

ACLS PEARLS FROM LBW – KNOW! KNOW! KNOW! YOUR ALGORITHMS

ALL PULSELESS RHYTHMS RECEIVE EPI AS FIRST DRUG AFTER CPR/AIRWAY/O₂
DEAD = Draw Epi And Deliver

ELECTRICAL SHOCK THERAPY = **2 benign** (SVT/A-flutter synch at 50), **2 potentially lethal** (A-fib/V-tach with pulse synch at 100), **2 lethal** (V-tach no pulse/V-fib) defib at 360

PULSELESS ELECTRICAL ACTIVITY & ASYSTOLE

CAUSES: **PATCH 5 MD**

Pulmonary Embolus
Acidosis
Tension Pneumothorax
Cardiac Tamponade
Hypoxia
Hypothermia
Hypo/hyperkalemia
Hypovolemia - Trauma
Hypoglycemia
Massive MI
Drug Overdose

V-FIB/PVT

CPR – 2 MINS
SHOCK – 360
CPR – 2 MINS
SHOCK – 360/CPR 2 mins
V (vasopressin) **OR**
E (epi q 5)
SHOCK – 360/CPR 2 mins
A (Amiodarone) **OR**
L (lido max 3 mg/kg)
SHOCK - 360/CPR 2 mins
DRUG
SHOCK – 360/CPR 2 MINS
DRUG

Treat **PEA & ASYSTOLE** ⇒ Pulseless, give Epi and/or Atropine (in PEA only if monitor rate is <60)

NARROW REGULAR TACHYCARDIA

Treat: **V ABC**

Vagal maneuvers
Adenosine

Beta blockers **OR**
Calcium channel blockers

BRADYCARDIC RHYTHMS

Treat: **TA DET**

Transcutaneous Pacer Prepare 1st
Atropine (for narrow brady ONLY)
Dopamine Drip
Epinephrine Drip
Transvenous Pacer

NARROW IRREGULAR TACHYCARDIA

Treat: Beta blockers **OR**
Calcium channel blockers

WIDE REGULAR TACHYCARDIA

Treat: Amiodarone **OR**
Lidocaine
Treat SVT with Aberrancy:
Adenosine

WIDE IRREGULAR TACHYCARDIA

Treat A-FIB: Diltiazem
Amiodarone
Beta Blockers
Treat Torsades:
Magnesium
Treat A-fib with WPW:
Amiodarone
AVOID: ADENOSINE
CA CHANNEL BLOCKERS
DIGOXIN

SS/DD: Stable or Sick-Impaired = some sx/sx but good BP and **NO** altered LOC ⇒ Drug therapy
Dying-Impaired or Dead = sx/sx with ↓ **BP** and/or **ALTERED LOC** ⇒ Electrical therapy

ALL UNSTABLE PATIENTS RECEIVE ELECTRICAL THERAPY – SYNCH OR UNSYNCH

DIFFERENTIAL DIAGNOSES FOR ALL DYSRHYTHMIAS

6 Hs AND 5 Ts

Thrombosis
<u>Tension Pneumothorax</u>
Tamponade, cardiac
Trauma
Toxins
<u>Hypoxia</u>
<u>Hydrogen ions</u>
Hypothermia
<u>Hypovolemia</u>
Hypo/Hyperkalemia
<u>Hypoglycemia</u>

PATCH 5 MD

Pulmonary embolus (thrombus)
Acidosis (hydrogen ions)
Tension Pneumothorax
Cardiac Tamponade
Hypoxia
Hypoglycemia
Hypothermia
Hypo/Hyperkalemia
Hypovolemia (trauma)
Massive MI (thrombus)
Drug OD (toxins)

