Triage Using Telemedicine: Advancements in Prehospital Stroke Care

Prasanthi Govindarajan MD, MAS
Associate Professor of Emergency Medicine
Stanford University Medical Center

Stanford University

Disclosures

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No other conflicts of interest

Talking points

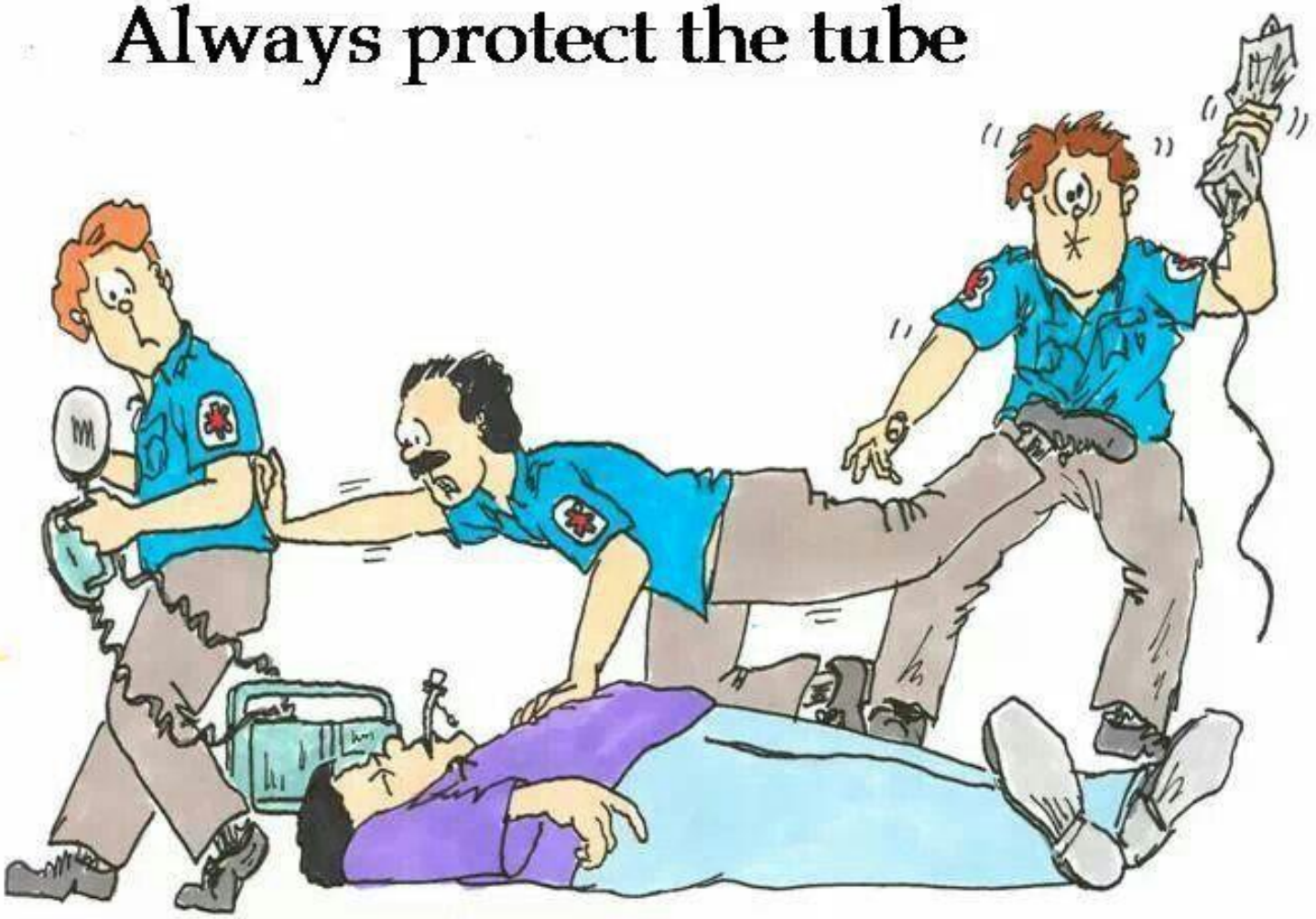
- Role of prehospital providers in acute stroke
- iTREAT 1 study
- Follow up to iTREAT 1 study – Phase 2

