

# Hypertensive Crisis

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# Overview of a Hypertensive Crisis

## Urgency

- ▶ Blood pressure extremely high and no sign of organ damage
- ▶ Asymptomatic patient should not be treated pre-hospital

## Emergency

- ▶ Blood pressure extremely high and has caused damage to organs
- ▶ Life-threatening complications
- ▶ Symptomatic patient

Note: If patient is hemodynamically and clinically stable, transport, observe and monitor. Efforts to reduce the blood pressure will add little benefit

# Hypertensive Crisis Symptoms

- ▶ End organ damage
  - ▶ Severe headache with neuro changes (dizziness, blurred vision, altered loss of consciousness)
- ▶ Dyspnea (shortness of breath)
- ▶ Edema (swelling)
- ▶ Chest pain
- ▶ Arrhythmia as result of the hypertension
- ▶  $>220$  systolic or  $>120$  diastolic in non-pregnant patients
  - ▶ Measurement should be manually taken & confirmed with multiple measurements at least 5 minutes apart



# Chief Complaint

Palpitations

Fast heart rate

Shortness of breath

Chest pain

Weakness

# OPQRST

- ▶ Onset and duration
- ▶ Precipitating factors and circumstances
- ▶ Associated symptoms
- ▶ Stroke symptoms
- ▶ Nausea vomiting

**O**nset

**P**rovokes/palliates

**Q**uality

**R**adiates

**S**everity

**T**ime

# Associated Symptoms/Pertinent Negatives

- ▶ Chest pain
- ▶ Shortness of breath
- ▶ Weakness
- ▶ Anxiety
- ▶ Leg-swelling



# SAMPLE

**S**igns & symptoms

**A**llergies

**M**edications

**P**ast medical history

**L**ast oral intake

**E**vents to present

- ▶ Previous History
- ▶ History of Thyroid Disease
- ▶ Coronary Artery Disease (CAD)
- ▶ Cardiac Medications

# Initial Exam

- ▶ Check ABCs

- ▶ Airway
- ▶ Breathing
- ▶ Circulation



- ▶ Correct any immediate life-threatening problems



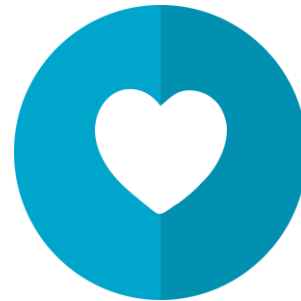
# Detailed Focused Exam

- ▶ Vital Signs: Blood Pressure (BP), Heart Rate (HR), Respiratory Rate (RR), Temperature, Oxygen Saturation (SpO<sub>2</sub>)
- ▶ General Appearance
- ▶ Skin: Cool, pale diaphoretic (excessive, abnormal sweating)
- ▶ Neck: Jugular Vein Distention (JVD)?
- ▶ Chest: Labored breathing



# Detailed Focused Exam

- ▶ **Lungs**: Wheezes, rales, rhonchi? Decreased breath sounds?
- ▶ **Heart**: Regular, rate fast or slow, murmur
- ▶ **Legs**: Edema? Signs of acute arterial occlusion (embolism)?
- ▶ **Neuro**: Altered loss of consciousness (ALOC)? Signs of stroke?



# Data, Goals of Therapy, & Monitoring

- ▶ Data
  - ▶ Oxygen Saturation (SpO<sub>2</sub>)
  - ▶ 12-Lead EKG
  - ▶ Blood Sugar if Diabetic or ALOC
- ▶ Goals of Therapy
  - ▶ Decrease rate
  - ▶ Treat chest pain
  - ▶ Treat Congestive Heart Failure (CHF)
- ▶ Monitoring
  - ▶ Cardiac monitoring and SpO<sub>2</sub>

# Emergency Medical Responder/EMT

- ▶ Routine medical care
- ▶ Administer Oxygen 2-4 LPM per nasal cannula
  - ▶ Increase flow to keep  $SpO_2 > 94\%$
- ▶ Transport sitting upright or head of cot at 30 degrees
- ▶ If the patient has suffered a stroke, follow the *Stroke Guidelines*

