

Regional Stroke Plan



The BorderRAC Stroke System of Care functions to:

1. Ensure effective interaction and collaboration among the agencies, services, and people involved in providing prevention and the timely identification, transport, treatment, and rehabilitation of individual stroke patients in a locality or region.
2. Promote the use of an organized, standardized approach in each facility and component of the system.
3. Identify performance measures (both process and outcomes measures) and include a mechanism for evaluating effectiveness through which the entire system and its individual components continue to evolve and improve.

This Plan was developed in accordance with generally accepted Stroke guidelines and procedures for implementation of a comprehensive Emergency Medical Services (EMS) and Stroke System plan. This plan does not establish a legal standard of care, but rather is intended as an aid to decision-making in general patient care scenarios. It is not intended to supersede the physician's prerogative to order treatment.

Dispatch

Early access to the emergency system is critical for patients experiencing a stroke. Dispatchers operate under standardized, written, often computerized (Computer Assisted Dispatch) protocols. Such protocols are developed nationally and then modified locally or regionally. The ideal system has intense quality improvement programs to ensure that dispatchers follow protocols and procedures correctly and consistently.

Pre-hospital Triage

Patients will be identified, rapidly and accurately assessed, and based on identification of their actual or suspected onset of symptoms, will be transported to the nearest appropriate TSA-I stroke facility.

To ensure the prompt availability of medical resources needed for optimal patient care, patients with stroke symptomology will be assessed using the Los Angeles Prehospital Stroke Scale (LAPSS). If the LAPSS is positive, severity (the potential of an emergency large vessel occlusion) will be assessed for utilizing the Los Angeles Motor Score (LAMS).

Patients should be transported without delay to a designated Stroke Center. For rural/frontier areas, consideration should be given to air evacuation for these patients. Identify "Code Brain" in report to receiving facility. Be prepared to relay pertinent patient information including results of LAPSS and LAMS. To determine severity, if the LAPSS is positive for stroke, the Los Angeles Motor Scale (LAMS) will be performed to assess for potential of a Large Vessel Occlusion (LVO). A LAMS score of ≥ 4 is indicative of an LVO and should be transferred to a Comprehensive Stroke Center.

Assess and document current medications for any Novel Oral Anti-Coagulants (NOAC).

Stroke Facility Definitions/Designation

- **Level I - Comprehensive Stroke Center (CSC)** is defined as a facility or system with the necessary personnel, infrastructure, expertise, and programs to diagnose and treat stroke patients who require a high intensity of medical and surgical care, specialized tests, or interventional therapies. This center requires survey by an approved surveying body and designation by the Texas Department of State Health Services.
- **Level II – Advanced Primary Stroke Center (APSC)** has the necessary staffing, infrastructure, and programs to stabilize and treat acute stroke patients and has 24/7 endovascular capability. This center requires survey by an approved surveying body and designation by the Texas Department of State Health Services.
 - **Level III - Primary Stroke Center (PSC)** has the necessary staffing, infrastructure, and programs to stabilize and treat most acute stroke patients. This center requires survey by an approved surveying body and designation by the Texas Department of State Health Services. The Joint Commission also identifies Primary Stroke Centers as centers that provide services with critical elements to achieve long-term success in improving outcomes.
- **Level IV – Acute Stroke-Ready Center** – has the necessary staffing and infrastructure to provide immediate and time-critical care to the stroke patient, including initial emergency evaluation and screening, stroke scale assessment, and, if indicated, thrombolytic treatment prior to transfer to a higher level of stroke capable center.

When a facility in the BorderRAC Region decides to proceed with initial stroke designation or upgrade of current stroke designation, the facility shall formally notify the RAC of its plans to seek stroke designation and at what level. The facility will address the System Performance Improvement Committee attesting to its readiness to proceed and anticipated timeline. Once readiness is confirmed, the System Performance Improvement Committee will allow regional EMS agencies to change transport destinations. This change is provided for six months to allow the facility to build a pool of patients for survey while not prolonging the preparation and survey scheduling.

