TeleStroke 2.0: The Evolution of Digital Stroke Care

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Disclosures

- Research funding NIH/NINDS
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Introduction

- IV rt-PA within 3 hours is only FDA approved medication for improving AIS outcomes
- Effectiveness of rt-PA is time dependent
- In 58,353 patients treated with IV rt-PA, every 15-minute delay:
  - reduced the odds of discharge to home
  - reduced odds of functional independence at hospital discharge
  - increased odds of sICH and mortality

Introduction

- 80% of the US population has access within an hour to an acute care hospital capable of administering IV rt-PA
- Only about 4% of all AIS patients receive rt-PA annually in the US

Introduction

- Low treatment rates are due to late presentation to the ED and inefficient systems of care
- Public service campaigns have been ineffective in improving awareness
- Quality improvement methods have markedly improved stroke systems of care
- Nonetheless, only half of rt-PA treated patients receive the drug within an hour of ED arrival
The fourth leading cause of death in the US

Leading cause of disability worldwide

$36 billion in annual costs in the US alone

There is a clinical need for rapid access to stroke experts who may facilitate the evaluation of and guidance on rt-PA for AIS patients
Telestroke As A Solution

- Telemedicine - “the use of medical information exchanged from one site to another via electronic communications to improve a patient’s clinical health status” (ATA)

- Two-way video, email, smart phones, wireless tools and other means of electronic communication

- In 2009, over 55 telestroke programs involving >350 hospitals in the US

The UC Stroke Team Provides In Person Expertise Within 30-Miles

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Hospitals</th>
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<tbody>
<tr>
<td>February 1987</td>
<td>2 hospitals</td>
</tr>
<tr>
<td>October 1987</td>
<td>3 hospitals</td>
</tr>
<tr>
<td>Spring 1988</td>
<td>4 hospitals</td>
</tr>
<tr>
<td>July 1990</td>
<td>11 hospitals</td>
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<tr>
<td>Currently 2015</td>
<td>15 hospitals</td>
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Telemedicine is Extending Our Impact Across the Region, from April 2012...
…to March 2015

University Cincinnati Medical Center

West Chester Hospital

Clinton Memorial Hospital

McCullough Hyde Hospital

Margaret Mary Hospital

St. Elizabeth Grant Hospital

Dearborn County Hospital

Adams County Medical Center
Telemedicine Really Works

- Allows for Natural Flow of Information
- Allows for Face to Face Interaction with Spoke Medical Staff
- Does Not Rely on the Assessment of Others
- Allows for Direct Interaction with Patient/Family
Experience with Telestroke

- Telestroke allows “laying eyes” on the patient but there are some exam limitations e.g., sensory

- Nonetheless, telestroke enhances clinical decision making

- 222 subjects randomized to clinical decision making via telephone versus videoconferencing
  - Correct decisions re: rt-PA were 98% versus 82%; odds ratio, 10.9; 95% confidence interval, 2.7–44.6
US Telestroke Experience

- 2009 survey of 97 potential programs found online
  - 56 confirmed active telestroke programs in 27 states
  - 95% used videoconferencing
  - >80% of non-Hub sites were small or rural hospitals
  - Allows “drip and keep” at rural or small hospitals
  - Inpatient teleconsultation in 46% of programs

Patient Outcomes with Telestroke

- Limited data on long term patient outcomes and sustainability of telestroke programs
- German study reported on experience from 2002-2012
  - median onset to treatment times steadily decreased from 150 to 120 minutes
  - door-to-needle times decreased from 80 to 40 minutes
  - proportion of AIS patients treated with rt-PA increased from 2.6% to 15%
  - In-hospital mortality was unchanged at a mean of 6%
Setting Up a Telestroke Program

- Administrators - financial, branding, public relations
- IT – adequate bandwidth, system updates and security upgrades
- Compliance – legal, credentialing, payor services
Technological Considerations

- Interface of technology with consulting stroke expert
  - tablet, laptop or smartphone
  - intrinsic or accessory wireless

- Interface with consulting ED/hospital
  - sturdy mobile cart or robot
  - tablet
Technological Considerations

- In-house development
  - iPad, iPhone, other tablets

- Commercial vendors
  - Robots
  - Carts

- PACS imaging
Building The Hub Team

Physician Director
Program Manager

PhySician Team

Legal Counsel

Medical Staff Office

IT Support
Assembling The Partner Sites

PROJECT MANAGER

ED MANAGER

PHYSICIAN CHAMPION

MEDICAL STAFF OFFICE

IT SUPPORT
Implementation

- Secure Contract
- Credential Telemedicine Providers
- Complete IT Assessment
- Schedule Planning Session
Training the Partner Site

- Provide Protocols and Order Sets
- Share Best Practice
- Schedule In-service Training for All Shifts
- Ensure Staff Knows Proper Contacts
The Importance of a Physician Champion Internally

- Advise Administration
- Develop Protocols
- Provide Support to the Program Manager
- Garner Support within your Own Team
The Role of the Physician Champion Externally

- Attend Site Visits
- Partner with Rural ED Physicians
- Provide Quarterly Continuing Education
- Assist Program Manager with any Partner Site Difficulties
Costs of Telestroke

- Available data on cost-effectiveness are limited

- Two reports have used decision-analytic models to compare telestroke networks with usual care

- Overall incremental cost-effectiveness ratio was < $50,000/QALY, a commonly accepted cost ratio in the US

Financing Your Telehealth Program

- Minimize overhead/sustaining costs
- Membership Model
- Lease Model
- Hub Supports Program
- Grants
Summary and Future Directions

- Clinically, telestroke has demonstrated significant utility in making stroke experts readily available to patients and emergency physicians caring for them in facilities without in-house stroke expertise.

- Given the impact of time to treatment on outcomes, efforts to make videoconferencing more ubiquitous in acute stroke care are warranted.
Summary and Future Directions

- Estimates with more cumbersome laptop/cart/robot systems suggest telestroke is cost-effective.
- Technological advances may allow cheaper development of future telestroke applications thereby improving cost-effectiveness.
- Continuous quality monitoring should accompany all telestroke efforts.
The UC Health Team is Committed to Innovation and Outreach