# Paramedic

- ▶ IV 0.9 Normal Saline TKO
- ▶ If treated, goal is to reduce BP by no more than 20% in first hour
  - ▶ Labetalol 10mg IVP over 2 min, if no effect, may repeat 20mg IVP in 10 min to a max of 100mg
  - ▶ If labetalol not available, **Metoprolol** 5mg IVP, repeat every 5 min to max of 15 mg
    - ▶ For either medication hold if SBP<140 or DBP<80 or HR<60
- ▶ OR
  - ▶ NTG Paste 1" to chest
  - ▶ Follow pain management guideline for pain that may be contributing to HTN

The background features abstract, overlapping geometric shapes in various shades of blue, ranging from light sky blue to deep navy blue. These shapes are primarily located on the left and right sides of the frame, creating a modern, dynamic feel.

# GFAST: Large Vessel Occlusion Stroke Screening Tool

# Objectives

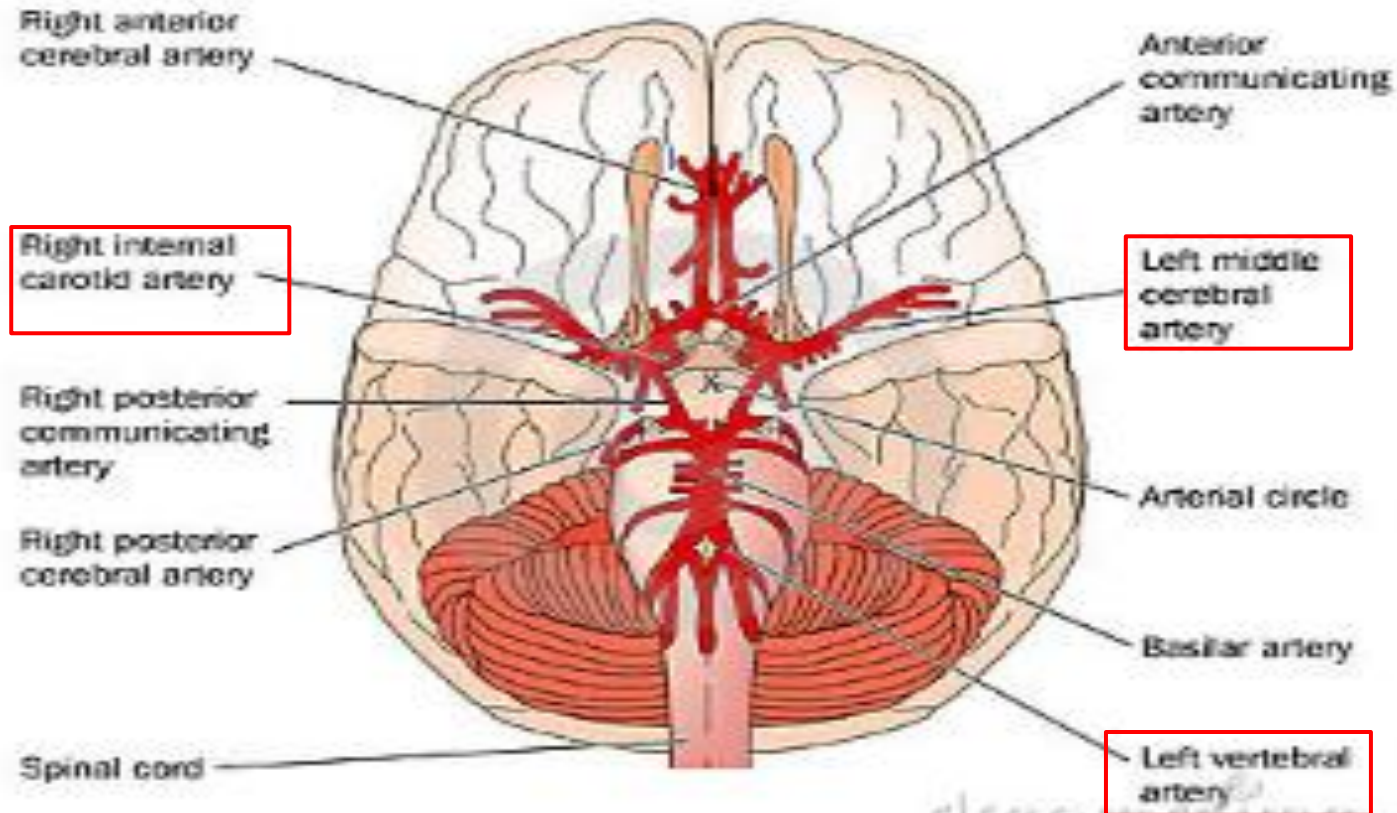
- Review of Brain structures
- Large Vessel Occlusions
- GFAST Symptoms
- GFAST Scoring

