Care of the post-TPA Ischemic Stroke Patient During Transfer

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Objectives

- Review of the pathophysiology of ischemic stroke
- Brief review of the acute treatment of an ischemic stroke
- Challenges of treating the ischemic stroke patient
- The need for remote treatment of stroke and transfer
What is a Stroke?

- A Stroke occurs when an area of the brain has its blood supply compromised and brain cells die
  - “It’s all about the plumbing”

- There are two types of stroke:
  - Ischemic Stroke- (87% of all strokes)
  - Hemorrhagic Strokes
Types of Stroke

Ischemic Stroke
Blockage of blood vessels, lack of blood flow to affected area

Hemorrhagic Stroke
Rupture of blood vessels, leakage of blood in affected area
Ischemic Stroke

Carotid artery

Area of brain affected by stroke

Blood clot
What does a stroke look like?

- Signs of a stroke to look for:
  - Facial drooping
  - Weakness of an arm and leg on the same side of body (hemiparesis)
  - Trouble speaking or understanding words
  - Double vision or loss of vision
  - Severe, sudden headache

- The most important *typical* characteristic of stroke is its abrupt onset.
SPOT A STROKE

F A S T

FACE DROOPING  ARM WEAKNESS  SPEECH DIFFICULTY  TIME TO CALL 911

Stroke Warning Signs and Symptoms
What does a stroke look like?

Other common signs:
- Unsteady gait
- Slurred speech
- Neglect - patient ignores one side of the body
- Vertigo
- Confusion/slowed thinking

Remember; the key feature is new, abrupt onset of these symptoms!
How do we treat stroke?

- Goal of acute ischemic stroke care is to restore blood flow to the brain as fast as possible to salvage as much brain as possible.

How do we treat stroke?
Treating Ischemic Strokes

- **TPA- Tissue Plasminogen Activator**
  - medication used to disrupt a clot and return blood flow to the area of injured brain.
  - Can be administered by IV
  - It has to be delivered within 3 hours of the symptoms starting, 4.5 hours in specific circumstances.

- **Thrombectomy**
  - Mechanical disruption and removal of the clot.
  - Can be performed up to 24 hours of onset of symptoms but only for a specific subtype of strokes known as Large Vessel Occlusions or LVO.
Treatment of Ischemic Stroke: IV TPA

- IV TPA was the first medication approved for the treatment of stroke initially in 1996 based on the NINDS trial.

- It found that 40% of patients who received TPA had an excellent outcome at 3 months and 1 year as compared to 28% of patients who did not receive TPA.
Treatment of Ischemic Stroke: IV TPA

- 34% of stroke patients receiving TPA had no neurologic deficit compared to 20% of patients who did not receive TPA.

- 53% of stroke patients receiving TPA had no difficulty with ADL’s as compared to 38% of patients who did not receive TPA.
Treatment of Ischemic Stroke: IV TPA

- Major risk factor for IV TPA is hemorrhage with intracranial hemorrhage occurring in 6.4% of cases.

- 0.6% of patients who did not receive TPA had an intracranial hemorrhage.

- Despite this 10 fold increase in intracranial hemorrhage there was no differences in mortality between patients who did receive TPA vs. those who did not with a clear trend in benefit.
TPA for Cerebral Ischemia within 3 Hours of Onset - Changes in Outcome Due to Treatment

Changes in final outcome as a result of treatment:
- **Green**: Normal or nearly normal
- **Light Green**: Better
- **White**: No major change
- **Red**: Worse
- **Dark Red**: Severely disabled or dead
Treatment of Ischemic Stroke: IV TPA

- There have been 6 major trials in the US and Europe involving over 8,000 patients along with several large registry's since its approval in the US in 1996.

- All trials and registry's have confirmed the efficacy of TPA without increase in mortality for the 0-3 hour window.

