STROKE Coordinator Case Study
Altru Health System, Grand Forks
Presentation

Family called “911”

- Cooking in the kitchen
- Family heard a loud bang
- Left sided facial droop
- Left arm weakness
- Difficulty finding words
- Slurred speech
Patients History

- 91 year old female
- Hypertension
- Thyroid disease
- Hyperlipidemia
- CAD/stent placement
- CHF
- History of A-Fib
- Non-smoker

Home Medications:
- ASA
- Norvasc
- Lisinopril
- Levothyroxine

- Stopped Coumadin-bleeding issues
Critical Access EMS

• 12:59 Ambulance dispatched
• 13:12 Arrive at patient home
• 13:25 Depart for Altru
• 13:52 Intercept with Altru EMS
• 14:15 Arrived at Altru

Overview
• 13 minute on scene time
• 46 miles to Altru
• 76 minutes from 911 call to arrival at Altru

Called Medical Control and told to bypass CAH and transport to Altru
Altru Ambulance Intercept

- 13:41  Dispatch time
- 13:52  Patient contact on interstate
- 14:02  In route to Altru
- 14:08  Blood drawn for lab work
- 14:15  Arrived at Altru

Summary
- Total time **10 minutes** for intercept process
Altru ED Timeline

- 14:16  Patient arrived at Altru
- 14:18  MD assessment
- 14:25  CT complete
- 14:50  CT Interpretation
- 14:54  Labs resulted
- 14:57  NIH completed (15)
- 15:00  Dysphagia Screening
- 15:18  Labetalol given
- 15:25  Alteplase given

69 minutes
# ED Summary

<table>
<thead>
<tr>
<th>Door to MD Assessment</th>
<th>Door to CT Scan</th>
<th>Door to Stroke Code Called</th>
<th>Door to CT Interpretation</th>
<th>Door to EKG</th>
<th>Door to Lab Results</th>
<th>Door to tPA Administered</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal Time:</strong> &lt; 10 mins</td>
<td>Goal Time: &lt; 25 mins</td>
<td>Goal Time: &lt; 10 mins</td>
<td>Goal Time: &lt;45 mins</td>
<td>Goal Time: &lt; 45 mins</td>
<td>Goal Time: &lt; 45 mins</td>
<td>Goal Time: &lt; 60 mins</td>
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<tr>
<td>12 mins</td>
<td><strong>9 mins</strong></td>
<td><strong>35 mins prior to arrival</strong></td>
<td><strong>34 mins</strong></td>
<td><strong>32 mins</strong></td>
<td><strong>38 mins</strong></td>
<td><strong>69 mins</strong></td>
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Slight delay in tPA administration- BP elevated prior to administration
Patient Summary

- Significant improvements in the ED post tPA infusion
- Admitted to the ICU
- Next day – no difficulties with left side extremities
- Only slight left facial droop remains

- Discharged home with home health about a week later.
- No deficits at time of discharge.
What Went Smooth?

• Patient family call “911” immediately
• By-passed CAH / Intercept arranged with Altru Ambulance
• Direct transport to Altru Health System from patient’s home
• Blood drawn by EMS for lab work

TEAM WORK at it’s finest!
STROKE Coordinator Case Study
Essentia Health, Fargo
Subarachnoid Hemorrhage Case Study

Image: [www.tewellingtonneurosurgeryunit.com](http://www.tewellingtonneurosurgeryunit.com)
Subarachnoid Hemorrhage
Subarachnoid Hemorrhage Case Study

- 56 year old male
- Sudden, severe headache
- At home, passed out in shower
- Presented to CAH
- Somnolent in ER
- Hypertensive with SBP >220
CT Scan at CAH
Ruptured Cerebral Aneurysm

Pre-coil

Post-coil
Cerebral Aneurysm Treatment

- Endovascular coiling
Outcome

• Patient NIHSS = ZERO at discharge
• Discharged home with no deficits
Great Outcome

Cerebral Aneurysm Rupture
Natural History

- Death: 25%
- Disability: 25%
- Good Outcome: 50%

Cerebral Aneurysm Rupture
Essentia Health

- Death: 27%
- Disability: 9%
- Good Outcome: 67%
Acute Ischemic Stroke Case Study