# Review of Time Windows

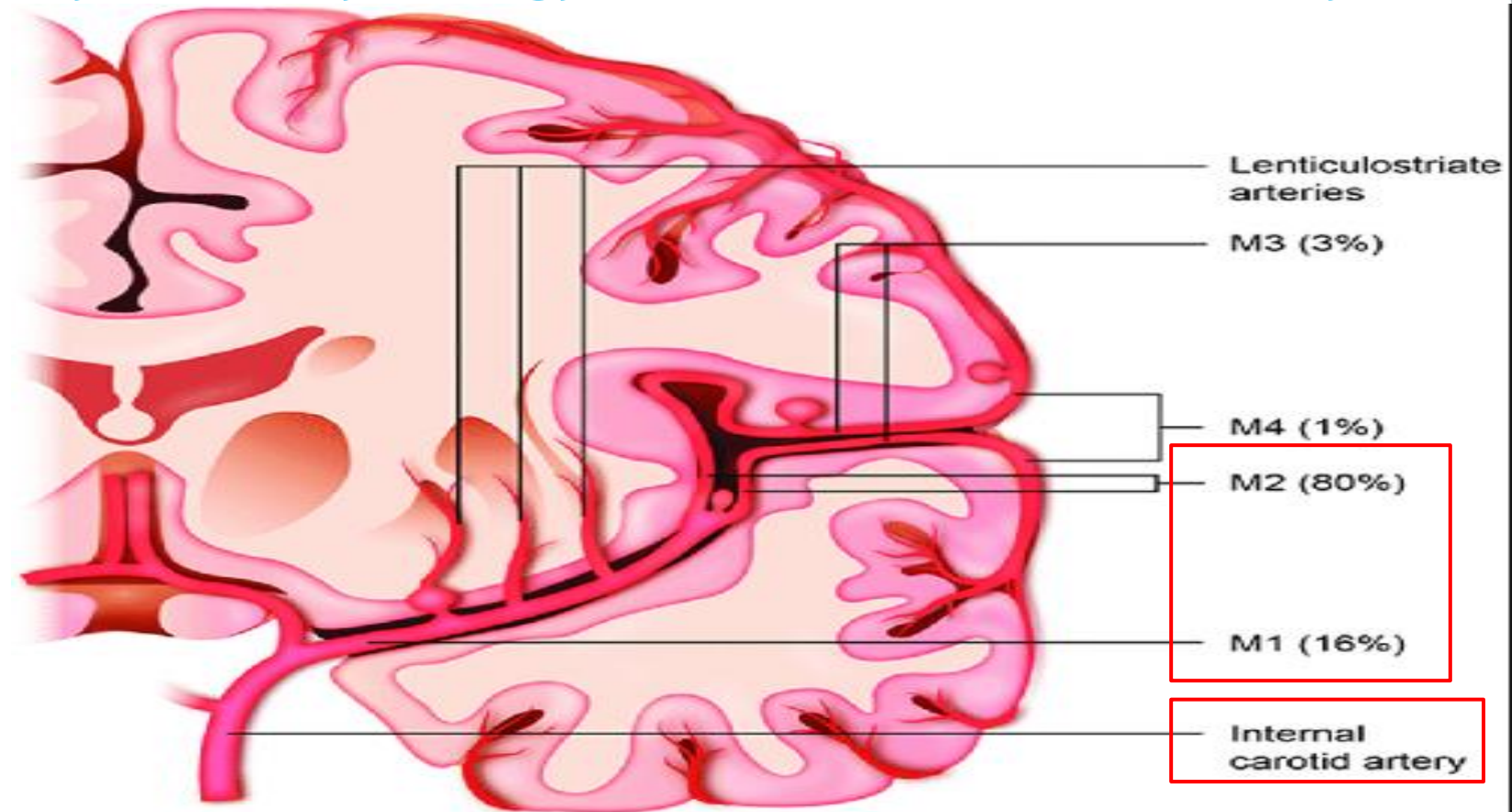
- IV tPA
  - ▶ Up to 4.5 hours
- Thrombectomy
  - ▶ Up to 24 hours