ELECTROLYTE ABNORMALITIES

<p>CAUSES OF HYPERKALEMIA Chronic Renal Failure Metabolic Acidosis Chemotherapy Rhabdomyolysis Medications Blood administration</p>	<p>MANAGEMENT OF HYPERKALEMIA Mild – Diuretics, Kayexalate Moderate – Glucose plus insulin drip and Sodium Bicarbonate Severe – CaChloride, Sodium Bicarb, Glucose with insulin Dialysis</p> <p>SIGNS AND SYMPTOMS OF HYPERKALEMIA Weakness, ascending paralysis, respiratory failure, Tall peaked T's, flat P's, prolonged PRI, wide QRS, IVR, asystole</p>
<p>CAUSES OF HYPOKALEMIA GI loss from diarrhea, laxatives Renal loss Severe hyperglycemia Intracellular shift (alkalosis) Malnutrition</p>	<p>MANAGEMENT OF HYPOKALEMIA Minimize further loss IV administration of potassium Gradual correction preferred</p> <p>SIGNS AND SMPTOMS OF HYPOKALEMIA Weakness, fatigue, paralysis, constipation, paralytic ileus, leg cramps, U waves, flat T's, vent arrhythmia, asystole, PEA</p>
<p>CAUSES OF HYPERNATREMIA Primary gain of sodium Excessive loss of water Hyperaldosteronism or Cushing's syndrome Hypertonic saline solution Sodium bicarbonate</p>	<p>MANAGEMENT OF HYPERNATREMIA Reduce water losses/correction of water deficits Avoid D₅W</p> <p>SIGNS AND SYMPTOMS OF HYPERNATREMIA Altered mental status, seizures, coma, weakness, irritability, focal neurologic deficits</p>
<p>CAUSES OF HYPONATREMIA Excess water Loss of sodium in the urine Renal failure, CHF, cirrhosis Vomiting SIADH, hypothyroidism</p>	<p>MANAGEMENT OF HYPONATREMIA Administer sodium (3%) and eliminate intravascular free water</p> <p>SIGNS AND SYMPTOMS OF HYPONATREMIA Asymptomatic unless acute and severe, cerebral edema, nausea, vomiting, headache, irritability, lethargy, seizures, coma, death</p>
<p>CAUSES OF HYPERCALCEMIA Hyperparathyroidism Malignancy</p> <p>SIGNS AND SYMPTOMS OF HYPERCALCEMIA = Depression, confusion, weakness, fatigue, hallucinations, hypotonicity, disorientation, hypertension, cardiac arrhythmias, short QT, hypokalemia, worsens Dig toxicity, dysphagia, peptic ulcers, constipation, peptic ulcers</p>	<p>MANAGEMENT OF HYPERCALCEMIA Restore intravascular volume and promote calcium urine excretion with 0.9% saline at 300-500 mL/h OR Hemodialysis</p>
<p>CAUSES OF HYPOCALCEMIA Thyroid surgery Magnesium abnormalities</p> <p>SIGNS AND SYMPTOMS OF HYPOCALCEMIA = paresthesias of extremities and face, muscle cramps, carpopedal spasm, stridor, tetany, seizures, hyperreflexia, decreased myocardial contractility, heart failure</p>	<p>MANAGEMENT OF HYPOCALCEMIA Administer Calcium gluconate or calcium chloride, correct other abnormalities with magnesium, potassium and pH</p>
<p>CAUSES OF HYPERMAGNESEMIA Renal failure</p> <p>SIGNS AND SYMPTOMS OF HYPERMAGNESEMIA = muscular weakness, respiratory depression, paralysis, ataxia, drowsiness, confusion, vasodilation, hypotension, bradycardia, cardiac arrhythmias, cardiorespiratory arrest</p>	<p>MANAGEMENT OF HYPERMAGNESEMIA Calcium chloride or dialysis</p>
<p>CAUSES OF HYPOMAGNESEMIA Decreased absorption or loss From kidneys or diarrhea</p> <p>SIGNS AND SYMPTOMS OF HYPOMAGNESEMIA = Muscle tremors/fasiculations, ocular nystagmus, tetany, Torsades, ataxia, vertigo, seizures, dysphagia</p>	<p>MANAGEMENT OF HYPOMAGNESEMIA Magnesium sulfate and possibly calcium</p>

1. BRADYCARDIA



Absolute = <60 BPM
Relative = less than expected for patient or condition



Assess ABC's, include blood pressure, oximetry
Manage Airway ⇒ Oxygen, BVM, LMA, Combitube, Intubate
Monitor ECG (identify rhythm) and then obtain 12 Lead
Establish IV



Signs or Symptoms of poor perfusion caused by the bradycardia
acute altered mental status, chest pain, hypotension, pulmonary edema, seizures, syncope, or other signs of shock



ADEQUATE PERFUSION ----- Observe/Monitor



POOR PERFUSION



Prepare for Transcutaneous Pacing (TCP)
Use w/o delay for high degree blocks - 2° II or 3° AVB



Consider Atropine while waiting for pacer
0.5 q 3-5 min total 3 mg (may worsen myocardial ischemia/infarct)
If ineffective use pacer
USEFUL FOR: sinus bradycardia or nodal level blocks



Consider Dopamine drip @ 2 - 10 mcg/kg/min **OR Epinephrine** drip @ 2 - 10 mcg/min
While awaiting pacer or if pacing ineffective



