Face the facts:
STROKE IS TREATABLE.
Lives can improve with better awareness access action

WHY DOES AMERICAN STROKE MONTH MATTER?

40 SECONDS
EVERY 40 SECONDS someone has a stroke
ONE OUT OF SIX people will suffer a stroke in his or her lifetime

#5
STROKE IS THE leading cause of disability in the U.S.
STROKE IS THE No. 5 cause of death in the U.S.
BHUPAT H. DESAI, M.D.

Medical Director
PVHMC Stroke Center

Financial disclosure: None
ADVANCES IN COMPREHENSIVE STROKE CARE

Where have we come from and what lies ahead
CT Scan of Brain

1975 EMI Scan  

2015
History of Stroke Care

- 1972 Development of CT Scan of Brain
- 1986 Diffusion-weighted (DWI) MRI Brain
- 1995 NINDS TPA Trial (3 hours) nejm dec 1995
- 1996 FDA Approval of IV TPA for AIS
- Mid-1990s AHA/ASA, NSA EMS Integration
- 1996 Brain Attack Coalition formed
- 2003 ASA/ASA and TJC PSC Certification program
- 2008 3 to 4.5 hrs TPA SITS-ISTR, ECASS III
- 2012 TJC Launched CSC Certification program
- 2015 Endovascular Thrombectomy Multiple trials
Cerebral Metabolism

- The Brain represent 2% of body wt, but consumes 20% of total Oxygen supply.
- The brain never sleeps, needs continuous supply of oxygen and glucose.
- The Brain maintains no reserve of oxygen.
- The Brain maintains only 2 grams of glucose in reserve.
- Normal cerebral blood flow is 50 ml/100 gm/min (15% of total cardiac output).
- Ischemic flow (< 20 ml), causes electrical and biochemical failure, but neurones are structurally intact (Penumbra), if flow is restored, neurone can function again.
- Ischemic flow below 10 cc, causes neuronal death (infarct).

In a typical acute ischemic stroke, every minute the brain loses:

- 1.9 million neurons
- 14 billion synapses
- 7.5 miles myelinated fiber
- TIME IS BRAIN
Acute Stroke Management
Time Windows

• 0-4.5 Hrs  IV TPA Rx
• 0-6 Hrs    IA TPA/Mechanical clot removal
• 0-36 Hrs  Observe for sICH, as a complication of Rx
• 1-3 Days  Observe for brain edema around large infarct (Consider Hemicraniectomy)
• 1-3 Days  1 in 4 pts has worsening Systemic causes
   Asp Pneumonia,
   PE from DVT
   Hyperthermia
   hyperglycemia
   Neurological causes
   Cerebral Haem
   Worsening of infarct
   Brain edema
• 1-3 days  Initiate secondery prophylaxis. Teachable Moments Antithrombotic, Statin, Ace/Arb/Diuretics Education-Stroke/911.Smoking.Ex.Diet
• 1-3 Days  Initiate Rehab Rx and long Term Rehab Planning
Lies, Damn lies, and statistics
Evidence-based medicine

- Good quality data
- useful Information
- Medical knowledge
- Empowerment of doctors, nurses, patients
All Stroke Volume

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# of Stroke Alert Activations vs Acute Stroke Thrombolysis Treatments

- **Beginning of Stroke Alert Process**: Mar/2010
- **Beginning of Intervention Program**: Feb 2014
- **Extended stroke alert criteria to 8 hours**
- **Endovascular Treatment became Standard of Care**: 2/2015
Volume

• 2016
  – tPA only 63
  – tPA+thrombectomy 30 (Total tPA = 93)
  – Thrombectomy only 50 (Total thrombectomy = 80)

• 2017 Q1-3
  – tPA only 48
  – tPA+thrombectomy 15 (Total tPA = 63)
  – Thrombectomy only 20 (Total thrombectomy = 35)
<table>
<thead>
<tr>
<th>Year</th>
<th>SAH</th>
<th>Clipping</th>
<th>Coiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>44</td>
<td>2</td>
<td>24</td>
</tr>
<tr>
<td>2017 Q1-3</td>
<td>25</td>
<td>1</td>
<td>18</td>
</tr>
</tbody>
</table>
Time to Intravenous Thrombolytic Therapy - 60 min

Percent of acute ischemic stroke patients receiving intravenous tissue plasminogen activator (t-PA) therapy during the hospital stay who have a time from hospital arrival to initiation of thrombolytic therapy administration (door-to-needle time) of 60 minutes or less.