Facility Triage and Bypass

Rapid and accurate detection of stroke by prehospital providers at the time of first contact is crucial for timely initiation of appropriate treatment. Prehospital triage includes the on-scene assessment utilizing the Los Angeles Prehospital Stroke Scale (LAPSS) to identify potential stroke victims. To determine severity, if the LAPSS is positive for stroke, the Los Angeles Motor Scale (LAMS) will be performed to assess for potential of a Large Vessel Occlusion (LVO). A LAMS score of ≥ 4 is indicative of an LVO.

Suspected stroke patients will be safely and rapidly transported to the nearest appropriate stroke facility within TSA I. When in doubt, patients should be transported to a designated stroke center. If unable to establish and/or maintain an adequate airway, the patient should be taken to the nearest acute care facility for stabilization.

Addendum – EMS Stroke Transport Algorithm

Mobile Stroke Unit

UMC El Paso Mobile Stroke Team is integrated into the emergency dispatch system, if a dispatcher believes the patient is experiencing stroke-like symptoms, the UMC Mobile Stroke Team may be immediately dispatched to the scene to provide rapid scan time, immediate imaging, and onboard treatment.

Helicopter Activation

TSA-I regional air transport resources will be appropriately utilized in order to reduce delays in providing optimal stroke care.

- Helicopter activation/scene response should be considered when it could reduce transportation time for patients with onset of symptoms between 3 and 24 hours.
- Patients transported via helicopter should be taken to the most appropriate stroke facility.

Capability Limitations

TSA-I designated stroke facilities will communicate capability limitations promptly to regional EMS and other facilities by identifying CT scan capability in EMResource. This will ensure that stroke patients are transported to the nearest appropriate stroke facility. If patient is on Novel Anti-Coagulants (NAC) transfer to stroke facility with reversal capability.

Inter-Hospital Transfers

Stroke patients with special needs may be transferred within the region to an appropriate stroke facility for assessment and treatment. If resource needs exceed current regional capabilities, transfer to a higher level of care stroke facility outside the region should be expedited.

Stroke patients in TSA-I are transported according to patient need, availability resources, and environmental conditions. Transport via BLS, ALS, or MICU ground ambulance is available throughout the Region. A medical professional competent in thrombolytic therapy and NIH Stroke Scale assessments MUST accompany the patient for infusion monitoring. Air Medical transport (fixed and rotor wing) is also available in this Region.

A Stroke Transfer Checklist is available for inter-hospital transfers. **Addendum -Stroke Transfer Checklist**

Indicators of when to consider a transfer

Hemorrhagic Stroke

- Large volume intracerebral hematoma
- greater than 5cm on CT
- Concern for expanding hematoma
- Rapidly declining mental status, especially requiring intubation
- Hunt Hess score > 3

Ischemic Stroke

- NIHSS > 4
- Signs & symptoms consistent with large vessel occlusion: LAMS \geq 4
- “Give and Go”
- Stroke in the young (<55 years of age)

Efforts to facilitate access and transitions in care should focus on reducing disparities in stroke care.

Consideration of the following will assist to better identify appropriate patient transport location.

- **Urban** areas have abundant healthcare resources, with access to one or more TSCs/CSCs within 30 minutes transport time by EMS ground
- **Suburban** areas may have access to both community hospitals and suburban or urban advanced stroke centers with a 30-60 minutes transport time by EMS air or ground
- **Rural** areas have limited local general healthcare resources and ground EMS transport times not within 60 minutes but may be one within 60 minutes by air.

Documentation

A 24-hour documentation tool will be utilized in all patients transferred from one facility to another. This will heighten the continuity of care and assure all elements of patient monitoring have documented. [Addendum-Thrombolytic Monitoring tool](#)

Stroke Patient Rehabilitation

Rehabilitation and continued care of the stroke patient will be a coordinated effort involving but not limited to the stroke patient, the patient’s family, physicians, stroke facility and referring facility. The goal of this region is to provide the best possible care for a stroke survivor and reduce mortality, maximize recovery, and prevent recurrent stroke and cardiovascular events.