# Anatomy and Physiology- Circle of Willis



## Anatomy and Physiology- Middle Cerebral Artery



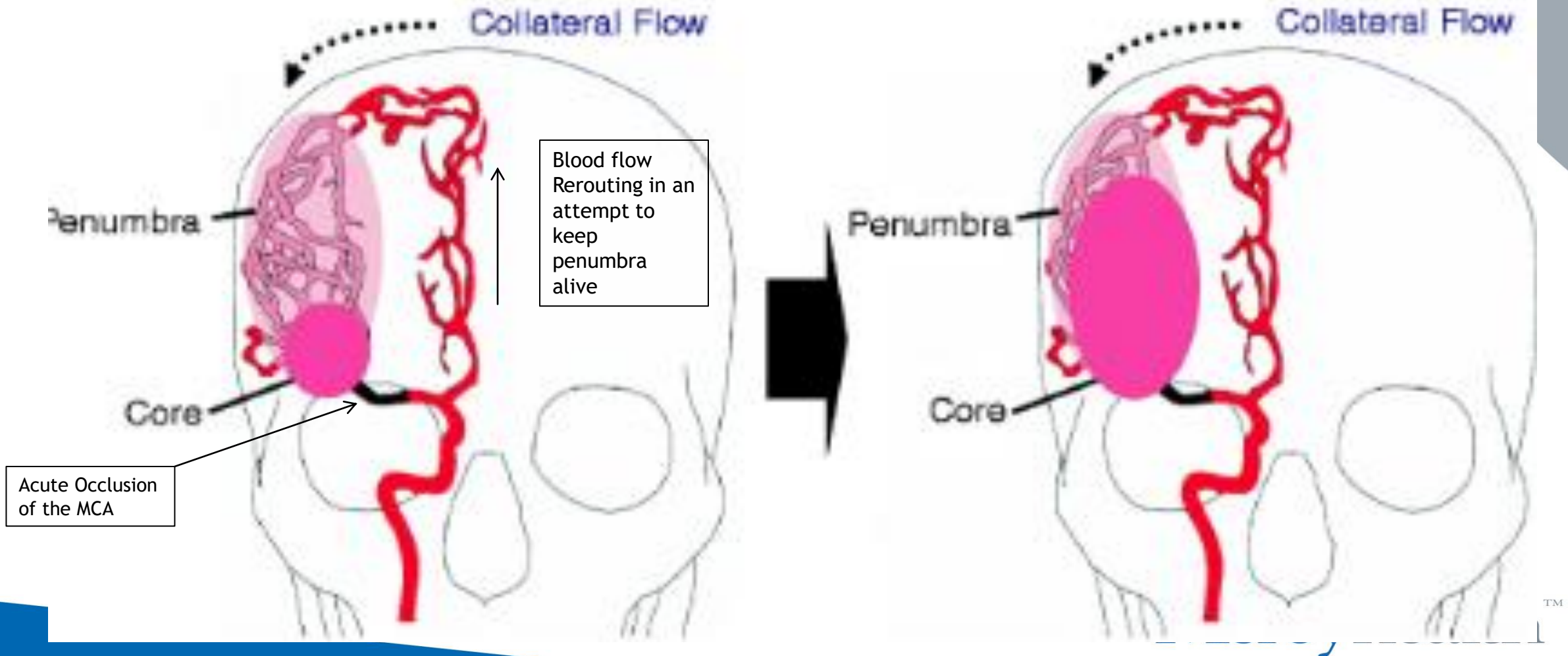
Internal carotid artery, MCA 1 and MCA 2 are the most common areas to perform thrombectomies. The lower the blockage is in the vessel, the larger area that will be damaged if not intervened upon.



