ACLS PROTOCOLS

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CHEST PAIN / ACUTE CORONARY SYNDROME

B	EMT – B	B
I	EMT – I	I
P	EMT – P	P
M	MED CONTROL	M

UNIVERSAL PATIENT CARE PROTOCOL

OXYGEN
>95% = 4 L NC, <95% = 15 L NRB

Apply Cardiac Monitor; EMT-B only if EMT-I or EMT-P present

→ Go to Appropriate Arrhythmia Protocol

Obtain 12 – Lead EKG
EMT-B and EMT-I may set up, but cannot interpret
Transmit to ED

Consider Transport to a Facility With PCI Capabilities if Patient is Showing Signs of an ST Elevation MI

IV PROTOCOL

NITROGLYCERIN
0.4 mg SL
EMT-B: Pt Assisted with Med Control
(If BP > 100 Systolic with IV - may give total of 3 1 q 5 min)

ST Elevation MI
Consider PLAVIX 600 mg PO
With 12-Lead transmission and Medical Control order

ASPIRIN
324 mg / 325 mg

Reassess and Monitor

→ Hypotension / Arrhythmia
Treat per Appropriate Protocol

Continued Pain?

→ No

Yes

MORPHINE SULFATE
2 – 4 mg IV q 5 min
(Max = 10 mg if no relief with a total of 3 NTG)

CONTACT MEDICAL CONTROL

TRANSPORT

CHEST PAIN / ACUTE CORONARY SYNDROME

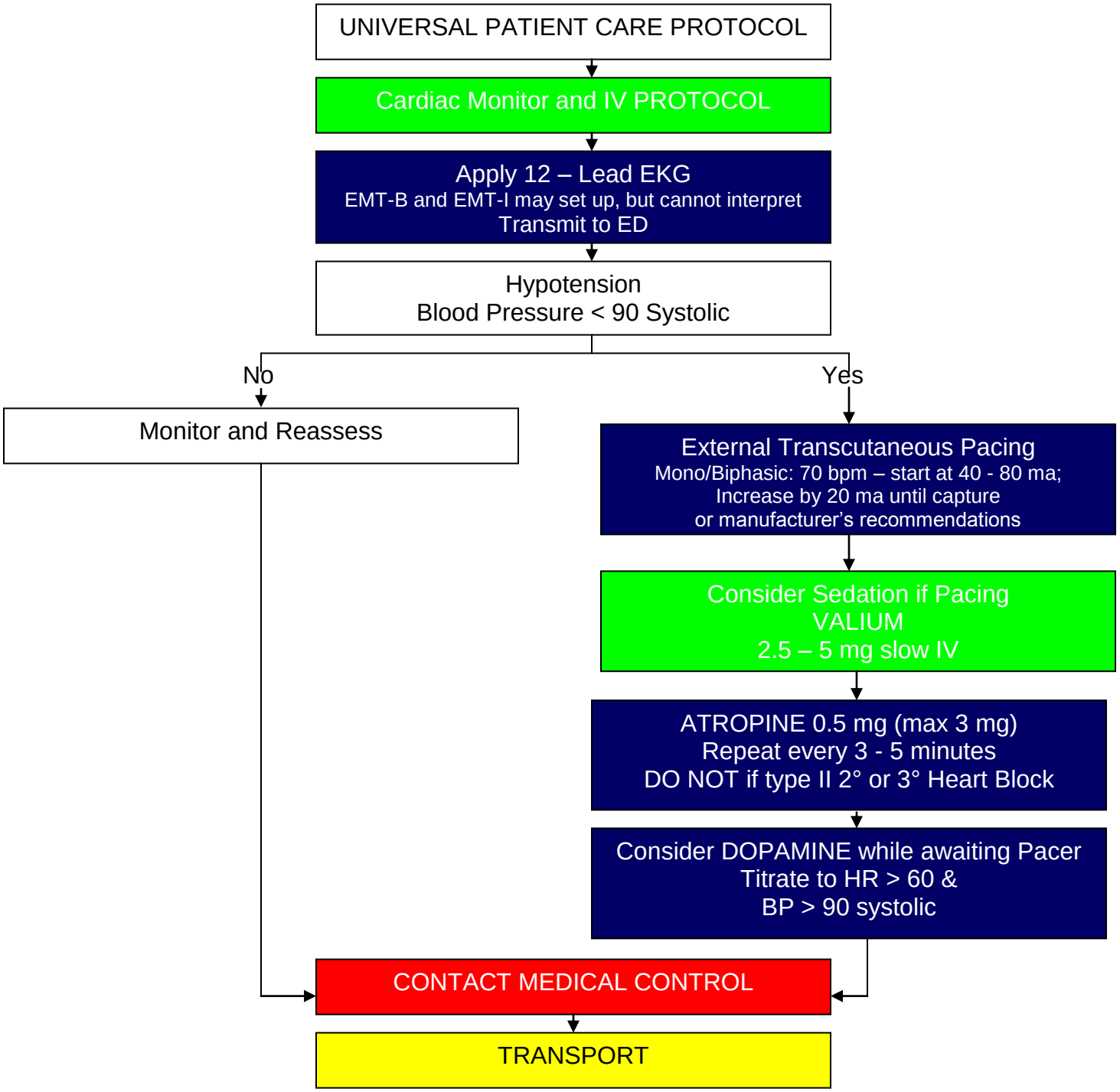
HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Age • Medications • Past medical history (MI, Angina, Diabetes) • Allergies • Recent physical exertion • Onset • Palliation / Provocation • Quality (crampy, constant, sharp, dull, etc.) • Region / Radiation / Referred • Severity (1-10) • Time (duration / repetition)	• CP (pain, pressure, aching, vice-like tightness) • Location (substernal, epigastric, arm, jaw, neck, shoulder) • Radiation of pain • Pale, diaphoresis • Shortness of breath • Nausea, vomiting, dizziness	• Trauma vs. Medical • Angina vs. Myocardial infarction • Pericarditis • Pulmonary embolism • Asthma / COPD • Pneumothorax • Aortic dissection or aneurysm • GE reflux or hiatal hernia • Esophageal spasm • Chest wall injury or pain • Pleural pain

