

# Telestroke: Ensuring a High Quality Practice

Ganesh Asaithambi, MD

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# Disclosures

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- I have no financial relationships or other conflict of interests to disclose
- I will not discuss off label use and/or investigational use in my presentation



# Objectives

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# Background

- Stroke remains 5<sup>th</sup> most common cause of death in the US
- Efforts to reduce recurrence and improve outcomes
  - Early antithrombotic use
  - IV alteplase
  - Endovascular treatment
  - Establishment of stroke centers and stroke units
  - Decompressive hemicraniectomy
- Limitations
  - High patient volume
  - Limited availability of expertise
  - Geography

# Background

- Bring the experience of stroke experts to hospitals without stroke experts
- As service matures
  - Monitor practice quality
  - Trend outcomes
  - Ensure patients receive full potential benefit of service

# Perspectives

- Complications associated with inexperienced use of IV alteplase
- Telestroke (TS) introduced in 1999
  - Interactive videoconferencing technology in the treatment of acute stroke syndromes
- Rates of IV thrombolytic therapy improved with TS
  - Increased assessment rates for eligible patients
  - Identification of mimics
  - Cranial imaging interpretation
  - Code process times

# Perspectives

- Urban-to-rural disparity in IV alteplase use
  - Small hospitals
  - Hospitals < 100 beds
  - Small populated communities
- Minimize delays for evaluation and treatment
- TS can provide stroke expertise to remote sites
  - Rapid evaluation
  - Joint treatment decision making

# TS Network Models

- Distributed
  - Service delivered to hospitals from providers at distant sites contractually
  - No affiliation with TS hospital other than a specific encounter
  - Pre-specified transfer protocol without help from provider
- Hub-and-spoke
  - Comprehensive center provides service
  - Assists in transfer as indicated for treatment of higher level of care
  - Assists in creation stroke system of care
    - Quality measures
    - Operational protocols
    - Order sets
    - Transfer protocols



# Component of System of Care

- TS service must be available 24/7/365
- Links a neurologist
  - Rural communities
  - Neurologically underserved area



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# QUALITY MEASUREMENTS

# Quality Measures: Examination

- NIHSS
  - Remote evaluation similar to onsite examination
  - Reproducible
- Can be performed in minutes

# Quality Measures: Time

- **Door to needle**
- Door to consultation request
- Door to video connection
  - Consultation request to connection
- Door to imaging
- Door to decision
  - Decision to order/mix
- Door to transfer out

# Door to Needle Times

- GWTG-Stroke: 16,901 patients
  - Median door to needle time 56 [42-75] minutes
  - 59.3% patients treated within 60 minutes
- Data focused on TS practices alone not as robust but many delays
  - Door to consult request
  - Request to connection
  - Connection to recommendation
- Our experience
  - Median door to needle time 54 [41-71] minutes
  - 63.5% patients treated within 60 minutes

# Quality Measures: Outcomes

- 90-day modified Rankin Scale score
  - Ideally in person
  - Achievable for patients traveling far distances?
  - Can it be done by phone?
- Surrogate measures
  - In-hospital mortality
  - NIHSS at 24 hours
  - NIHSS at discharge
  - Modified Rankin Scale score at discharge
  - Discharge disposition

# Quality Measures: Mimics

- Diagnostic accuracy is key without too much delay in treatment decision
- Treatment rates 6-16%
- Not exposed to risk related to thrombolytic use
  - Expensive
  - Cost of alteplase
  - Cost of ICU stay
  - Cranial imaging
  - Transfer to higher level of care
- Minimize exposure

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Scott PA et al. Ann Emerg Med 2003;42:611-618.

Yaghi S et al. J Telemed Telecare 2013.

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# Quality Measures: Alteplase Use

- Rate of utilization
- Protocols define criteria to activate stroke alerts
- Potential for increased use in mild and rapidly improving stroke
- Protocol adherence
  - 2 IVs
  - BP monitoring
  - Neurologic assessments
  - Flush after infusion





# Emergency Department Stroke Treatment Paradigm

- Recognition and appropriate triage to treatment
  - 20-30% ischemic stroke discharges have been treated with either IV alteplase, endovascular, or combined approach
  - Cast a wide net!
    - Balance or incoordination
    - Eye movement or vision abnormalities
    - Focal motor, sensory changes
    - Confusion or speech changes
    - Vertigo with neck pain or conventional risk factors
    - All within a broad time window

# Quality Measures: Safety

- Protocol adherence
  - BP and neurologic monitoring
- Intracranial hemorrhage
  - Symptomatic vs asymptomatic
  - Consistent definition (NINDS, ECASS, SITS-MOST)
- Systemic hemorrhage
- Angioedema

# Quality Measures: Technology

- Potential technical failures and limitations should be constantly monitored
  - Consider back up system if able
- Constant monitoring of security
- Ensure protected health information stays that way
- High quality access to qualifying imaging
- Consider on-call support



# Quality Measures: Satisfaction

- Patients and families
  - Informed of process
  - Satisfied with transfer if needed
  - Service and communication adequate
- Healthcare team
  - Communication effective
  - Joint decision making process
  - Feedback provided



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# STROKE TEAM MEMBERS

# Stroke Team Members

- Hub members
  - Neurologist
  - Stroke coordinator/liaison
- Spoke members
  - Stroke coordinator
  - ED physician/provider lead
  - Inpatient physician/provider lead
  - ED RN
  - ICU/floor RN
  - HUC
  - EMS
  - Radiology staff (CT, MRI tech)
  - Phlebotomy
  - Therapists



# Quality Review

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- Involve all stroke champions
- Review cases – both acute and subacute
- Identify process issues
- Resource utilization

# Future Endeavors

- Education in pre-hospital triaging and alert process as part of TS
- Establish more effective follow up care after discharge
- Mobile stroke unit?
  - Not generalizable
  - Cost prohibitory



# Conclusions

- Treatment of acute stroke is evidence-based
- With broader use of TS
  - Need to start establishing evidence-based practices unique to TS
  - Improve quality care
  - Identify specific barriers to successful implementation
- Assigning champions at TS sites is key
- Frequent feedback
  - Case-by-case
  - Quarterly



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**THANK YOU**

GANESH.ASAITHAMBI@ALLINA.COM