# Ischemic Core vs. Penumbra



# Acute Ischemic Stroke- Ischemic Core



# Detection of Large Vessel Occlusions

## G F A S T

### FAST

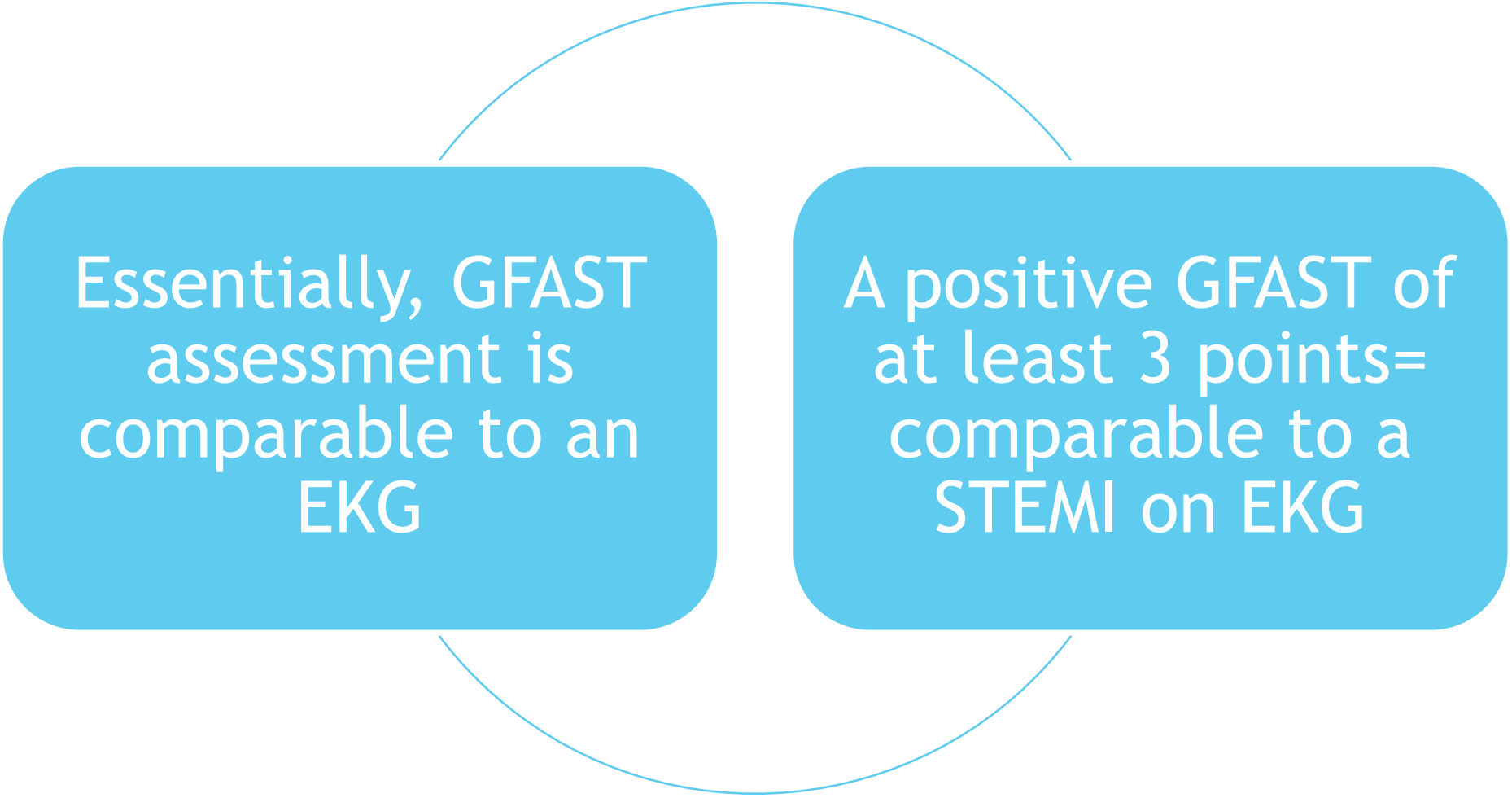
IS very sensitive for detection of strokes

BUT, it does not identify small vessel stroke vs. large vessel stroke

### GFAST

Allows for rapid recognition of severe strokes that will unlikely improve with IV TPA alone.  
\* Severe stroke patients usually require emergent endovascular intervention

Adding gaze preference to the other signs of strokes quickly and accurately allows recognition of these patients