Prevention Education

Public education will be directed at primary and secondary prevention targeting populations at increased risk for stroke and poor outcomes after stroke and their immediate families and will focus on signs and symptoms of stroke, risk factors as well as the need to rapidly access the emergency healthcare system (by calling 9-1-1) and recovery.

System Performance Improvement

A regional system performance improvement program will identify opportunities for treatment efficiencies within the system and allow targeted education. Data is collected utilizing the RAC Data Collaborative as the data reservoir.

In order to demonstrate active participation in the Regional Stroke System, all regional partners shall participate in data collection.

Goals of data collection will be to identify:

- Numbers of patients
- Demographic propensities
- Types of strokes
- Types of treatment provided
- Timelines for providing treatment
- Measurement of outcomes
- Time of initiation of transfer process and receipt at the receiving hospital
- Criteria by which patients are considered for endovascular treatment

Referral filters include:

- EMS: Positive stroke scale – Code Brain not communicated
- EMS: Patient transported to inappropriate facility based on LAPSS/LAMS
- Delay in diagnosis
- DIDO > 60 min for transfers
- Thrombolytic indicated, not given
- Neuro-intervention indicated, not given (or missed window)
- Patient diagnosed with stroke discharged from original hospital and reappeared at another hospital within 30 days.

The committee will determine data elements to be reviewed for system performance. Consolidated data will be provided to the Stroke Sub-Committee and to System Performance Committee to further advance the Regional Stroke System of Care.

Regional Stroke Treatment Guidelines

- All care will be facilitated by hospital and EMS evidence-based treatment protocols.
- All hospitals will utilize recognized clinical practice guidelines such as those published by the American Heart Association/American Stroke Association and the Brain Attack Coalition.

Special Populations

Pediatrics

Strokes are primarily associated with adults however; the management of pediatric stroke patients requires specialized care. Challenges include managing urgent sedation and imaging. Hospitals in the region utilize Image Gently to avoid overexposure to radiation. Risk factors and causes of pediatric stroke differ from adult stroke patients. Obtaining a perinatal history on any child with a collection of symptoms to determine predisposition to stroke. The risk of stroke in children peaks in the perinatal period and is the greatest during the first year of life.

Perinatal factors that may contribute to a stroke may include

- Maternal history of infertility
- Chorioamnionitis
- Premature rupture of membranes
- Maternal preeclampsia

Pediatric comorbidities

- Congenital Heart Disease
- MoyaMoya disease
- Abnormalities of arteries of the brain
- Autoimmune Disorders
- Blood Clotting Disorders
- Sickle Cell Anemia

Common pediatric stroke mimics: alcoholic intoxication, cerebral infections, drug overdose, hypoglycemia, hyperglycemia, genetic/metabolic disorders, atypical migraines, neuropathies (e.g. Bell's palsy), seizure, post-ictal state and tumors.

Maternal

Women with cardiovascular disease or specific pregnancy related conditions are at increased risk for thromboembolic stroke in the 6 weeks postpartum and the risk, remains elevated up to 12 weeks postpartum. Primary cause of maternal death is hemorrhagic stroke caused by untreated severe hypertension.

A regional MOM Band was created and placed on patients with preeclampsia or severe hypertension to wear for 6 weeks after discharge. It serves as a reminder for patients or family members to tell health care providers that they recently had a baby. The band helps health care providers to instantly recognize that the patient is at risk for preeclampsia and promotes more timely and appropriate care. EMS, ED and L&D units may perform stroke assessment for postpartum patients presenting with elevated blood pressure SBP \geq 160 and/or DBP \geq 110 and symptoms of preeclampsia and/or stroke. A checklist is available for Emergency Department guidance. [Addendum- ED Postpartum Preeclampsia Checklist.](#)

Bariatric

CT scans are available for imaging for persons with obesity and/or morbid obesity with the max load weight of 675 pounds (308 Kg). A list of local CT scans and weight capability for bariatric outpatient imaging is available.

