)	•Congenital heart disease •VAD/ECMO (click here for VAD algorithm) •Sickle cell disease (see sidebar) •Hemophilia (see sidebar) •Known cerebral vasculopathy/moyamoya

YES

Is patient > 18 years of age?

YES → Is patient currently located inside LCH?

NO → If >18 and still outpatient, refer to closest adult hospital.

YES → STAT page neurology and obtain STAT non-contrast head CT → Neurocritical care attending to arrange transfer to adult hospital if indicated.

NO

Provider initiates neuro protection orders via **Suspected Stroke Order Set** and STAT consults neurology.

Bedside nurse initiates neuro protective measures including HOB flat, Q15min vitals and neurochecks

*Click here for full neuro protection checklist

How much time has passed since the patient's last known normal exam?

< 24 Hours →
- **Provider orders MR Brain Acute Stroke with MRA from suspected stroke order set**
- Ordering provider pages Neuroradiology attending at 97349 with Callback name, Callback number, and text "STROKE CODE – Patient MRN and name"
- Consider head CT +/- CTA instead of MRI according to left sidebar*

> 24 Hours →
Provider:
- Together with Neurology, determine timing of neuroimaging, consider MR rapid or MR brain
- Consider admission for further workup

Bedside RN:
1) **Completes MRI screening form together with provider and patient family** (Click here to access form)
2) Call MRI charge tech (Voalte phone ext 65331) to coordinate an exam time

Is MRI screening form complete and free of contraindications for MRI?

NO → If MRI contraindicated or delayed, refer to left sidebar*

YES

Bedside RN prepares patient for MRI by removing all clothing/equipment other than a metal-free gown (click here for full checklist) and transports prepared patient to MRI on 5th floor for scan.

Upon patient arrival, **MRI tech will**:
- Complete visual patient and staff metal check
- Place MRI-compatible patient monitoring devices
- Together with bedside RN, place patient in scanner

Neuroradiologist calls ordering provider with verbal report of critical findings or to state there are not critical findings

Results Review by Ordering Provider:
- **ICH**: URGENT Neurosurgical Consult; if in the ED, activate CODE ICE
- **Acute Stroke:** Admit to PICU (CCU if congenital heart disease), complete Stroke event note in Epic, initiate acute treatment (See Confirmed Stroke Order Set), adjust neuroprotection orders as necessary; see next page for hyperacute stroke management options

**Urgent hematology consult for red cell exchange for sickle cell patients
- **Image Negative:** Consider stroke mimics, adjust neuroprotection orders as necessary

Neuro Protection Checklist

Monitoring:
□ HOB flat & strict bedrest
□ Continuous HR/RR & pulse ox monitoring
□ Q15 min vitals (including BP)
□ Q15 min neurochecks
□ Avoid fever (consider Acetaminophen for >38°C)
□ Maintain normotension for age & treat hypotension

Diet/Fluids:
□ NPO
□ Draw Labs (see orders)
□ Infuse D5 + 0.9NS at rate of 1.5 x Maintenance, unless otherwise indicated

Obtain Stat Baseline Labs & Studies:
□ Serum: CBC, BMP, PT/PTT/INR
□ Urine: Utox, urine HCG
□ iStat with electrolytes (if not available – accucheck)

Special Considerations
• Sickle Cell patients: hemoglobin electrophoresis, CBC, type/screen

MRI Patient Preparation Checklist

□ Remove 12 Lead EKG stickers and medication patches with metal backings
□ If patient with Bivona trach, discuss potential switch to Shiley trach with team
□ If patient with medication infusions that cannot be paused, prime and connect MRI tubing
□ If patient on respiratory support, secure respiratory therapist and any additional equipment needed

Hyperacute Stroke Management

Last Known Normal Exam **< 4.5 hours prior** **AND** **Age > 11 years**	**Discuss tPA with NCC team. tPA requires NCC attending approval and should be supervised by neurology fellow** •**tPA Indications:** arterial ischemic stroke confirmed by imaging; witnessed last known normal < 4.5 hours prior; peds NIHSS > 4; age > 11 •**tPA Contraindications:** more than 4.5 hours from last known normal; ICH/history of ICH, aneurysm, vascular malformation; infarct > 1/3 MCA territory; pedNIHSS >= 24; BP > 15% above 95th %ile for age and weight; glucose < 50 or > 400; intracranial arterial dissection; positive pregnancy test; PLT < 100,000, abnormal PT/aPTT, known bleeding disorder; on anticoagulation with INR > 1.4, received heparin within 4 hours with abnormal aPTT; acute MI or post-MI pericarditis; major surgery or parenchymal biopsy within 10 days; GI or GU bleeding within 21 days; arterial puncture at non-compressible site within 7 days; malignancy or within 1 month of completing treatment for cancer; suspected CNS vasculitis, bacterial endocarditis, sickle cell, meningitis, moyamoya, marrow/air/fat embolism
Last Known Normal Exam **< 24 hours** **AND** **Large Vessel Occlusion on MRA/CTA (all ages)**	**Discuss endovascular intervention with NCC** • **Indications:** arterial ischemic stroke confirmed by imaging; last known normal < 24 hours prior; occlusion of large vessel on MRA/CTA; mismatch between exam severity and volume of diffusion restriction on MRI **OR** mismatch between hypoperfusion (ASL) and diffusion restriction on MRI ***NCC team to page neuro-interventional radiology**

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Evidence

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