Essentially, GFAST  
assessment is  
comparable to an  
EKG

A positive GFAST of  
at least 3 points=  
comparable to a  
STEMI on EKG



# Why G F A S T ???



FAST IS SENSITIVE



GAZE IS SPECIFIC



IDEALLY, WE WANT A  
SCORE THAT IS  
SENSITIVE AND SPECIFIC  
FOR LARGE VESEL  
OCCLUSIONS

# G F A S T- What exactly is it?

- Evidence based stroke assessment tool that identifies Large Vessel Occlusions (LVO)
  - ▶ **GFAST Score 1-2=** Probable small vessel= tPA treatment if meet criteria
  - ▶ **GFAST Score of 3-4=** Probable Large Vessel= Emergent Endovascular procedure (Thrombectomy) if meets criteria
    - ▶ Can also receive tPA if eligible. tPA does not interfere with ability to perform thrombectomy



## G F A S T- EMS usage

- GFAST replaced Cincinnati screening tool for EMS providers
  - ▶ Already perform the FAST, just add the Gaze assessment
- EMS is being educated throughout Region 1 to identify and call ahead to the receiving hospital with a GFAST score

# G F A S T Assessment

- ▶ **G:** Gaze Preference
- ▶ **F:** Facial Droop
- ▶ **A:** Arm Drift
- ▶ **S:** Speech Difficulty
- ▶ **T:** Time

# G F A S T Scoring

GAZE 2

FACE Droop 1

ARM Drift 1

SPEECH 1

TIME

## GAZE= 2 points

Gaze Preference has  
a 90% specificity for  
large vessel  
occlusion.

Gaze Preference has  
a 94% positive  
predictive value for  
large vessel  
occlusion.

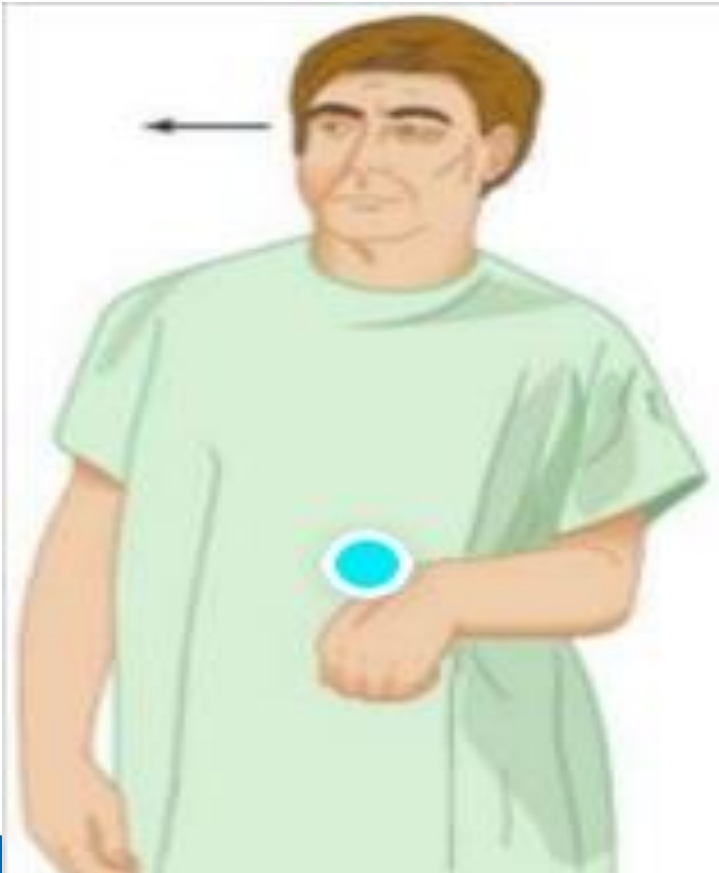
# G F A S T Assessment

- ▶ **G:** Gaze Preference= 2 points
  - ▶ **MOST IMPORTANT!**
  - ▶ Patient's eyes are looking to the right or left when relaxed
    - ▶ \* Often the patient will turn their head toward the side of the gaze preference
    - ▶ Right gaze preference= Right sided occlusion and Left sided motor weakness
      - ▶ Easiest to observe gaze after side of weakness identified.
    - ▶ May track to midline when prompted, but gaze will return to the side when they relaxed

# Gaze Assessment

- Observe eyes for deviation/preference to one side
  - ▶ Any gaze preference or eye deviation = **points**