[Addendum- CT Outpatient Imaging](#)

Levels of Harm

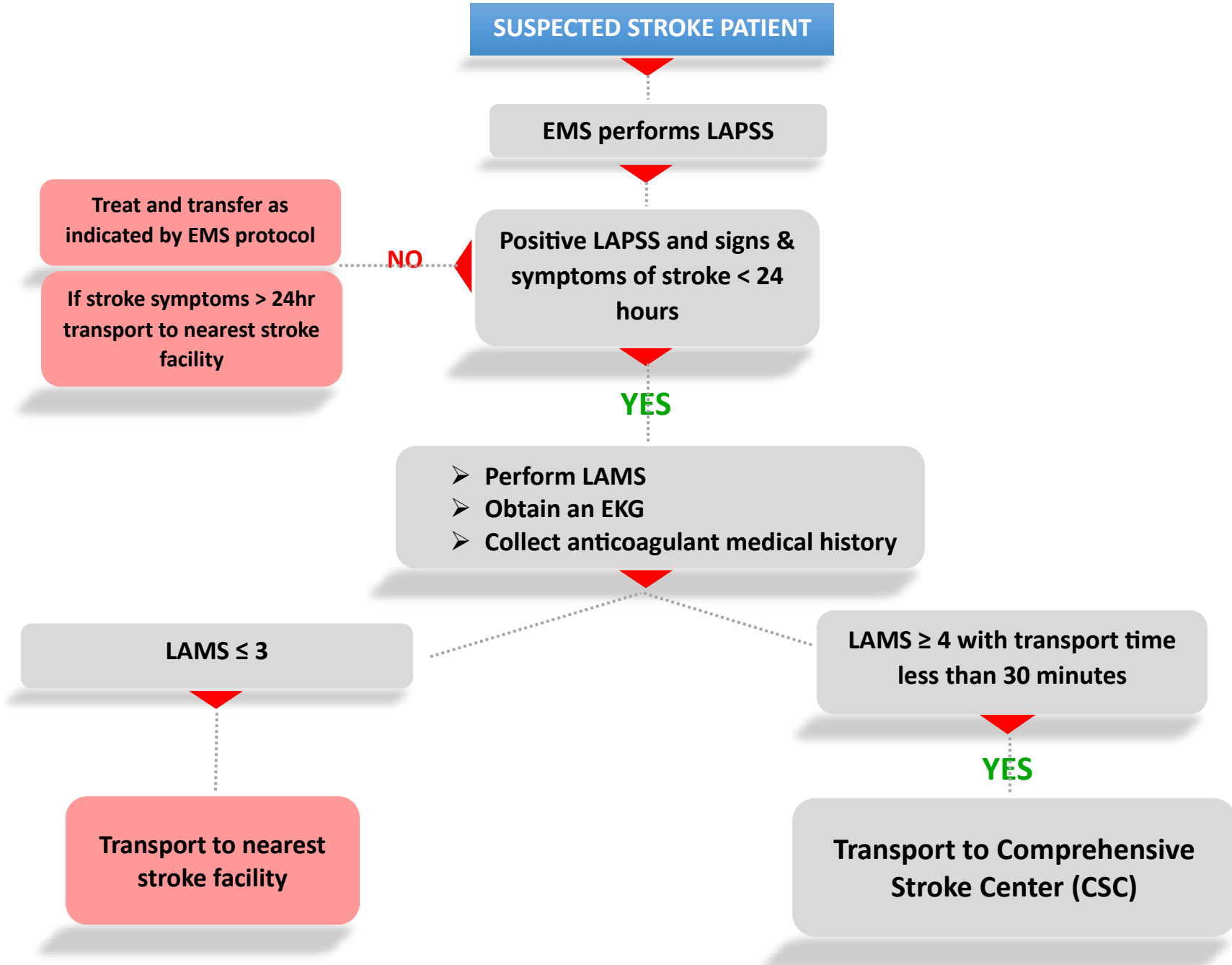
Regional aggregated data is reviewed to identify and address any system process opportunities that may affect patient outcomes. For example, if regional data demonstrates a delay in door-in-door-out (**DIDO**) times, this can be cross-referenced with NIHSS and Modified Rankin Score (mRS), treatment therapies, arrival mode and times, etc. and analyzed for process improvement measures.