Prepare for Transvenous Pacing

Consider Differential Diagnoses: (6H and 5T) PATCH 5 MD

****DENERVATED HEARTS:**

DO NOT RESPOND TO ATROPINE – GO TO PACING, CATECHOLAMINE INFUSION OR BOTH

2. NARROW (<0.12) QRS COMPLEX TACHYCARDIAS **STABLE AND REGULAR:**

POSSIBLY SINUS TACH, SVT, AVNRT, A-FLUTTER, ATRIAL TACH, JUNCTIONAL TACH

Assess ABC's, include blood pressure, oximetry
Manage Airway ⇒ Oxygen, BVM, LMA, Combitube, Intubate
Monitor ECG (identify rhythm)
Identify and treat reversible causes – **PATCH 5 MD**
Establish IV and Obtain 12 lead ECG



Vagal Maneuvers - Blowing through straw, blowing on thumb, bearing down, ice to face, IV
Consider Differential Diagnoses: (6H and 5T) PATCH 5 MD



Adenosine 6 mg RAPID IV over 1 - 3 sec – FOLLOWED by 20 mL flush/ARM elevation
May repeat x 2 at 12 mg in 1 - 2 min. **RAPID IV**



CONVERSION?? ----YES
PROBABLY REENTRY SVT – Observe for recurrence and treat with Adenosine
CONSIDER EXPERT CONSULTATION

CONVERSION?? ----NO
POSSIBLY A-flutter, MAT, Junctional tach



May treat with:

Calcium Channel Blockers
Verapamil 2.5 - 5 mg slow IVP MR at 5 - 10 mg in 15 - 30 min Max dose of 20 mg
OR
diltiazem 0.25 mg/kg followed by 2nd dose 0.35 mg/kg in 15 min

OR

Beta Blockers
atenolol 5mg IV SLOW over 5 mins, MR 5mg IV SLOW over 5 mins
OR
metoprolol 5mg IV SLOW q 5 mins for max dose of 15mg
OR
propranolol 0.1mg/kg IV SLOW divided into 3 equal doses at 2-3 min intervals (1mg/min push rate)
OR
esmolol 0.5mg IV over 1 min, followed by 4 min infusion of 0.05mg/kg/min

OR

Amiodarone for reentry SVT
150 mg in 100 mL over 10 min followed by 1 mg/min infusion for 6 hrs, then 0.5mg/mim drip for 18 hrs
May repeat 150 mg q 10 mins IV for recurrence ----- MAX 2.2gm/day

UNSTABLE REGULAR NARROW TACHYCARDIAS

IMMEDIATE SYNCHRONIZED CARADIOVERSION
SVT AND A-FLUTTER (50-100J)

Not likely to be effective for junctional tachycardia
SEDATION IF PATIENT IS CONSCIOUS – DO NOT DELAY CARADIOVERSION FOR THIS
CONSIDER EXPERT CONSULTATION

3. NARROW (<0.10) QRS COMPLEX TACHYCARDIAS

STABLE AND IRREGULAR:

PROBABLY A-FIB, POSSIBLY A-FLUTTER OR MAT

Assess ABC's, include blood pressure, oximetry
Manage Airway ⇒ Oxygen, BVM, LMA, Combitube, Intubate
Monitor ECG (identify rhythm)
Consider Differential Diagnoses: (6H and 5T) PATCH 5 MD
Establish IV and Obtain 12 lead ECG
CONSIDER EXPERT CONSULTATION



CONTROL RHYTHM: DURATION > 48 HRS OR UNKNOWN

These patients are at risk for cardioembolic events and must be anticoagulated first
Only attempt to convert rhythm if --- **UNSTABLE OR ABSENCE OF LEFT ATRIAL THROMBUS IS DOCUMENTED BY TRANSESOPHAGEAL ECHOCARDIOGRAPHY – (TEE)**

CONTROL RATE:

May treat with:

Calcium Channel Blockers

Verapamil 2.5 - 5 mg slow IVP MR at 5 - 10 mg in 15 - 30 min Max dose of 20 mg

OR

diltiazem 0.25 mg/kg followed by 2nd dose 0.35 mg/kg in 15 min

OR

Beta Blockers

atenolol 5mg IV SLOW over 5 mins, MR 5mg IV SLOW over 5 mins

OR

metoprolol 5mg IV SLOW q 5 mins for max dose of 15mg

OR

propranolol 0.1mg/kg IV SLOW divided into 3 equal doses at 2-3 min intervals (1mg/min push rate)

