Stroke System Update
Swedish Health System

2019

Process Improvement ..... It takes a village

Stroke Care at Primary Stroke Centers

Onset of symptoms to EMS arrival	911 call to ER arrival	ER arrival to treatment time

Stroke Care at Comprehensive Stroke Centers

Onset of symptoms to EMS arrival	911 call to ER arrival	Initial ER Receiving Time to Transfer Time	Interfacility transport time	Receiving hospital (Endovascular center) to treatment time

Stroke Onset to treatment time

SWEDISH 2

EMS Recognition of Stroke Severity

Stroke Care at Endovascular Stroke Centers

Onset of symptoms to EMS arrival	911 call to ER arrival	Initial ER Receiving Time to Transfer Time	Inter[illegible] transf[illegible]me	Receiv[illegible] (Endov[illegible] to trea[illegible]

If a patient is having a severe stroke EMS should bring them to the nearest endovascular center as long as there is no more than **15 minutes** delay in transport

Onset of symptoms to EMS arrival	911 call to ER arrival	Receiving hospital (Endovascular center) to treatment time

Onset to Treatment Time → Potential Time Saved

SWEDISH 3

Prehospital Stroke Severity Score: Tool to Predict Large Vessel Occlusions

Table. The Los Angeles Motor Scale (LAMS)

Facial droop	
Absent	0
Present	1
Arm drift	
Absent	0
Drifts down	1
Falls rapidly	2
Grip strength	
Normal	0
Weak grip	1
No grip	2

King County went live with use of the LAMS score by EMS Feb 1, 2017

- Patients with a score of 4 or 5 are more likely to have a LVO and will be transported to Endovascular center if there is no more than a 15 minute delay

Stroke 2008; 39: 2264-2267

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Swedish CH Code Stroke Protocol (current as of 9/12/19)

The Code Stroke process described in this slide deck, is subject to change, as this is a pilot process, and will start on **October 7, 2019.**

- (1) Call for mixing will occur at ambulance bay
  - A new PSJH goal is Door to Needle time of 30 minutes
  - ED doc will examine patient and go through inclusion/exclusion
  - Will call for mixing if LAMS>=1
- (2) Direct to CT/CTA for all, unless specified otherwise
  - Please ask the patient if they have a history of iodine allergy or kidney disease. If they are on dialysis, CTA is ok.
  - If EGFR is 45 or above, CTA should be done. If EGFR is below 45 but they are not on dialysis, default would still be CTA but risk benefit decision by neurologist and/or ER doc may override this

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Swedish CH Code Stroke Protocol (current as of 9/12/19)

- (3) Two IV's will be placed in the ambulance bay
  - POCT will be done for BMP/EGFR; NOT for INR
  - Labs will immediately be drawn for CBC, coags, thrombin.
- (4) The bolus of alteplase will occur immediately after con head CT. The patient will be pulled out of the CT tube prior to CTA.
  - NHT will review scan off CT scanner itself
  - If a "go", NHT will notify ED doc who will come by scanner and double verify inclusion/exclusion

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Swedish CH Code Stroke Protocol (current as of 9/12/19)

- (5) "Door to First Pass" goal for Emergency Department Code IR is 90 minutes. This is an AHA goal.
  - EMS should report the LAMS score to the ED charge from field and ED staff on arrival
  - If LAMS score is 4 or 5, Emergency Department Code IR is activated by EMS from the field, or by the ED physician on arrival, if not already activated.
    - Neuro IR staff should be activated prior to CTA (will received Code IR pages)
    - Reduces the 45-60m delay between travel/set up of the IR suite
    - If the CTA shows no LVO, neurology will cancel the Emergency Department Code IR

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Swedish CH Code Stroke Protocol (current as of 9/12/19)

- (6) Key point
  - We do not want to delay our Door to Needle Times. This will be monitored.
  - All patients will receive a non con head CT. You do not need to order this. It is auto-prechecked. Please do not uncheck it. This will be read by RADIA immediately
  - CTA reading will come after non con head CT reading and will not affect Alteplase decision.
- (7) Code IR terminology changes:
  - **Inpatient Code IR** (formerly Internal Code IRs – Code BART/admitted patient with an LVO)
  - **Transfer Code IR** (formerly External Code IR – transfer patient with an LVO)
  - **Emergency Department Code IR** (formerly Internal Code IR – stroke patient coming from the field or in the ED with a LAMS 4-5)

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Swedish CH Code Stroke Protocol (current as of 9/12/19)

- (8) Inpatient Code IR:
  - Code BART is called for LKW < 4.5 hours
  - For >4.5 h, if a patient has *new* neuro symptoms, staff will call an RRT
  - Responding RRT RN does LAMS, and if LAMS 4-5, RN will activate a Code BART to alert NHT
  - NHT will determine if Inpatient Code IR should be called
    - NHT is the only inpatient provider that can activate a Code IR.
    - ED physicians can also active Code IR for ED patients.

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Other system updates

- All ED's (except CH):
  - ED physician and RNs will assess LAMS on arrival
    - All suspected stroke patients in the 0-4.5 hour window should be activated as a Code Stroke, as usual
    - **Patients in the 4.5-24 hour window will only be activated as a Code Stroke if their LAMS is 4-5.** If their LAMS is 1-3, they will be a sub-acute stroke work-up, and the ED physician will have to page for an NHT consult.
    - **Non-Cherry Hill Emergency Departments should NEVER activate a Code IR, as this is a Cherry Hill-only code.**

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Other system updates

- CH ED:
  - If LKW < 4.5 hours, and LAMS 1-3, activate a **Code Stroke**
  - If LKW < 4.5 hours, and LAMS 4-5, activate a **Code Stroke/IR**
  - If LKW > 4.5 hours, but < 24 hours, and LAMS 4-5, activate an **Emergency Department Code IR**
  - If LKW > 4.5 hours, and LAMS 1-3, this will be a sub-acute stroke work-up, and the ED physician will have to page for an NHT consult.

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Reminders

- BE FAST: remember the Balance and Eyes!!!
- Thunderclap headaches: neurological emergency and imaged and treated like acute strokes. We are missing many hemorrhagic stroke patients in the ED.
- NHTs: must remember to put in the IR angio order and admit order for all Code IR patients
- Epic order sets for ED:
  - 2565, "ED Stroke-Treatment-TIA/Ischemic"
  - And 2566, "ED Stroke-Evaluation"
- Epic order sets for NHT/SHM:
  - 1716, "Stroke Admit - TIA / Ischemic"
  - And 1412, "Stroke Admit - Post Alteplase and Endovascular Therapy" (if applicable)

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