EMS: Second Link In the Stroke Chain of Survival

EMS play a crucial role in acute stroke management

- Evaluation as the first healthcare provider
- Stabilization
- Rapid neurological assessment and exclusion of stroke mimics
- Triage to centers of excellence (primary stroke centers and in the future maybe to comprehensive centers/neurovascular capability)

Always protect the tube



Gaps in acute stroke care

- Data show that recognition of stroke in the prehospital setting varies by region (Sensitivity 40%)
- Prehospital notification or “incoming stroke alert” is also highly variable (19-94%) –GWTG
- Qualitative study using focus group methodology conducted within California highlighted the need for prehospital provider training and integration of EMS and hospital stroke teams.
- Our approach is to use telemedicine as a way of linking prehospital providers with vascular neurologists to increase appropriateness of triage in the field.

Telemedicine

- Could lead to better recognition of stroke
- Provide earlier resource mobilization through prenotification
- Increase appropriate triage for timelier stroke treatment

ARTICLES

A low-cost, tablet-based option for prehospital neurologic assessment

The iTREAT Study

Sherita N. Chapman Smith, MD*
Prasanthi Govindarajan, MD, MAS*

ABSTRACT

Objectives: In this 2-center study, we assessed the technical feasibility and reliability of a low cost, tablet-based mobile telestroke option for ambulance transport and hypothesized that the NIH Stroke Scale (NIHSS) could be performed with similar reliability between remote and bedside

iTREAT study

- Improving Treatment with Rapid Evaluation of Acute stroke via mobile Telemedicine (iTREAT)
- Pilot study to demonstrate the technical feasibility and reliability of bi-directional communication using a low cost, off the shelf telemedicine unit supported by 4G LTE (fourth generation long term evolution commercial broadband)

Methods

Hypotheses:

(Validity) Mobile Telestroke assessments are clinically reliable between bedside and remote assessment.

(Reliability) 80% of iTREAT test runs could be completed without prohibitive technical interruption.

Study sites:

Two geographical regions: Virginia and San Francisco (Rural and Urban EMS systems)

Central Virginia: Thomas Jefferson EMS Council Inc., serves 6 rural counties and has 35 ambulance agencies.

Designated as medically underserved areas.

City of Berkeley Fire department: Urbanized with a call volume of 8000/ year and advanced life support responders.