OR

esmolol 0.5mg IV over 1 min, followed by 4 min infusion of 0.05mg/kg/min

OR

Amiodarone IN THE HOSPITAL SETTING

150 mg in 100 mL over 10 min followed by 1 mg/min infusion for 6 hrs, then 0.5mg/min drip for 18 hrs

May repeat 150 mg q 10 mins IV for recurrence ----- MAX 2.2gm/day

to control rhythm or rate: Magnesium Sulfate or Ibutilide or Flecainide or Propafenone or Procainamide or Sotalol can be considered

UNSTABLE IRREGULAR NARROW TACHYCARDIAS

IMMEDIATE SYNCHRONIZED CARADIOVERSION

A-FIB (100-200J monophasic and 100-120J biphasic)

Not likely to be effective for MAT (multifocal/ectopic atrial tachycardia)

SEDATION IF PATIENT IS CONSCIOUS – DO NOT DELAY CARADIOVERSION FOR THIS

CONSIDER EXPERT CONSULTATION

4. WIDE (>0.10) QRS COMPLEX TACHYCARDIAS

STABLE AND REGULAR:

POSSIBLY V-TACH (rate over 100) OR SVT WITH ABERRANCY (rate >150)

Assess ABC's, include blood pressure, oximetry
Manage Airway ⇒ Oxygen, BVM, LMA, Combitube, Intubate
Monitor ECG (identify rhythm)
Consider Differential Diagnoses: (6H and 5T) PATCH 5 MD
Establish IV
Obtain 12 lead ECG

EXPERT CONSULTATION ADVISED



VENTRICULAR TACHYCARDIA:

Amiodarone 150 mg over 10 min
May repeat 150 mg in 10 min prn to **MAX DOSE OF 2.2 GM/24 HRS**

OR

IF AMIODARONE UNAVAILABLE
Lidocaine – **INITIAL DOSE:** 0.5 – 0.75mg/kg up to 1 - 1.5 mg/kg IVP
May repeat 0.5 - 0.75 mg/kg IVP every 5 - 10 min to total of 3 mg/kg



Whichever antiarrhythmic converts the rhythm, that is the drip of choice to start
Mix 1 gm in 250 mL = 4 mg/mL = 60 gtts for **Lidocaine** @ 1-4mg/min
Mix **Amiodarone** 360 mg over 6 hours (1mg/min) then 540 mg over last 18 hrs (0.5mg/min)



SVT WITH ABERRANCY:

Adenosine 6 mg **RAPID IV** over 1 - 3 sec – FOLLOWED by 20 mL flush/ARM elevation
May repeat x 2 at 12 mg in 1 - 2 min. **RAPID IV**

UNSTABLE REGULAR WIDE TACHYCARDIAS

IMMEDIATE SYNCHRONIZED CARディオVERSION
V-TACH (100-200J monophasic and 100-120J biphasic)
SEDATION IF PATIENT IS CONSCIOUS – DO NOT DELAY CARディオVERSION FOR THIS

5. WIDE (>0.10) QRS COMPLEX TACHYCARDIAS

STABLE AND IRREGULAR:

PROBABLY A-FIB WITH ABERRANCY, A-FIB WITH WPW, POLYMORPHIC V-TACH

Assess ABC's, include blood pressure, oximetry
Manage Airway ⇒ Oxygen, BVM, LMA, Combitube, Intubate
Monitor ECG (identify rhythm)
Consider Differential Diagnoses: (6H and 5T) PATCH 5 MD
Establish IV and Obtain 12 lead ECG
CONSIDER EXPERT CONSULTATION



CONTROL RATE:

May treat with:

Calcium Channel Blockers

diltiazem 0.25 mg/kg followed by 2nd dose 0.35 mg/kg in 15 min

OR

Beta Blockers

atenolol 5mg IV SLOW over 5 mins, MR 5mg IV SLOW over 5 mins

OR

metoprolol 5mg IV SLOW q 5 mins for max dose of 15mg

OR

propranolol 0.1mg/kg IV SLOW divided into 3 equal doses at 2-3 min intervals (1mg/min push rate)

OR

esmolol 0.5mg IV over 1 min, followed by 4 min infusion of 0.05mg/kg/min

A fib or flutter w/WPW – EXPERT CONSULTATION ADVISED

CONSIDER: Amiodarone 150mg over 10 mins

AVOID ⇒ Adenosine, β Blockers, Calcium Channel Blockers, Digoxin

UNSTABLE IRREGULAR WIDE TACHYCARDIAS

IMMEDIATE SYNCHRONIZED CARIOVERSION

V-TACH (100-200J monophasic and 120-200J biphasic)