The **NIHSS** measures the level of brain damage from a stroke along with physical and cognitive impairment.

Modified Rankin Score (mRS) is a disability scale for outcome measures.

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EMS Stroke Transport Algorithm



Regional Stroke Transfer Checklist



Patient full name _____ DOB _____

Stroke: when to consider a transfer

Hemorrhagic Stroke	Ischemic Stroke
<ul style="list-style-type: none"> Large volume intracerebral hematoma greater than 5cm on CT Concern for expanding hematoma Rapidly declining mental status, especially requiring intubation Hunt Hess score > 3 	<ul style="list-style-type: none"> NIHSS > 4 Signs & symptoms consistent with large vessel occlusion: LAMS \geq 4 “Give and Go” Stroke in the young (<55 years of age)

STROKE TRANSFER CHECKLIST

- Arrival Time Hospital: _____
- “Last time known well” Date and Time _____
- Date/Time of symptom onset _____
- Presenting symptom _____
- Glucose _____
- Last dose of anticoagulant _____
- NIHSS documentation to assess improvement or decline upon arrival to Comprehensive Stroke Center
 - NIH stroke scale on arrival to your hospital _____ Time _____
 - NIH Stroke Scale at time of transfer _____ Time _____
- Brief documentation of ALL therapies initiated at your hospital
 - If IV thrombolytic therapy is excluded, please document rationale _____
 - If IV thrombolytic therapy is administered, type and time given _____
 - Initiated IV thrombolytic monitoring tool (attached)

<p><u>Modified Rankin Score (mRS)</u> <u>(premorbid function)</u></p> <p>Y N Live alone x 1 week</p> <p>Y N Walk unassisted</p>

PATIENT RECORD ITEMS NEEDED:

- Send Results of all diagnostic testing performed, including lab results and imaging exams.
(All imaging exams transferred to CD whenever possible)
- Pertinent elements of patient past medical history (especially atrial fibrillation, anticoagulant therapy, congestive heart failure, prior strokes, prior intracerebral hemorrhage, recent surgeries or instrumentation and trauma.
- List of patient’s current medications
- Allergies to Medications

***Source of this information** Patient or family member (authorized to give consent)

Contact information of family member: Name _____ Cellphone _____

Acquisition of these items should not delay the transfer of the patient. Emergent transfer minimizing time to presentation an absolute priority.

Completed by: _____ Date: _____

Hunt and Hess Scale

The Hunt and Hess scale describes the clinical severity of subarachnoid hemorrhage resulting from the rupture of an intracerebral aneurysm and used as a predictor of survival.

Hunt and Hess Grade	Criteria
1	Asymptomatic, mild headache, slight nuchal rigidity
2	Moderate to severe headache, nuchal rigidity, no neurologic deficit other than cranial nerve palsy
3	Drowsiness/confusion, mild focal neurologic deficit
4	Stupor, moderate-severe hemiparesis
5	Coma, decerebrate posturing

Intracerebral Hemorrhage – ICH Score

The ICH score grades ICH severity and subsequent 30-day mortality, thus helping to guide goals of care conversations with patients' families. The score allows for a standardized and consistent clinical grading scale for ICH, thus improving communication among clinicians.