Time Period: 01/2016 - 12/2016; Site: Pomona Valley Hospital (18385)

Data For: Time to Intravenous Thrombolytic Therapy - 60 min

<table>
<thead>
<tr>
<th>Benchmark Group</th>
<th>Time Period</th>
<th>Numerator</th>
<th>Denominator</th>
<th>% of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>My Hospital</td>
<td>2016</td>
<td>64</td>
<td>71</td>
<td>90.1%</td>
</tr>
<tr>
<td>All CA Hospitals</td>
<td>2016</td>
<td>3240</td>
<td>3957</td>
<td>81.9%</td>
</tr>
<tr>
<td>All CSTK Hospitals</td>
<td>2016</td>
<td>10695</td>
<td>12330</td>
<td>86.7%</td>
</tr>
</tbody>
</table>

Date of report: 06/04/2017 15:52:40 GMT-07:00 run by User: Karen Tse-Chang (ktsechang) at Site: Pomona Valley Hospital (18385)

Please note: GWTC aggregate comparative data is intended for internal quality improvement. Permission is required from the American Heart Association and Quintiles for external presentation or publication of benchmark data.
Time to Intravenous Thrombolytic Therapy - 45 min
Percent of acute ischemic stroke patients receiving intravenous tissue plasminogen activator (tPA) therapy during the hospital stay who have a time from hospital arrival to initiation of thrombolytic therapy administration (door-to-needle time) of 45 minutes or less.

Time Period: 01/2016 - 12/2016; Site: Pomona Valley Hospital (18385)

<table>
<thead>
<tr>
<th>Benchmark Group</th>
<th>Time Period</th>
<th>Numerator</th>
<th>Denominator</th>
<th>% of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>My Hospital</td>
<td>2016</td>
<td>41</td>
<td>71</td>
<td>57.7%</td>
</tr>
<tr>
<td>All CA Hospitals</td>
<td>2016</td>
<td>1864</td>
<td>3959</td>
<td>47.1%</td>
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<tr>
<td>All CSTK Hospitals</td>
<td>2016</td>
<td>7111</td>
<td>12332</td>
<td>57.7%</td>
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</tbody>
</table>

Date of report: 06/04/2017 15:53:01 GMT-07:00 run by User: Karen Tse-Chang (kiteechang) at Site: Pomona Valley Hospital (18385)
Please note: GWTG aggregate comparative data is intended for internal quality improvement. Permission is required from the American Heart Association and Quintiles for external presentation or publication of benchmark data.
Median Door to TPA time – GWTG Data

©2012 Pomona Valley Hospital Medical Center
<table>
<thead>
<tr>
<th>Year</th>
<th>PVHMC Any Thrombolysis Tx Rate</th>
<th>PVHMC IV tPA Tx rate</th>
<th>All CA Hosp Any Thrombolysis Tx Rate (GWTG)</th>
<th>CSTK Hosp Any Thrombolysis Tx Rate (GWTG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>6.30%</td>
<td>15.60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>15.60%</td>
<td>22.30%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>17.60%</td>
<td>21.00%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>22.30%</td>
<td>24.40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>24.00%</td>
<td>20.00%</td>
<td></td>
<td></td>
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<tr>
<td>2015</td>
<td>24.00%</td>
<td>20.00%</td>
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<td></td>
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<tr>
<td>2016</td>
<td>24.00%</td>
<td>20.00%</td>
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<td>24.00%</td>
<td>20.00%</td>
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<td></td>
</tr>
<tr>
<td>2017</td>
<td>24.00%</td>
<td>20.00%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Thrombolysis Treatment Rate – tPA/IR

