Reducing Door-to-Needle Times

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“Time is Brain”

- When ischemic stroke happens, part of the brain is not getting enough oxygen/nutrition and starts dying
- The longer the process continues, the more brain is lost
- In ONE MINUTE….
  - 1.9 million neurons lost
  - 14 billion synapses lost
  - 12 km (7.5 miles) of myelinated fibers destroyed

WITH A STROKE, TIME LOST IS BRAIN LOST.

Learn more at StrokeAssociation.org or 1-888-4-STROKE.

Time lost is brain lost

時間の損失は脳の損失。

Tiempo es cerebro... ¡GANÁLE AL ICTUS!!
Background

Intravenous tissue plasminogen activator (IV tPA)
- Reduces long-term disability when administered early to eligible patients with acute ischemic stroke
- Benefits are highly time dependent
- Earlier IV tPA associated with lower risks of complications
- Strict time window – 3 hours within onset of symptoms or last seen normal, 4.5 hours for eligible patients (additional exclusion criteria apply for 3-4.5 hour window)
What is “Door-to-Needle (DTN)” time?
- The time it takes from a stroke patient entering ED (“door”) until he/she receives IV tPA (“needle”)

What needs to happen?
- Examination – identification of symptoms and confirmation of stroke clinically
- CT head without contrast – making sure there is no hemorrhage
- Review of contraindications – blood pressure, anticoagulation use, recent surgery, etc

The American Heart Association sets the goal DTN time to be 45 min
Our Process: CODE FAST

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- Problems we were having – patients roomed in ED, stroke symptoms identified, neurologist paged, exam in the room, then to CT – the process was taking TOO LONG
- Goals: reduce DTN times, reduce stroke misses
- Education of providers, ED physicians and staff, ancillary staff (ED techs, radiology techs)
CODE FAST

Potential stroke identified in field

CODE FAST activated

Stroke team meets the patient in hallway as they roll in

Straight to CT Neurologist accompanies

TPA administered in CT suite

Patient arrives in ED

EMS

Neurologist
ED MD
Pharmacist
ED RNs
ED techs
CT tech
Radiologist

DTN GOAL <30 min

Quick check by ED MD (ABC), patient cleared for CT

CT reviewed on the scanner
CODE FAST

“CODE FAST: a quality improvement initiative to reduce door-to-needle times” – Journal of Neurointerventional Surgery 2015

- Total of 93 patients who received TPA at Wellstar Kennestone
  - 41 pre code fast, 52 post code fast
  - No significant difference between two groups other than pre-code fast patients were younger and more likely to be men

- Substantial reduction in door-to-needle times: \(62 \text{ min} \to 25 \text{ min} \quad (p<0.0001)\)

- Trend toward more discharges to home
CODE FAST

Future

- Continued education to reduce “false alarms”
- Refining the process, cutting potential time loss
- Data looks promising – more IV tPA given with less DTN times, more discharges to home
  - Record is 7 min! Many cases with one-digit DTN times
  - Some patients leave hospital from ICU with minimal/no residual deficits
- How to extend the same level of care to the facilities without on-site neurology coverage
  - Utilization of technologies
  - Developing care systems
New Approaches

Mobile stroke unit
- Cleveland clinic, UT Health, Germany

Inside: a registered nurse, paramedic, emergency medical personnel, CT technologist.
Stroke physician via telemedicine.
New Approaches

Mobile Stroke Treatment Unit

- Cleveland Clinic data: first 100 patients
  - Only one connection failure (crew error)
  - Diagnosis of probable stroke made in 33 patients
  - Telemedicine assessment completed successfully in 99 patients
  - 16 patients received IV tPA in MSTU (one additional patient received tPA after hospital arrival due to video failure in MSTU)
  - Door-to-Needle time median \textit{32 min in MSTU and 58 min in ED group} (compared with matched group from prior data)
New Approaches

- Technology
- Telestroke

Consultations that involve a physician stroke expert using a high-quality bidirectional audio and videoconferencing system to interact with a bedside provider and/or patient/caregiver for the purposes of delivering stroke care or advice

Method used to overcome barriers to the delivery of proven, evidence-based therapies that might otherwise be unavailable for stroke patients

Whenever local or on-site acute stroke expertise or resources are insufficient to provide around-the-clock coverage for a healthcare facility, telestroke systems should be deployed to supplement resources at participating sites (American Heart Association Policy statement)
References


Cleveland Clinic Website
(https://my.clevelandclinic.org/services/neurological_institute/cerebrovascular-center/treatment-services/mobile-stroke-unit)