Mobile system

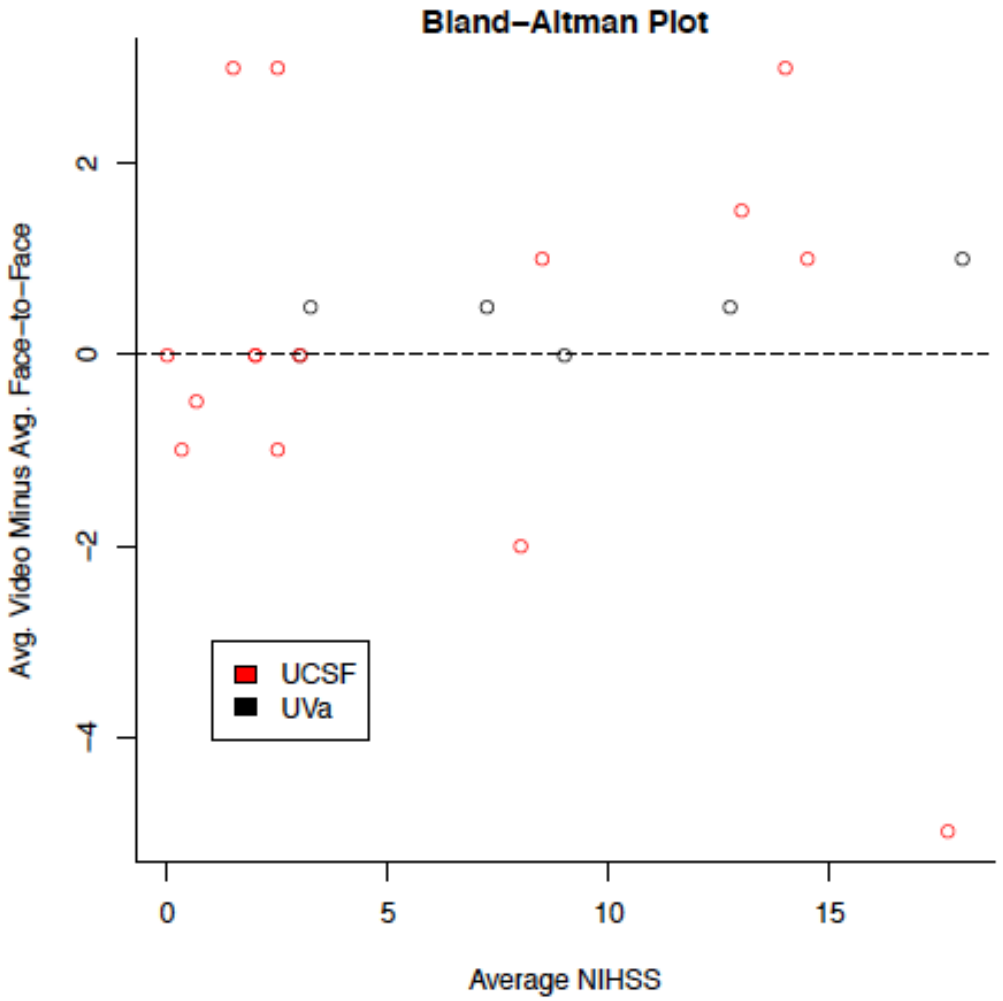
iTREAT Methods

- Virginia: Simulation study
- Medical students were trained in mock stroke scenarios
- Bedside assessments and remote assessments of stroke scenarios were done by blinded examiners
- Mean telemedicine connectivity time was 18 minutes
- 93% achieved a pre-specified minimum of 9 minutes
- NIHSS comparison between bedside and remote was high (96%- ICC)

University of California, San Francisco:

- Standardized patients were trained in stroke and mimic scenarios and portrayed scenarios in a moving ambulance.
- Remote and bedside vascular neurologists scored the NIHSS concurrently
- We used Bland-Altman plot to calculate the difference between bedside and remote assessments

Results


Bland–Altman Plot
Avg. Video Minus Avg. Face–to–Face
2
0
−2
−4
0
5
10
15
Average NIHSS
UCSF
UVa

Mobile Telemedicine Initiative Looks to Diagnose Stroke Patients Before Reaching Emergency Department

See link for video on University of Virginia Health System telemedicine program: https://www.youtube.com/watch?v=Z55PorvK8dA&list=WL

Phase 2 –Woodside Fire Department

- Woodside Fire Department is our community partner for the second phase of the telemedicine study
- The second phase of telemedicine study will be actively enrolling patients with stroke symptoms starting November 1, 2016
- All of the Woodside paramedics are trained to use a new prehospital stroke scale (modified NIHSS)
- We will use the iTREAT device (with hobnob) to support the video streaming from the ambulance
- Paramedics will use a study checklist (stroke specific history, IV t-PA exclusions, mNIHSS score, signs of large vessel occlusion) and stream this to the vascular neurologist through the telemedicine platform.

Outcomes

- Audio- video quality of the telecommunication
- Agreement between paramedic and vascular neurologist stroke scale scores
- Prehospital time intervals (time to connect, time on scene with telemedicine)

Thank you

- Woodside Fire Department (Jonathan Francisco, Firefighter/Paramedic, Woodside Fire Protection District)
- Woodside Fire Department – Paramedics and leadership
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- Ilana Spokoyny, MD – Vascular Neurology, Stanford Health Care
- San Mateo County EMS