KEY POINTS

- Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro.
- All cardiac chest pain patients must have an IV, O_2 and monitor.
- If a patient has taken their own nitroglycerin without relief, consider the potency of their medication.
- If positive EKG changes, establish a second IV while en route to the hospital.
- Monitor for hypotension after administration of nitroglycerin and morphine.
- Nitroglycerin and morphine may be repeated per dosing guidelines in Appendix 1: Medications.
- Diabetics, women and geriatric patients often have atypical pain or generalized complaints.
- Refer to the Sinus Bradycardia Protocol if indicated (HR < 60 bpm) or Wide & Narrow Complex Tachycardia Protocol (HR > 150 bpm) as necessary.
- If the patient becomes hypotensive from nitroglycerin administration, place the patient in the Trendelenburg position and administer a 250 mL normal saline bolus.
- Be prepared to administer naloxone (narcan) 2mg, if the patient experiences respiratory depression or hypotension due to morphine administration.
- If pulmonary edema is present, refer to the CHF / Pulmonary Edema Protocol.
- Be suspicious of a “Silent MI” in the elderly, diabetics, and women.
- Consider other causes of chest pain such as aortic aneurysm, pericarditis, and pulmonary embolism.
- Aspirin can be administered to a patient on Coumadin unless the patient’s physician has advised them otherwise.
- If the patient took a dose of aspirin that was less than 325 mg in the last 24 hours, then additional aspirin can be administered to achieve a therapeutic dose of 325 mg.
- DO NOT administer nitroglycerin to a patient who took an erectile dysfunction medication (Viagra, Cialis, Levitra, etc.) within the last 48 hours due to potential for severe hypotension.
- Nitroglycerin can be administered to a patient by EMS if the patient has already taken 3 of their own prior to arrival. Document if the patient had any changes in their symptoms or a headache after taking their own nitroglycerin.
- Check and document the expiration date of the patient’s prescribed nitroglycerin.
- Nitroglycerin can be administered to a hypertensive patient complaining of chest discomfort without Medical Control permission.
- Nitroglycerin can be administered without an IV as long as the patient takes nitroglycerin at home and has a B/P greater than120 mmHg.
- All patients complaining of chest discomfort must be administered at least 2 lpm of oxygen by nasal cannula. Administer oxygen by non-rebreather or assist the patient’s ventilations as indicated.