Feature	Finding	Points
GCS	3-4	2
	5-12	1
	13-15	0
Age	>=80	1
	<80	0
Location	Infratentorial	1
	Supratentorial	0
ICH Volume	>-30cc	1
	<30cc	0
Intraventricular Blood	Yes	1
	No	0
ICH Score		0-6 points

ICH Score	30 day Mortality
0	0%
1	13%
2	26%
3	72%
4	97%
5	100%
6	100%

The Los Angeles Motor Scale

<p>Los Angeles Motor Scale (LAMS)</p> <p>Score ≥ 4 Sensitivity 81% Specificity 89%</p>	Facial Droop	
	Absent	0
	Present	1
	Arm Drift	
	Absent	0
	Drifts Down	1
	Falls Rapidly	2
	Grip Strength	
	Normal	0
	Weak	1
No Grip	2	
Total		

**A score of ≥ 4
is "positive" for a
Large Vessel Occlusion
Stroke.**

Emergency Department

Postpartum Preeclampsia Checklist

If Patient <6 weeks Postpartum with:

- BP > 160/110 or
- BP > 140/90 with unremitting headache, visual disturbances, epigastric pain

Call for OB consult; (document call)

Designate:

- Team Leader
- Checklist reader/recorder
- Primary RN

Place IV

If seizing, proceed with anticonvulsant therapy

Draw preeclampsia labs:

- CBC
- PT
- PTT
- Fibrinogen
- CMP
- Urine Protein/Creatinine Ratio
- Type and Screen
- LDH

Ensure medications appropriate given patient history

- Administer antihypertensive therapy. If unable to establish IV, use oral Nifedipine
- Contact MFM or Critical Care for refractory blood pressure
- Consider indwelling urinary catheter. Maintain strict I&O (patient at risk for pulmonary edema)
- Administer seizure prophylaxis with magnesium sulfate
- Brain imaging if unremitting headache or neurological symptoms

* Active asthma is defined as:

- Symptoms at least once a week, or
- Use of an inhaler, corticosteroids for asthma during the pregnancy, or
- Any history of intubation or hospitalization for asthma

Antihypertensive Medications

For SBP 160 or DBP 110

Labetalol (initial dose 20mg**); Avoid parenteral labetalol with active asthma*, heart disease, or congestive heart failure; use with caution with history of asthma.

Hydralazine (5-10 mg IV** over 2 min); May increase risk of maternal hypotension

Oral Nifedipine (10 mg capsules); Capsules should be administered orally, not punctured or otherwise administered sublingually

**Maximum cumulative IV- administered doses should not exceed 220 mg labetalol or 25mg hydralazine in 24 hours

Note: If first line agents unsuccessful, emergency consult with specialist (MFM, internal medicine, OB anesthesiology, critical care) is recommended

Seizure Therapy

Prophylaxis Therapy

Magnesium Sulfate

Contraindications: Myasthenia gravis.

Avoid pulmonary edema, use caution with renal failure.

IV access:

- Load 4 grams 10% magnesium sulfate in 100mL solution over 20 min
- Label magnesium sulfate; connect to labeled infusion pump
- Magnesium sulfate maintenance 2 grams/hour

No IV access:

- 10 grams of 50% MgSO4 solution IM (5g /10 ml plus 1mL of 2% lidocaine Z-track to each buttock)

Anticonvulsant Therapy

For recurrent seizures or when magnesium sulfate contraindicated

- Lorazepam(Ativan): 2-4 mg IVx1, may repeat once after 10-15 min
- Diazepam(Valium): 5-10mg IV q 5-10 min