Not likely to be effective for MAT (multifocal/ectopic atrial tachycardia)

SEDATION IF PATIENT IS CONSCIOUS – DO NOT DELAY CARIOVERSION FOR THIS

CONSIDER EXPERT CONSULTATION

RECURRENT POLYMORPHIC IRREGULAR V-TACH

SEEK EXPERT CONSULTATION

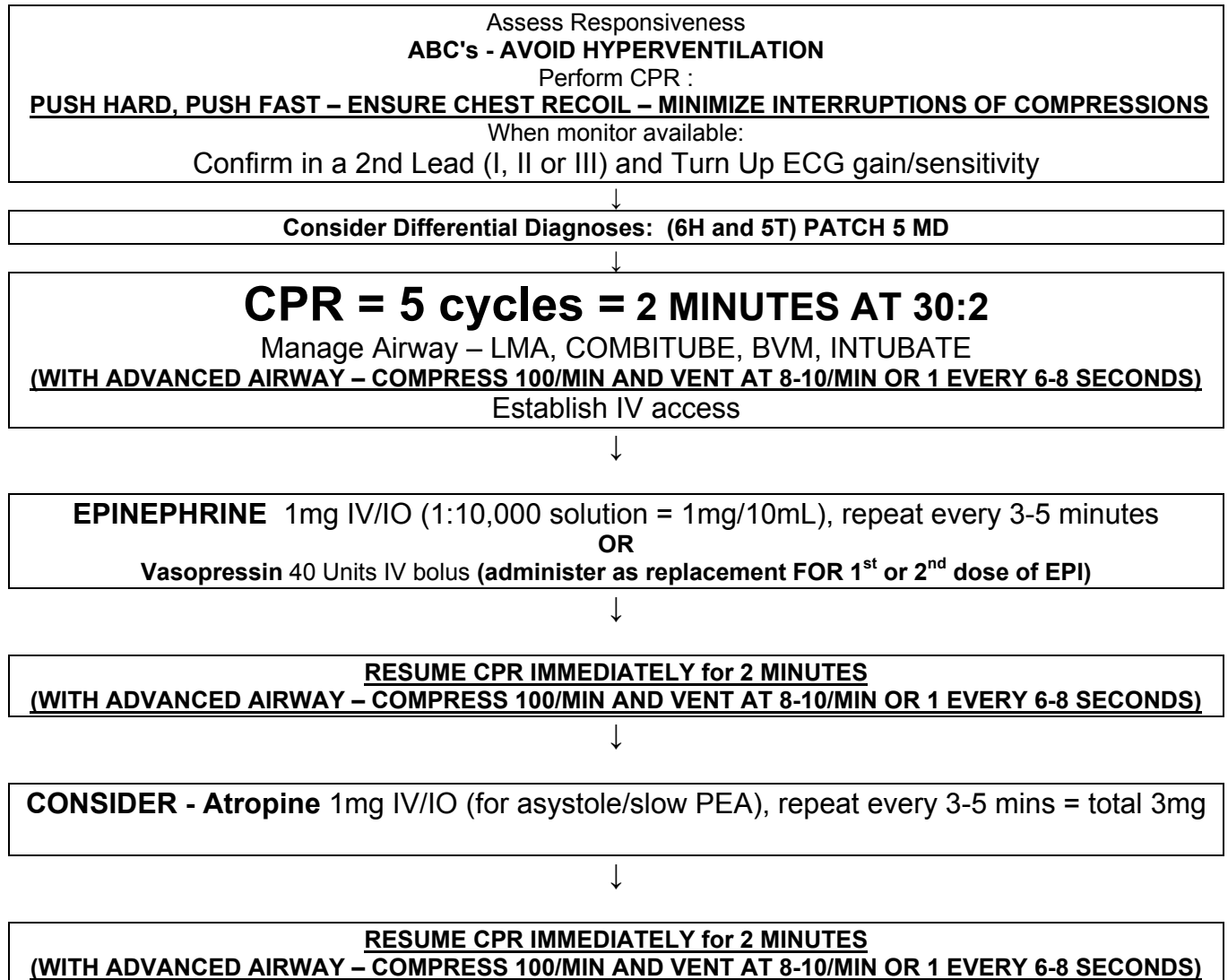
CONSIDER Magnesium sulfate 1-2gms in 50-100mL D₅W over 5-60 min if **TORSADES**