SINUS BRADYCARDIA

B	EMT – B	B
I	EMT – I	I
P	EMT – P	P
M	MED CONTROL	M



SINUS BRADYCARDIA

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS

• Past medical history
• Medications
  • Beta-Blockers
  • Calcium channel blockers
  • Clonidine
  • Digitalis
• Pacemaker
	• HR < 60/min
	• Chest pain
	• Respiratory distress
	• Hypotension or Shock
	• Altered mental status
	• Syncope
		• Acute myocardial infarction
		• Hypoxia
		• Hypothermia
		• Sinus bradycardia
		• HOCM (Athletes)
		• Head injury (elevated ICP) or Stroke
		• Spinal cord lesion
		• Sick sinus syndrome
		• AV blocks (1°, 2°, or 3°)

KEY POINTS

- Exam: Mental Status, Neck, Skin, Lungs, Heart, Abdomen, Extremities, Neuro.
- The use of lidocaine in heart block can worsen bradycardia and lead to asystole and death.
- Pharmacological treatment of bradycardia is based upon the presence or absence of hypotension.
  - If hypotension exists, treat.
  - If blood pressure is adequate, monitor only.
- DO NOT administer atropine if the patient's rhythm is a Type II second-degree heart block or a third degree heart block.
- Transcutaneous pacing is the treatment of choice for Type II second-degree heart blocks and third degree heart blocks.
- If the patient is critical and an IV is not established, initiate pacing with Medical Control permission.
- If the patient converts to another rhythm, refer to the appropriate protocol and treat accordingly.

NARROW COMPLEX TACHYCARDIA

B	EMT – B	B
I	EMT – I	I
P	EMT – P	P
M	MED CONTROL	M

UNIVERSAL PATIENT CARE PROTOCOL

Cardiac Monitor

IV PROTOCOL

Stable

Vagal Maneuvers

ADENOSINE 6 mg IVP followed by
10 mL NS flush
(Not for atrial fibrillation)

No Response
1 – 2 minutes

ADENOSINE 12 mg IVP followed by
10 mL NS flush

No Response
1 – 2 minutes

Repeat ADENOSINE 12 mg IVP followed by
10 mL NS flush

No Response

Monitor and Reassess

Unstable

Attempt Stable Procedures or
may go directly to Cardioversion

AMIODARONE
150 mg IVP over 10 minutes

Consider Sedation with Cardioversion
VALIUM
2.5 – 5 mg slow IV

Synchronized Cardioversion
Biphasic: 30-75J – 120J – 150J – 200J
Monophasic: 100J-200J-300J-360J
Or manufacturer's recommendations

No response
1 –2 minutes

Repeat Synchronized Cardioversion

If rhythm changes,
Go to Appropriate Protocol

CONTACT MEDICAL CONTROL

TRANSPORT

NARROW COMPLEX TACHYCARDIA

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS

• Medications (aminophylline, diet pills, thyroid supplements, decongestants, digoxin)
• Diet (caffeine, chocolate)
• Drugs (nicotine, cocaine)
• Past medical history
• History of palpitations / heart racing
• Syncope / near-syncope
	• HR > 150/Min
	• QRS < 0.12 Sec
	• Dizziness, CP, SOB
	• Potential presenting rhythm
	  • Sinus tachycardia
	  • PSVT
	  • Atrial fibrillation / flutter
	  • Multifocal atrial tachycardia
		• Heart disease (WPW, Valvular)
		• Sick sinus syndrome
		• Myocardial infarction
		• Electrolyte imbalance
		• Exertion, Pain, Emotional stress
		• Fever
		• Hypoxia
		• Hypovolemia or anemia
		• Drug effect / Overdose
		• Hyperthyroidism
		• Pulmonary embolus

KEY POINTS

- Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro.
- Adenosine may not be effective in identifiable atrial flutter/fibrillation, but is not harmful.
- Monitor for respiratory depression and hypotension associated with valium.
- Continuous pulse oximetry is required for all patients.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- If the patient converts to another rhythm, refer to the appropriate protocol and treat accordingly.
- Examples of vagal maneuvers include bearing down, coughing, or blowing into a syringe. DO NOT perform a carotid massage.
- If possible, the IV should be initiated in either the left or right AC.
- Consider applying the Combo patches prior to adenosine administration.
- When administering adenosine, raise the patient's arm and immediately follow the bolus with 10 mL rapid bolus of normal saline.
- Record EKG strips during adenosine administration.
- Perform a 12-Lead EKG prior to and after adenosine conversion or cardioversion of NCT.
- If the patient converts into ventricular fibrillation or pulseless ventricular tachycardia immediately defibrillate the patient and refer to the appropriate protocol and treat accordingly.
- Give a copy of the EKG's and code summaries to the receiving facility upon arrival.