POMONA VALLEY HOSPITAL MEDICAL CENTER
Expert care with a personal touch
CSTK-05a
Hemorrhagic Transformation for Patients Treated with Intra-Venous (IVO) Thrombolytic (t-PA) Therapy only
Time Period: 01/2016 - 12/2016, Site: Pomona Valley Hospital (18385)

Data For CSTK-05a

<table>
<thead>
<tr>
<th>Benchmark Group</th>
<th>Time Period</th>
<th>Numerator</th>
<th>Denominator</th>
<th>% of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>My Hospital</td>
<td>2016</td>
<td>1</td>
<td>49</td>
<td>2.0%</td>
</tr>
<tr>
<td>All CSTK Hospitals</td>
<td>2016</td>
<td>264</td>
<td>8679</td>
<td>3.0%</td>
</tr>
</tbody>
</table>
CSTK-05b
Hemorrhagic Transformation for Patients Treated with Intra-Arterial (IA) Thrombolytic (t-PA) Therapy or Mechanical Endovascular Reperfusion Therapy
Time Period: 01/2016 - 12/2016; Site: Pomona Valley Hospital (18385)

<table>
<thead>
<tr>
<th>Benchmark Group</th>
<th>Time Period</th>
<th>Numerator</th>
<th>Denominator</th>
<th>% of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>My Hospital</td>
<td>2016</td>
<td>10</td>
<td>76</td>
<td>13.2%</td>
</tr>
<tr>
<td>All CSTK Hospitals</td>
<td>2016</td>
<td>1094</td>
<td>8384</td>
<td>13.0%</td>
</tr>
</tbody>
</table>
Median Time to Revascularization

PVHMC = 96 mins
All CSTK Hospitals = 112 mins
% of Successful revascularization achieving TICI2B or better

<table>
<thead>
<tr>
<th>Benchmark Group</th>
<th>Time Period</th>
<th>Numerator</th>
<th>Denominator</th>
<th>% of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>My Hospital</td>
<td>2016</td>
<td>84</td>
<td>76</td>
<td>84.2%</td>
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<tr>
<td>All CSTK Hospitals</td>
<td>2016</td>
<td>6989</td>
<td>8458</td>
<td>82.6%</td>
</tr>
</tbody>
</table>
Door to Groin Puncture time

PVHMC = 63.2% within 90 mins of arrival
All CSTK Hosp = 55% within 90 mins of arrival

PVHMC Median Door to Groin = 68.5 mins
All CSTK Hosp Median Door to Groin = 83 mins
The American Heart Association/American Stroke Association recognizes this hospital for achieving 85% or higher compliance with all Get With The Guidelines®-Stroke Achievement Measures and 75% or higher compliance with five or more Get With The Guidelines®-Stroke Quality Measures for two or more consecutive years and achieving Thrombolytic Therapy ≤ 60 minutes 75% and ≤ 45 minutes 50% or more of applicable acute ischemic stroke patients to improve quality of patient care and outcomes.
Stroke Thrombolysis

Save a Minute, Save a Day

Save a minute—save a week
### MRS at DC/30/90/180/1 Year Follow Up TPA/IR (Q1-Q4 2015)

<table>
<thead>
<tr>
<th>Time Period</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>Total n</th>
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</thead>
<tbody>
<tr>
<td>MRS D/C</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>72</td>
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<tr>
<td>MRS 30 Day F/U</td>
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<td>1</td>
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<td>3</td>
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<td>5</td>
<td>6</td>
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<td>MRS 90 Day</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>48</td>
</tr>
<tr>
<td>MRS 6 Mth</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>46</td>
</tr>
<tr>
<td>MRS 1 YR</td>
<td>0</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>44</td>
</tr>
</tbody>
</table>
FUTURE IS HERE

Prehospital Evaluation and treatment
THANK YOU

Six letters: BEFAST
Three numbers: 911. Know when it's time.

BEFAST
BALANCE  EYES  FACE  ARMS  SPEECH  TIME

- Sudden loss of balance?
- Loss of vision in one or both eyes?
- Face looks uneven?
- Arm or leg weak/hanging down?
- Speech slurred?
- Trouble speaking or seem confused?
- Call 911 now!

May is Stroke Awareness Month