ADVANCES IN ACUTE STROKE MANAGEMENT

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APRNs: Agents of Change
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OBJECTIVES
UPON COMPLETION THE ATTENDEE WILL:

• Recognize goal differences in management of ischemic and hemorrhagic stroke events

• Have increased knowledge of improved medical and mechanical treatments of acute ischemic stroke

• Understand advances in mechanical intervention methods in acute cerebral hemorrhage

• Become aware of potential access barriers to acute stroke management
REFRESHING OUR MEMORY......

- Stroke: leading cause of severe disability; 3rd in death
- Advances: spurred by prevalence/impact of stroke
- Two types of stroke: Ischemic and Hemorrhagic
- Two subgroups of hemorrhagic: ICH and SAH
GOALS!

Ischemic
Restore the flow

Hemorrhagic
Stop the flow
A LITTLE HISTORY: ISCHEMIC STROKE

- Medical management: Symptoms/complications
- IV tpa –1996
- Mechanical removal (embolectomy)
- 2015 International Stroke Conference, Nashville: embolectomy superior to tpa
- IV/IA tPA with embolectomy
IS IT A STROKE?

Get a plain CT of the head!
ISCHEMIC PATHWAY?

Normal CT

Too late……
FLOW OBSTRUCTION?

CT: Dense R MCA

CTA: L MCA Occlusion
CTP: ISCHMEIC PENUMBRA
# ISCHEMIC STROKE: PHARMACEUTICAL (TPA)

<table>
<thead>
<tr>
<th>Process</th>
<th>Barriers</th>
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<tbody>
<tr>
<td>• NIHSS</td>
<td>• Mimics, confounding presentation</td>
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<tr>
<td>• LSN: 3- 4.5 hrs PTA</td>
<td>• LSN clarification</td>
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<tr>
<td>• Time window exclusions: 3-4.5H onset, AC, NIHSS &gt; 25, DM + prior stroke</td>
<td>• Poor historians – Rx and PMH</td>
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<td>• Effective 1/3 patients</td>
<td>• Public/EMS education</td>
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<td>• Low rates of administration</td>
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<td>• Remote area access</td>
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Stroke – there’s treatment if you act FAST.

Face
Face look uneven?

Arm
One arm hanging down?

Speech
Slurred speech?

Time
Call 911 NOW!
**KNOW THE SIGNS OF A STROKE**

- **B** - Balance
  - Does the person have a sudden loss of balance?

- **E** - Eye
  - Has the person lost vision in one or both eyes

- **F** - Face
  - Does the person’s face look uneven

- **A** - Arm
  - One arm hanging down?

- **S** - Speech
  - Is the person’s speech slurred?

- **T** - Time
  - Its time to take action immediately if you notice any of these signs or symptoms.

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**What are the risk factors for stroke?**

- High blood pressure
- Smoking
- Diabetes
- High cholesterol

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**Preventing Stroke**

- Eat Healthy
- Exercise Regularly
- Stop Smoking
- Limit Alcohol
- Manage Diabetes
- Control Cholesterol
- Control Blood Pressure
- Avoid Stress

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*Source: Internet*
The Rapid Arterial Occlusion Evaluation (RACE) Scale

<table>
<thead>
<tr>
<th>Condition</th>
<th>Score</th>
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<tbody>
<tr>
<td>Facial palsy</td>
<td>0-2</td>
</tr>
<tr>
<td>Arm motor function</td>
<td>0-2</td>
</tr>
<tr>
<td>Leg motor function</td>
<td>0-2</td>
</tr>
<tr>
<td>Head and gaze deviation</td>
<td>0-2</td>
</tr>
<tr>
<td>Aphasia (if right hemiparesis)</td>
<td>0-2</td>
</tr>
<tr>
<td>Agnosia (if left hemiparesis)</td>
<td>0-2</td>
</tr>
<tr>
<td><strong>Score total</strong></td>
<td><strong>0-9</strong></td>
</tr>
</tbody>
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OVERCOMING BARRIERS