UNSTABLE = UNSYNCHRONIZED SHOCK IMMEDIATELY (#6)

6. V-FIB AND PULSELESS V-TACH



7. ASYSTOLE/PEA



Consider early termination of efforts

8a. ACUTE CORONARY SYNDROMES

Chest discomfort suggestive of ischemia



EMS ASSESSMENT AND CARE AND HOSPITAL PREPARATION

Monitor and support ABC's with blood pressure and oximetry
 Be prepared to provide CPR and defibrillation
 Establish IV
 Monitor and obtain 12 Lead
 Obtain History and eligibility for fibrinolytic therapy

GENERAL MANAGEMENT --- "MONA "

Oxygen in an appropriate amount

Aspirin 162 – 325 mg po (non enteric coating)

Nitroglycerin – 0.4 mg SL q 5 min to max of 3 or spray

Morphine Sulfate 2 mg+ increments until symptom free

****Lasix 20-40 mg IV or double daily dose - if the patient has Acute Pulmonary Edema**

IMMEDIATE ED ASSESSMENT (<10 MIN)

Check vital signs, evaluate oxygen saturation
 Establish IV
 Obtain and review 12 lead ECG
 Perform brief targeted history and physical exam
 Review and complete fibrinolytic checklist, check contraindications
 Obtain initial cardiac marker levels, electrolytes and coagulation studies
 Obtain portable chest x-ray (<30 mins)

GENERAL MANAGEMENT --- "MONA "

<u>ST ↑ OR NEW LBBB</u> STEMI	<u>ST ↓ OR T WAVE ↓</u> UA/NSTEMI	<u>NONDIAGNOSTIC</u> LOW RISK UA
Beta blockers	Beta blockers	If unstable – see UA/NSTEMI
Clopidogrel	Nitroglycerin IV	If stable – Cardiac markers
Heparin (UFH/LMWH)	Heparin (UFH/LMWH) Clopidogrel Glycoprotein IIb/IIIa inhibitors	12 lead, monitor, Echo
<p><u>IF SX/SX LESS THAN 12 HOURS:</u> Select reperfusion strategy - PCI w/in 90 min, surgery, fibrinolytic therapy w/in 30 min, ACE inhibitors w/in 24 hrs, statin therapy</p> <p><u>IF SX/SX MORE THAN 12 HOURS:</u> Early invasive strategy – catheterization and revascularization w/in 48 hrs of AMI, continue other therapies</p>		

8b. FIBRINOLYTIC CRITERIA FOR AMI

Patient symptomatic for less than 6 or even possibly 12 hours
Chest pain suggesting an MI
ST segment elevation > 1 mm in 2 or more contiguous leads, with new or presumable new LBBB, strongly suspicious for injury (BBB obscuring ST segment analysis)
Age < 75 years (age >75 years, Class IIa)

Absolute Contraindications:

History of hemorrhagic stroke or intracranial hemorrhage
Known structural cerebral vascular lesion (e.g. AVM)
Known malignant intracranial neoplasm (primary or metastatic)
Ischemic stroke or CVA within 3 months, EXCEPT acute ischemic stroke within 3 hours
Active internal bleeding (menses excluded)
Suspected aortic dissection
Significant closed head trauma or facial trauma within 3 months

Relative contraindications:

Uncontrolled severe hypertension (BP sys>180 or dia >110)
Hx of chronic, severe or poorly controlled hypertension
Hx of prior ischemic CVA >3 months, dementia, or known intracranial pathology not covered in contraindications
Current use of anticoagulants – the higher the INR, the higher the risk of bleeding
Traumatic or prolonged (>10 minutes) CPR **or** major surgery (<3 weeks)
Noncompressible vascular punctures
Pregnancy
Recent (2-4 weeks) internal bleeding **or** active peptic ulcer disease
For streptokinase/anistreplase – prior allergic reaction **or** prior exposure (more than 5 days ago)

8c. GENERAL EKG CHANGES

Myocardial **ischemia** (reversible) may produce **ST segment depression** and **T-wave inversion** in all leads, this may return to normal, or the T wave may remain permanently inverted.

Myocardial **injury** (beyond ischemia, but still potentially reversible): you will see **ST segment elevation** greater than 1 mm in the involved leads. This usually returns to normal when the pain subsides.

Myocardial **infarction** can produce (changes must be seen in at least two leads):

Pathologic **Q-waves** - will be at least .04 seconds in width and 25% of the height of the QRS in the facing leads.