ARRHYTHMIAS / ACLS

WIDE COMPLEX TACHYCARDIA

B	EMT – B	B
I	EMT – I	I
P	EMT – P	P
M	MED CONTROL	M

UNIVERSAL PATIENT CARE PROTOCOL

Palpate Pulse

No → V-FIB PULSELESS / V-TACH PROTOCOL

Yes

Cardiac Monitor

IV PROTOCOL

Stable/Regular

If V-Tach or uncertain rhythm:
AMIODARONE
150 mg IV
Mixed in 15 - 20 mL NS
(Over 10 minutes)
Or
LIDOCAINE
1-1.5 mg/kg IVP
May repeat at 0.5-0.75 mg/kg
every 5-10 min (max 3 mg/kg)

Monitor and obtain 12-Lead EKG
Reassess for underlying rhythm
Transmit to ED

If unstable, prepare for immediate Cardioversion

Unstable

Prepare for immediate Cardioversion

Consider Sedation with Cardioversion
VALIUM
2.5 – 5 mg slow IV

Synchronized Cardioversion
Biphasic: 30-75J – 120J – 150J – 200J
Monophasic: 100J-200J-300J-360J
Or manufacturer's recommendations

AMIODARONE
150 mg IV
Mixed in 15 – 20mL NS
(Over 10 minutes)
Or
LIDOCAINE
1-1.5 mg/kg IVP
May repeat at 0.5-0.75 mg/kg
every 5-10 min (max 3 mg/kg)

Repeat Synchronized Cardioversion

CONTACT MEDICAL CONTROL

TRANSPORT

WIDE COMPLEX TACHYCARDIA

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Past medical history • Medications, diet, drugs • Syncope / near-syncope • Palpitations • Pacemaker • Allergies	• Ventricular tachycardia on EKG (runs or sustained) • Conscious • Rapid pulse • Chest pain • Shortness of breath • Dizziness • Rate usually 150 - 180 bpm for sustained V-Tach	• Artifact / Device failure • Cardiac • Endocrine / Metabolic • Drugs • Pulmonary

KEY POINTS

- Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro.
- For witnessed / monitored ventricular tachycardia, try having patient cough or deliver a precordial thump.
- Polymorphic V-Tach (Torsades de Pointes) may benefit from the administration of magnesium sulfate and may require non-sync cardioversion.
- If the patient converts to another rhythm, refer to the appropriate protocol and treat accordingly.
- If the patient relapses back into wide complex tachycardia / ventricular tachycardia, initiate synchronized cardioversion with the joules setting that previously cardioverted the patient.
- Record EKG strips during lidocaine or amiodarone administration.
- Perform a 12-Lead EKG prior to and after lidocaine conversion, amiodarone conversion or synchronized cardioversion of wide complex tachycardia / ventricular tachycardia.
- Perform a Code Summary and attach it to the patient run report.
- Be sure to treat the patient and not the monitor.

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CARDIAC ARREST

B	EMT – B	B
I	EMT – I	I
P	EMT – P	P
M	MED CONTROL	M

UNIVERSAL PATIENT CARE PROTOCOL

Criteria for Death

Yes → Withhold Resuscitation CONTACT MEDICAL CONTROL

Criteria for DNR

Yes → Review DNR Comfort Care Guidelines CONTACT MEDICAL CONTROL

No

CPR x 5 cycles / 2 minutes

Attach AED Or Cardiac Monitor Defibrillator

Medic/Intermediate → Go to Appropriate Protocol

Basic/First Responder

Follow AED Prompts (if applicable)

CPR x 5 cycles / 2 minutes

AIRWAY PROTOCOL

Follow AED Prompts (if applicable)

Maintain CPR / Airway

CONTACT MEDICAL CONTROL

TRANSPORT

Consider Termination of Resuscitative Efforts

At Any Time

Return of Spontaneous Circulation

Go To POST RESUSCITATION CARDIAC CARE PROTOCOL

CARDIAC ARREST

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Events leading to arrest • Estimated down time • Past medical history • Medications • Existence of terminal illness • DNR or Living Will	• Unresponsive • Apneic • Pulseless • Signs of lividity, rigor mortis	• Medical vs Trauma • V-fib vs Pulseless V-tach • Asystole • Pulseless electrical activity (PEA)