• Public education: FAST, 911

• Establish CODE STROKE policy

• ED education: stroke clinics, CEU

• EMS & Stroke team: education, assessment tools, protocol development, hospital routing, CT/intervention participation, crew recognition,

• Stroke team support of ED staff in acute phase

• Teleneurology for remote locations
EMBOLECTOMY

**Process**

- Symptom presentation (NIHSS), LSN <24h
- Administer tpa if time eligible
- CTA evidence of LVO
- CTP evidence of penumbra
- Rapid transfer to angio suite

**Barriers**

- LSN *does, allow for intervention for non-tpa eligible candidates*
- Geographical barriers
- Imaging availability
EVOLUTION OF EMBOLECTOMY

Merci

Penumbra - aspiration
### Evolution of Embolectomy: Stentreivers

<table>
<thead>
<tr>
<th>Device</th>
<th>Function</th>
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</thead>
<tbody>
<tr>
<td>Solitaire</td>
<td></td>
</tr>
<tr>
<td>Trevo</td>
<td></td>
</tr>
<tr>
<td>Penumbra</td>
<td></td>
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<tr>
<td>Emboshield</td>
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POST-EMBOLECTOMY
WITHOUT INTERVENTION
(MRI & MRA)
WITHOUT INTERVENTION (CT)
OVERCOMING BARRIERS

• Trials: MR CLEAN, ESCAPE, SWIFT PRIME – standard of care

• Building stroke programs

• Comprehensive Stroke Certification

• Including CTA and CTP imaging in eligibility screening
A LITTLE HISTORY: HEMORRHAGIC

- Medical management: Symptoms/complications
- Surgical intervention: aneurysmal clipping
- Mechanical intervention - aneurysm (embolization)
- Mechanical intervention – hematoma (evacuation)
- Mechanical intervention – intraventricular (external ventricular drain EVD)
HEMORRHAGE: STOP FLOW

Subarachnoid

Intraparenchymal
SAP: SECURING THE ANEURYSM

**Process**

- Image-confirmed presence of aneurysm (CT, CTA, MRI, MRA)
- Clipping
- Coiling
- Stent-support Coiling
- Flow Diverting

**Barriers**

- Neurosurgical availability (clipping)
- Interventional Neurology vs Interventional Radiology
- Training
- Geographic barriers
EMBOLIZATION

• IA access via femoral artery
• Cerebral arteriogram: determine size and location
• Device selection
• Embolize
• Closure
• 6 month, 12 month, 18 month follow-up
ANEURYSM CLIPPING
COILING

Direct
(narrow neck)

Stent-assisted
(wide neck)
COILING:
BEFORE & AFTER
FLOW DIVERSION
PIPELINE
BEFORE & AFTER
INTRAVENTRICULAR HEMORRHAGE
INTRAVENTRICULAR

ICH w/ IVE

SAH w/ IVE
IVH WITH EVD
EVD
IPH/ICH (HEMATOMA)
ACUTE ICH TREATMENT

Intervention

• Medical management
• Acute intervention for complications: IVE, functional/cognitive decline
• Craniotomy
• Minimal-invasive evacuation

Barriers

• Access to neurosurgical services
• Geographic location
• Pending evidence-based guidelines
• Myriad complications of hospitalization
CRANIOTOMY
MINIMALLY INVASIVE EVACUATION
HEMATOMA EVACUATION

Before

After
SAH & ICH: OVERCOMING BARRIERS

• Dynamic research outcomes – implementing best practice guidelines & education

• Tele-neurology: expedite transfers to treatment centers from remote areas

• Public education on preventive measures

• Recognizing opportunities for improved primary management of secondary prevention
AND IN CONCLUSION…

• Stroke’s impact on healthcare demands ongoing innovation in medical technology and NP roles

• Changing face of stroke creates dynamic nature of evidence based practice

• Need continues for on-going community and health provider education

• Advanced Practice NPs: agents of change in world of stroke care
THANK YOU!

• Questions?

• Comments?