2



# Gaze Preference

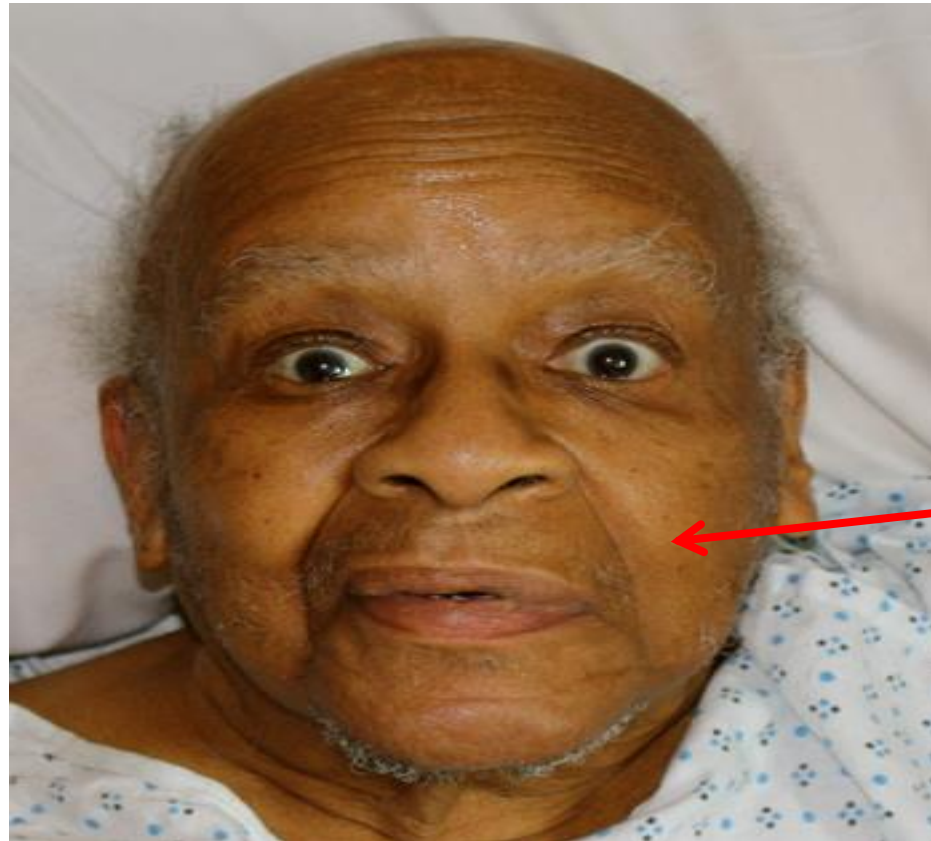
- Can be seen on CT



# G F A S T Assessment

## ► F: Facial Droop=1 point

- Flattened nasolabial fold





# G F A S T Assessment

► A: Arm Drift= 1 point



# G F A S T Assessment

## ► S: Speech Difficulty= 1 point

- Ask the person to repeat a simple sentence. Is the person unable to speak or is speech strange or slurred?



- Use a statement that does not elicit emotion  
“No ifs, ands, or buts about it”

# Recap: EMS Assessment Changes

- Cincinnati score is replaced with GFAST
- GFAST has been adopted in our region (region 1) as the official large vessel occlusion screening tool
- GFAST scores should be reported by EMS to receiving hospital during inbound report
- ▶ If the patient is identified in the field as GFAST of 3 or more, the patient should be routed to the nearest Comprehensive hospital, if it does not extend the transfer time by more than 15 min.

# Priorities in Stroke Management

<b>Priorities</b>	<b>Assessment Findings</b>
Chief Complaint	"Weakness", "Confusion", "Slurred Speech", "Unresponsive" <b>G-F-A-S-T</b> ( <b>G</b> aze, <b>F</b> acial droop, <b>A</b> rm drift, <b>S</b> peech difficulties, <b>T</b> ime symptoms started)
OPQRST	Last known well time? Was it witnessed?
Associated Symptoms/ Pertinent Negatives	Headache, weakness, pupil dilation, slurred speech, aphasia, incontinent
SAMPLE	Medication consistent with history of stroke or TIA
Initial Exam	ABC's and correct any immediate life threats
Detailed Focused Exam	<b>Vital signs:</b> BP, HR, RR, Temp, SpO2 <b>General Appearance:</b> Unresponsive?, noticeable facial droop, drooling, slouched posture <b>Neuro: GFAST</b>
Data	Blood Glucose
Goals of Therapy	Maintain ABC's and adequate vital signs
Monitoring	12 lead EKG Heart rate and blood pressure