Imaging CT Girth

	A	B	C	D	E
1	<u>Outpatient Imaging</u>	<u>Address:</u>	<u>Phone Numbers</u>	<u>Bariatric CT (weight lbs/kg)</u>	<u>Girth-width</u>
2	Akumin (West)	10501 Gateway Blvd West Ste 140	(915) 544-7300	650 lbs 294.83kg	States only weight based
3	Akumin (Osborne)	4930 Osborne Ste H El Paso TX 79922	(915) 544-7300	550 lbs 249.47kg	States only weight based
4	Akumin (Northeast)	9870 Gateway Blvd North El Paso TX 79924	(915) 544-7300	500 lbs 226.79kg	States only weight based
5	Akumin (Joe Battle)	2204 Joe Battle Blvs Ste 107	(915) 544-7300	500 lbs 226.79kg	States only weight based
6	Akumin (Cliff Drive)	1700 E. Cliff Dr El Paso TX 79902	(915) 544-7300	400 lbs 181.43kg	States only weight based
7	Desert Imaging (West)	122 West Castellano	(915) 577-0100	350 lbs 158.75kg	States only weight based
8	Desert Imaging (East)	1727 Lee Trevino El Paso TX	(915) 577-0100	350 lbs 158.75kg	States only weight based
9	Diagnostic Outpatient Imaging (EAST)	1426 George Dieter El Paso TX 79936	(915) 881-1900	550 lbs 226.79kg	72 cm
10	Sun City Emergency Room (East)	3281 Joe Battle Blvd, El Paso, TX 79936	(915) 308-4218	450 lbs 204.11kg	States only weight based
11	Sun City Emergency Room (West)	351 Redd Rd, El Paso, TX 79932	(915) 209-4699	450 lbs 204.11kg	States only weight based
12	THOP Emergency Room-Montwood	1890 George Dieter Dr, El Paso TX 79936	(915) 225-7100	350 lbs 158.75kg	25-27 inches
13	THOP Emergency Room-Edgemere	12101 Edgemere Blvd, El Paso, TX 79938	(915) 832-2490	500 lbs 226.79kg	63-65 cm
14	Total Care West -(THOP)	601 Sunland Park Dr, El Paso, TX 79912	(915) 577-8400	350 lbs 158.75kg	States only weight based
15	<u>Hospital</u>	<u>Address:</u>		<u>Bariatric CT(weight lbs/kg)</u>	<u>Girth-width</u>
16	Del Sol Medical Center	10301 Gateway Blvd W, El Paso, TX 79925	(915) 595-9000	400 lbs 181.43kg	66 cm
17	El Paso Childrens Hospital	4845 Alameda Ave, El Paso, TX 79905	(915) 298-5444	675 lbs 306.17kg	States only weight based
18	Las Palmas Medical Center	1801 N Oregon St, El Paso, TX 79902	(915) 521-1200	350-400 lbs 158.75kg- 181.43kg	27 inches
19	THOP East Campus	3280 Joe Battle Blvd, El Paso, TX 79938	(915) 832-2000	600 lbs 272.15kg	72 cm
20	THOP Memorial Campus	2001 N Oregon St, El Paso, TX 79902	(915) 577-6011	600 lbs 272.15kg	29 inches
21	THOP Sierra Campus	1625 Medical Center St Drive, El Paso, TX 79902	(915) 747-4000	Room 1: 600 lbs 272.15kg	72 cm
22	THOP Sierra Campus	1625 Medical Center St Drive, El Paso, TX 79902	(915) 747-4000	Room 2: 420 lbs 190.50kg	72 cm
23	THOP Trans Mtn Campus	2000 Woodrow Bean Transmountain Dr, El Paso, TX 79911	(915) 877-8136	500 lbs 226.79kg	55 cm
24	UMC Hospital	4815 Alameda Ave El Paso TX 79905	(915) 544-1200	600 lbs 272.15kg	States only weight based
25	UMC Northeast	9839 Kentworthy St El Paso TX 79924	(915) 231-2300	500 lbs 226.79kg	States only weight based
26	UMC East	1521 Joe Battle Blvd El Paso TX 79936	(915) 790-5700	500 lbs 226.79kg	States only weight based
27	Mobile Stroke Unit				15.7 inches (40cm) strictly head CT's
28	William Beamount Army Medical Center	18511 Highlander Medics St, Fort Bliss TX 79936	(915) 742-2273	500 lbs 226.79kg	2.6 Ft (78 cm)