ST segment changes - elevation in the facing leads, depression in reciprocal leads.

T-wave changes - within hrs to wks, may become taller and peaked, or may become inverted.

ARTERY OCCLUDED	TYPE OF INFARCT	LEAD CHANGES SEEN	CLINICAL MANIFESTATIONS	MANAGEMENT
Left main	Massive LV	All precordial leads	Acute left heart failure Cardiogenic shock	Treat Sx/Sx, may need Furosemide, Dopamine
Left anterior descending	Anterior Septal	V1-V4 (V3-V4) V1-V3 (V1-V2)	Right bundle branch block, 2 nd ° Type II and 3 rd °	Treat Sx/Sx, Treat pain with MONA , Pacing
Left circumflex	Lateral Posterior	I, aVL, V5-V6 Reciprocal in V1-V3		Treat Sx/Sx
Right	Inferior Right Ventricular	II, III, aVF	1 st ° block, 2 nd ° Type I, Sinus Bradycardia, ↑ CVP, ↓ CO	Treat Sx/Sx, 250mL fluid challenges checking breath sounds, Atropine

Now, how can you determine the type of infarction with your three-lead cable system?

Well, you already know how to get leads I, II, III, and V-1 (remember the MCL-1 lead?)

You can add another couple of V-similar leads by creating MCL-4 and MCL-6 & turn dial to Lead III:

For MCL-4, move the positive lead from the MCL-1 position at the right sternal border over to the mid-clavicular line in the fifth intercostal space.

For MCL-6, move the positive lead over to the mid-axillary line in the fifth intercostal space.

If you see changes in: **Your patient may be having:**

Leads II, III	Inferior wall MI
MCL-1, MCL-4	Anterior wall MI
Lead I, MCL-6	Lateral wall MI
R MCL-4	Right ventricular infarct

9a. SUSPECTED STROKE

EMS ASSESSMENT AND ACTIONS

- Support ABC's, give oxygen if needed
- Perform prehospital stroke assessment
- Establish time patient last known to be normal
- Transport and consider triage to Stroke Center (Arrowhead, Banner Good Sam, Banner Thunderbird, Boswell, Del Web, Mayo, Scottsdale Osborn, St. Joseph's)
- Consider bringing a witness, family member or caregiver
- Alert hospital
- Check glucose

Immediate general assessment and stabilization:

- Assess ABC's, vital signs
- Provide **oxygen** if hypoxemic
- Obtain IV access, obtain blood samples (CBC, electrolytes, coagulation studies)
- Check glucose, treat if indicated
- Perform general neurological screening assessment
- Activate stroke team, neurologist, radiologist, CT technician
- Order urgent non-contrast CT scan
- Obtain 12 lead ECG, check for arrhythmias

Immediate neurological assessment by stroke team or designee

- Review patient history
- Establish onset (< **3 hours** required for fibrinolytics)
- Perform physical assessment
- Perform neurological examination: Determine level of consciousness (Glasgow Coma Scale) & determine level of stroke severity (NIH scale or Canadian Neurologic Scale)

Does the CT scan show hemorrhage – IF NO - PROBABLE ISCHEMIC STROKE

- Review for CT exclusions: are any observed?
- Repeat neurological exam: are deficits variable or rapidly improving?
- Review fibrinolytic exclusions: are any observed?
- Review patient data: is symptom onset now > 3 hours

IF NO TO ALL OF THE ABOVE

Does the patient remain a candidate for fibrinolytic therapy? Yes or No

****DRUG**

Review the risks and benefits with patient and family: If acceptable

BEGIN FIBRINOLYTIC TREATMENT with tPA

- Monitor neurological status: emergent CT if deterioration
 - Monitor BP; treat as indicated
 - Admit to critical care unit
- No anticoagulants or antiplatelet treatment for 24 hours

9b. PREHOSPITAL STROKE CRITERIA

DETECTION

1. EMS Assessment and actions to include the Cincinnati Prehospital Stroke Scale and Los Angeles Prehospital Stroke Screen
2. Alert hospital to possible stroke
3. Rapid transport

DISPATCH

DELIVERY

CINCINNATI PREHOSPITAL STROKE SCALE

1. Facial droop – have patient both smile and frown. Look for symmetry, and movement of all aspects of face, including forehead and eyebrows
2. Arm drift – have patient close their eyes and hold hands out in front. If 1 arm “drifts” away, this is considered abnormal
3. Abnormal speech – completely aphasic, slurred, expressive or receptive aphasia, cannot grasp the correct word or finish a sentence or thought.
 - a. expressive aphasic – know what you are asking, the just can’t express it appropriately and are frustrated with themselves.
 - b. receptive aphasics – have no clue what you are asking – what they hear is not what was said. They are frustrated with you as you “do not seem to listen to their answers”. Their speech can be perfectly clear, it is their answers that are suspect.
 - c. garbled or slurred speech – may never be clear, may start out clear and then drift off or into garbled incomprehensible sounds.