- 70 y/o female
- LKW: 2200 Thursday night
- Symptoms noted: 0730 Friday morning
- NIHSS: 18
- Transferred to Essentia-Fargo - Comprehensive stroke evaluation
- CT-Perfusion Scan: Large mismatch L) MCA territories
- Viable brain tissue noted!
CT-Perfusion Scan
Outcome

- **Day 1**: NIHSS = 18 (confusion, visual deficit, severe R) weakness, facial droop, sensory loss, aphasia)
- **Day 2**: NIHSS = 13
- **Discharge**: NIHSS = 4 (right sided weakness and mild aphasia)
- Good candidate for rehab, sent to acute care facility for continued work toward baseline
Wake-Up Stroke

- Out of window for IV tPA (LKW = 9.5 hours earlier)
- Taken for emergent ENDOVASCULAR THERAPY
- L) MCA occlusion
- Stent retriever device used to recanalize vessel
- Blood flow restored
  - TICI score from I to III
TICI score

<table>
<thead>
<tr>
<th>TICI Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>O-I: No or limited perfusion</td>
<td>![Thumbs Down]</td>
</tr>
<tr>
<td>IIA: Less than half perfusion</td>
<td></td>
</tr>
<tr>
<td>IIB: Half or greater perfusion</td>
<td></td>
</tr>
<tr>
<td>III: Full perfusion</td>
<td>![Thumbs Up]</td>
</tr>
</tbody>
</table>

TICI score 24
STROKE Coordinator Case Study
Sanford Health Fargo
The Rapidly Improving Patient……Stroke Chain of Survival

Detection:
- 911 dispatcher gets call at 1530
  - Patient experiencing abrupt onset of the inability to talk, while having conversation with friend

Dispatch and Delivery:
- EMS dispatch at 1531, arrival to patient 1532
  - 77yo, Male, unknown medical history
  - BP 220/120, EKG NSR
  - EMS calls stroke alert enroute to hospital
Delivery, Door, Data:

• Arrival to Critical Access Hospital- 1547
  - Stroke Code process occurred immediately
  - Initial NIHSS 9
    - Severe aphasia, severe dysarthria, unable to answer LOC questions, and bilateral leg weakness (previous injury)
  - 1603 patient returns baseline
  - BP comes down on own to 180/91
  - CT negative

Decision and Disposition:
- Patient ruled as not a tPA candidate

• Provider Calls OneCall for transfer of possible TIA vs HTN encephalopathy patient
Transfer to Primary Stroke Center

Delivery and Data:
- Patient sent via Ground Ambulance
  - Just prior to arrival patient becomes aphasic, and then rapidly begins to improve. .....Detection
  - BP continues to range from 127-176/77-94
  - Heart rhythm continues in NSR
Arrival

Delivery, Door, Data:

• Stroke Code initiated in EC
  - Patient improved and then began to show more neurologic deficits
  - NIHSS 9
    - LOC question, Right Leg weakness(2), Left leg(3), severe aphasia, mild dysarthria
  - Repeat CT

Decision and Drug:

• Deemed Candidate for tPA
  - tPA given 39 minutes from arrival
Outcome

• Admission to Critical Care NIHSS 6
  ▫ Language back to normal - clear and fluent

• MRI 24hrs post tPA showed L) parietotemporal stroke

• Stroke Work up - HTN...classified as cryptogenic stroke
  ▫ Patient discharge home with wearable wireless patch to monitor continuous heart rhythm for 14 days

• Bingo
  ▫ Atrial fibrillation detected and started anti-coagulation
Take Away

• Importance of rapid evaluation
  • This occurred 4 times in this case

• Evaluation of Cause of Neurological Deficits
STROKE Coordinator Case Study
CHI St. Alexius Health, Bismarck
Patient Information

- 81 year old Female presented to ED with acute right hemibody weakness and aphasia
- Onset approximately one hour prior to arrival
- NIHSS 20
- History of atrial fibrillation, INR was subtherapeutic at 1
- Bilateral cataract extraction preceding day-Coumadin not held for procedure
Past Medical History