# Management Stroke (EMS)

- O2 (2-4 L/min) via nasal cannula
  - ▶ Keep SpO2  $\geq$  94%
- Monitor BG
  - ▶ If BG<70 → Hypoglycemia guidelines
- Keep Pt NPO
- Set head of bed @ 30degrees
- Assess GFAST Q15min or if any neuro changes
  - ▶ GFAST >0 → positive
  - ▶ GFAST 3+ → preferentially taken to thrombectomy capable center (Diversion time <15min)

# Stroke Management (Paramedic)

- IV/IO 0.9% NS
  - ▶ Large bore (20g+) is preferred
- Consider
- Notify Medical Control ASAP (GFAST Scale)
- In Ischemic Stroke, elevated BP may provide neuro protection
- For those that receive tPA, special care must be taken

# tPA Management (Paramedics)

- Verify total dose given or to be infused
  - ▶ With start and stop times
- Following tPA administration begin 0.9%NS at existing rate
  - ▶ Do not give other meds via tPA line
- Monitor vitals and neuro exam Q5min
  - ▶ BP Guidelines to be discussed
- Changes to neuro condition (severe headaches, acute HTN, vomiting) → discontinue tPA and contact medical control
- Oropharyngeal Edema → Stop tPA; tx according to allergic rxn guideline and contact control

# BP Guidelines for tPA Patients

- SBP>180, DBP>105 or BP meds started at sending facility
  - ▶ Labetalol drip
    - ▶ May increase 1-2mg/min Q10min to max dose 8mg/min (Max total dose 300mg)
    - ▶ If SBP<140, DBP<80 or HR<60
      - ▶ Discontinue infusion and contact control
  - ▶ Nicardipine Drip
    - ▶ May increase 2.5mg/hr Q5min to max of 15mg/hr
    - ▶ If SBP<140, DBP<80 or HR<60
      - ▶ Discontinue infusion and contact control
  - ▶ If other meds needed: Discuss with control and sending facility
    - ▶ Need to know all meds infused



# BP Guidelines for tPA Patients

- SBP>180, DBP>105 & meds not started
  - ▶ Labetalol
    - ▶ 10mg IV over 2min
    - ▶ If no effect → repeat 20mg IVP in 10min to a max of 100mg
  - ▶ Metoprolol (if labetalol not available)
    - ▶ 5mg IVP
      - ▶ Repeat every 5min to max of 15mg
  - ▶ For either hold if SBP <140, DBP <80 or HR <60

# Pre-Hospital Checklist

- Stroke Alert Criteria
  - ▶ Last known well <24hr
  - ▶ Any abnormal findings on exam
  - ▶ BG > 50
  - ▶ If all are yes, call Primary Stroke Center with Code Stroke

# Pre-Hospital Checklist

- Minimum Info needed for ED Radio Report
  - ▶ Time of Onset/Last Known Normal
  - ▶ Level of Consciousness (AVPU)
  - ▶ GFAST (Score 3+ should be preferential taken to thrombectomy capable center)
  - ▶ Blood Glucose Lvl
  - ▶ HPI
    - ▶ Sudden weakness of one side? (arm, leg, face)?
    - ▶ Severe headache? Difficulty speaking or understanding?
    - ▶ Seizure at onset?
    - ▶ Head trauma or fall?

# Pre-Hospital Checklist

- Additional Useful Information
  - ▶ Date, Pt Name, Age, Witness, Witness Phone #
  - ▶ Vital Signs (HR, BP, RR, SpO2)
  - ▶ PMHx
    - ▶ Stroke/TIA
    - ▶ DM
    - ▶ HTN
    - ▶ Recent Surgery
    - ▶ MI
  - ▶ Current Meds and Last Dose
    - ▶ Aspirin, Plavix?
    - ▶ Coumadin, Aggrenox?
    - ▶ Other?