LOS ANGELES PREHOSPITAL STROKE SCREEN – LAPSS

For evaluation of acute, noncomatose, nontraumatic neurologic complaint. If items 1-6 are all checked YES or unknown, provide pre-arrival notification to the hospital of a potential stroke patient.

If any item is checked no, then return to the appropriate treatment protocol.

Criteria

	Yes	Unk	No
1. Age > 45 years	—	—	—
2. Absent history of seizures or epilepsy	—	—	—
3. Duration of symptoms < 24 hours	—	—	—
4. Patient is not wheelchair bound or bedridden, at baseline	—	—	—
5. Blood glucose is between 60 and 400	—	—	—

6. Obvious asymmetry (right vs. left) in any of the following 3 exam categories: **MUST BE UNILATERAL**

	Equal	R Weak	L Weak
Facial smile/grimace	—	__ droop	__ droop
Grip	—	__ weak __ no grip	__ weak __ no grip
Arm strength	—	__ drifts down __ falls rapidly	__ drifts down __ falls rapidly

AIRWAY

MONITOR

VITAL SIGNS

NEURO EXAM

GCS

9c. FIBRINOLYTIC CRITERIA FOR CVA

Inclusion criteria – must have all yes boxes checked

YES:

18 years or older

Clinical diagnosis of ischemic stroke with a measurable neurologic deficit

Time of onset was well established as <180 minutes or 3 hours before treatment would begin

Exclusion criteria – must have all no boxes checked under contraindications:

NO:

Evidence of intracranial hemorrhage on pretreatment noncontrast head CT

Clinical presentation suggestive of subarachnoid hemorrhage even with normal CT

CT shows multilobar infarction

History of hemorrhagic stroke or intracranial hemorrhage

Uncontrolled severe hypertension (BP sys>185 or dia remains >110 despite repeated measurements)

Known structural cerebral vascular lesion (e.g. AVM)

Known malignant intracranial neoplasm (primary or metastatic)

Witnessed seizure at stroke onset

Active internal bleeding or acute trauma (fracture)

Acute bleeding diathesis, including but not limited to:

 Platelet count <100,000/mm

 Heparin received within 48 hours, resulting in an activated PTT > upper norm limit for lab

 Current use of anticoagulants that has produced elevated INR >1.7 or PT > 15 seconds

Within 3 months of intracranial or intraspinal surgery, serious head trauma or previous stroke

Arterial puncture at a Noncompressible site within the past 7 days

Relative contraindications:

Recent experience suggest that under some circumstances - with careful consideration and weighing of risk-to-benefit ratio - patients may receive fibrinolytic therapy despite one or more relative contraindications. Consider the pros and cons of tPA administration carefully if any of the relative contraindications is present:

Only minor or rapidly improving stroke symptoms (clearing spontaneously)

Trauma **or** major surgery within 14 days

Recent GI or urinary tract hemorrhage within previous 27 days

Recent AMI within previous 3 months

Postmyocardial infarction pericarditis

Abnormal blood glucose level (<50 or >400 mg/dL)

APPROACH TO ELEVATED BLOOD PRESSURE IN ACUTE ISCHEMIC STROKE

NOT ELIGIBLE FOR FIBRINOLYTIC THERAPY:

Systolic ≤ 220 OR diastolic ≤ 120:	Observe unless other end-organ involvement Treat other s/s of stroke Treat other complications of stroke
Systolic > 220 OR diastolic 121-140:	Labetalol 10-20 mg IV for 1-2 min Nicardipine 5mg/h IV initial
Diastolic >140	Nitroprusside 0.5mcg/kg/min IV initial

ELIGIBLE FOR FIBRINOLYTIC THERAPY:

Pretreatment systolic > 185 OR diastolic >110	Labetalol 10-20 mg IV for 1-2 min (MR x1)
During and after treatment: monitor BP	
Diastolic >140	Nitroprusside 0.5mcg/kg/min IV initial
Systolic >230 OR diastolic 121-140	Labetalol OR Nicardipine
Systolic 180-230 OR diastolic 105-120	Labetalol 10 mg