- Atrial fibrillation
- Status post pacemaker placement
- Hypertension
- Hyperlipidemia
- History of prior TIA
- Multivalvular regurgitation (aortic, mitral and tricuspid valves)
- Bilateral cataract surgery day prior
IMAGING

- CT of head suggestive of acute clot
- CT perfusion and CT angiogram were performed and an intraluminal clot was noted in the left MCA
• Patient presented as a Code Level 3. After discussion and review, family requested Code Level 2.
• Family agreed to proceed with intervention but declined treatment with systemic thrombolytics
• Patient was treated with intra arterial t-PA and intracranial thrombectomy by interventional radiology
POST PROCEDURE

• Marked improvement in patient:
  - Aphasia resolved
  - Facial droop resolved
  - Power loss in right arm resolved
  - NIHSS 0 (Day 2)

• Patient was discharged to her home after four days with stroke symptoms completely resolved
DISCUSSION

• Because of patient’s presenting Code status, patient’s aphasia and family discussion there was delay with intervention

• TIMES:
   LKW 13:20
   Triage in ED 14:08
   CT results reported 14:32
   IR intracranial thrombectomy 16:30
STROKE Coordinator-Inpatient Stroke
Trinity Health, Minot
Objectives

• Define Inpatient stroke and review challenges in the Critical Access Hospital
• Review Case Studies from our institution
• Develop Action Plans and tools to assist your facility.
Definition of Inpatient Stroke

- A stroke occurring while the patient is hospitalized with another diagnosis or procedure

- Inpatient stroke patients are at higher risk for morbidity and mortality from their stroke as they are already ill
Incidence of stroke while hospitalized

- Nationally between 5-15% of stroke occur in hospitalized patients. Meaning that 35,000-70,000 strokes take place each year in hospitalized patients.
Recognition of stroke in Inpatients

- Recognizing stroke in inpatients is trickier as there are many possible explanations for mental changes and other stroke-like symptoms on post-surgical patients.
- Medications causing the symptoms (Sedation, pain meds, etc)
- Procedures (Surgery on leg causing it to be weaker)
- NIHSS is a great tool to pick out subtle neuro changes
Case Study

- 68 y.o. male patient admitted for elective cardiac angiogram
- Post procedure admitted to ICU, due to need for further intervention.
- PMH: Previous cancer treatment in 1978, HTN, Dyslipidemia, Aortic Stenosis
- Home Medications: Lipitor, Atenolol, Aspirin, Norvasc, L-Thyroxine, Allopurinol
Case Study

- Patient admitted to ICU, had received extra dose of sedation for anxiety during procedure. RN noted some speech difficulties but related to extra medication.
- Patient continued to have speech problems, physician notified with order for Narcan received. Patient received the dose without change in symptoms. Was contacted again without any further orders.
- Cardiac surgeon saw patient in consult, felt the patient was having a stroke, and also ordered a dose of Narcan.
- Stroke Coordinator notified. NIHSS completed showing expressive aphasia. Stroke Alert called. Neurology involved
Case Study

- LKW: 0900
- CT Scan Head and Chest: 0953
- Stroke Coordinator consult 1145/Stroke Alert
- NIHSS 8
- MRI started at 1209
- tPA 1240
Case Study

- Patient was tPA candidate, delay to treatment due to physician resistance.
- Outcome: Patient did well, continued to have slight residual speech problem that improved prior to discharge. Outpatient speech therapy.

- **Barriers:** Medication possibly masked symptoms. Even wife felt symptoms were related to medication. Physician did not believe it was a stroke.
Observations

• Further staff education required for recognition of stroke in Inpatients. Physician vs. Nurse
• Risk factors should be reviewed to “predict” high risk patients
• Education focused on assessment skills, trust that knowledge, and make the call. Family and staff initiated “Rapid Responses”.
Barriers to Inpatient Stroke Care

- Assessment of patient
- Provider buy-in
- Awareness and availability of treatment options
- Imaging availability
Action plans/Tools

- Develop system within the hospital (Rapid Response, Code Stroke)
- Team approach or authorization to evaluate
- Map out the process
- Standing orders/protocols
- One call notification
- Transfer protocols
- Telemedicine Plan
• Questions?