- In 2010 the American Heart Association endorsed the use of IV TPA out to 4.5 hours after a stroke for a more limited population. This was approved by the European Regulatory Committee but not the FDA.
Treatment of Ischemic Stroke: IV TPA

- Despite the benefit of IV TPA up to 4.5 hours after onset of symptoms there has been shown a clear trend of improved outcome with earlier administration

- Patients who received TPA within 0-90 minutes had an OR of 2.11 at 3 months.

- Patients who received TPA between 90-180 minutes had an OR of 1.69 at 3 months.

- Risk of Intracerebral Hemorrhage was also reduced with earlier treatment times
Stroke and the Challenge of Time

- Why is stroke treatment so time dependent?

- The longer the brain goes without blood the more damage occurs;

- During a stroke we lose 1.9 million neurons, 14 billion synapses and 7.5 miles of myelinated fiber for every minute the brain is without oxygen!*

- Compared to normal ageing, a brain undergoing a stroke ‘ages’ 3.6 years for every hour during a stroke!

*"Time is Brain- Quantified", Saver et al. Stroke; 37:263-266.
Figure. Number of patients who benefit and are harmed per 100 patients treated in each time window.

The Importance of Early Treatment with IV TPA

- A large review of 58,000 patients showed that for every 15 minutes sooner TPA was given;
  - 18 more patients per 1000 treated have improved ambulation at discharge and 8 are fully independent.
  - 13 more patients per 1000 treated will be discharged to an independent environment and 7 of those will be discharged to home.
  - 4 fewer patients per 1000 treated will die prior to discharge.

*Time to Treatment with IVTPA and Outcome from Acute Ischemic Stroke in the National US GWTG-Stroke Population; Dr. Jeffrey Saver et al. Presentation at the 2013 ISC*
Stroke Care and the Challenge of Distance

- To get IV TPA in a timely fashion you must be near a center with expertise to treat.
- Hospitals that have been accredited for stroke care are certified as primary or comprehensive stroke centers.
- These facilities have dedicated stroke resources 24 hours a day and closely track performance.
Stroke Care and the Challenge of Distance

- Unfortunately as of 2010, 105 million Americans did not have access to a primary stroke center within 60 minutes of activating 911*

- 50% of hospitals in the US do not have a neurologist on staff.

- This disproportionally affects suburban and rural areas.

*Disparities in Accessibility of Certified Primary Stroke Centers. Mullen M, et al. Stroke; 2014;45-00-00
Stroke Care and the Challenge of Distance

- Percentage of a population within 60 minutes of activating 911*;
  - Major City- 87%
  - Minor City- 59%
  - Suburban- 9%
  - Rural- 1%

- Despite being the 7th largest city in the US, San Antonio did not have a PSC until 2009. There are now > 10 such hospitals in the city.

*Disparities in Accessibility of Certified Primary Stroke Centers. Mullen M, et al. Stroke; 2014;45-00-00
Stroke Care Challenges

- Stroke is a major cause of death and disability in the US.

- It requires quick and accurate diagnosis and treatment to save lives and improve outcome.

- Up to 45% of Americans do not have timely access to centers able to provide ischemic stroke care.
Stroke Care Challenges

- Our challenge is distance; we do not have time to get the patient to a primary stroke center and then treat. They need to get IV TPA first and then transport.

- To help more rural areas Telemedicine has become the standard of care to guide rural sites in treating patients and then coordinating transfer to primary and comprehensive stroke centers for further care and management.

- This has increased the number of transported patients with IV TPA which has its own unique challenges.
Methodist Healthcare System
South Texas Tele-Stroke Network
Tele-Stroke Locations

- Dimmit Regional
- Carrizo Springs
- Frio Regional
- Pearsall
- Peterson Regional
- Kerrville
- Gillespie
- Guadalupe Regional
- Seguin
- Guadalupe
- Gonzales
- Connally Memorial
- Floresville
- So. Texas Regional
- Jourdanton
- Laredo Medical Center
- Cuero Community