KEY POINTS

- Exam: Mental Status, Neck, Skin, Lungs, Heart, Abdomen, Extremities, Neuro.
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- If witnessed arrest – consider a precordial thump.
- Reassess airway frequently and with every patient move.
- Maternal Arrest - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport.
- If the patient converts to another rhythm, refer to the appropriate protocol and treat accordingly.
- Attempt to obtain patient history from family members or bystanders:
    - Estimated down time
    - Medical history
    - Complaints prior to arrest
    - Bystander CPR prior to EMS arrival
    - AED use prior to EMS arrival
- Administer dextrose only if the patient has a Glucose Level < 70 mg/dl. Dextrose should be administered as soon as hypoglycemia is determined.
- DO NOT administer narcan until the patient has been resuscitated and is known or suspected to have used narcotics.
- Reassess the patient if the interventions do not produce any changes.
- If indicated, refer to the Termination of Resuscitative Efforts Protocol.

ASYSTOLE / PULSELESS ELECTRICAL ACTIVITY (PEA)

B	EMT – B	B
I	EMT – I	I
P	EMT – P	P
M	MED CONTROL	M

UNIVERSAL PATIENT CARE PROTOCOL

Criteria for Death

Yes → Withhold Resuscitation CONTACT MEDICAL CONTROL

Criteria for DNR

Yes → Review DNR Comfort Care Guidelines CONTACT MEDICAL CONTROL

No

CPR for 5 cycles

AIRWAY PROTOCOL

IV/IO PROTOCOL

Apply AED Or Cardiac Monitor

ASYSTOLE/PULSELESS ELECTRICAL ACTIVITY (PEA)

Resume CPR for 5 cycles

EPINEPHRINE
1 mg IV / IO 1:10,000 Solution
Repeat every 3- 5 minutes
Or
VASOPRESSIN 40 U IV/IO
Give ONE Dose

End Stage Renal Patient Consider:
CALCIUM CHLORIDE
1 amp slow IV
&
SODIUM BICARBONATE
1 amp IV
After 10 minutes of CPR

If PEA HR < 60
Consider
ATROPINE 1.0 mg IV
Repeat every 3 - 5 minutes
Max 3.0 mg

Consider Termination of Resuscitative Efforts

CONTACT MEDICAL CONTROL

TRANSPORT

At Any Time

Return Of Spontaneous Circulation

Go To POST RESUSCITATION CARDIAC CARE PROTOCOL

ASYSTOLE / PULSELESS ELECTRICAL ACTIVITY (PEA)

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS

• Past medical history
• Medications
  • Tricyclics
  • Digitalis
  • Beta-blockers
  • Calcium channel blockers
• Events leading to arrest
• End stage renal disease
• Estimated down time
• Suspected hypothermia
• Suspected overdose
• DNR or Living Will
	• Pulseless
	• Apneic
	• No electrical activity on EKG
	• Cyanosis
		• Medical vs Trauma
		• Hypoxia
		• Potassium (hypo / hyper)
		• Acidosis
		• Hypothermia
		• Device (lead) error
		• Death
		• Hypovolemia
		• Cardiac tamponade
		• Drug overdose (Tricyclics, Digitalis, Beta-blockers, Calcium channel blockers)
		• Massive myocardial infarction
		• Tension pneumothorax
		• Pulmonary embolus

CONSIDER TREATABLE CAUSES

• Hypovolemia • Hypoxia • Hydrogen ion (acidosis) • Hypo- or hyperkalemia • Hypoglycemia • Hypothermia	• Tamponade, cardiac • Tension pneumothorax • Thrombosis (coronary or pulmonary; ACS or PE) • Trauma • Toxins

KEY POINTS

- Exam: Mental Status, Neck, Skin, Lungs, Heart, Abdomen, Extremities, Neuro.
- Always confirm asystole in more than one lead.
- Consider each possible cause listed in the differential: Survival is based on identifying and correcting the cause!
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options. Early identification and treatment of reversible causes of PEA increases the chance of a successful outcome.
- If the patient converts to another rhythm, refer to the appropriate protocol and treat accordingly.
- Consider volume infusion for all patients in PEA. Be alert for fluid overload.
- Vasopressin is not repeated. If given, epinephrine may be used 5 minutes after vasopressin if still in arrest; 1 mg of epinephrine 1:10,000 would then be administered every 3-5 minutes.
- Treat as ventricular fibrillation if you cannot differentiate between asystole and fine ventricular fibrillation.
- Medical Control must be contacted prior to administering antidotes for all poisonings/overdoses except for narcotic overdoses.
- Dextrose 50% should only be administered to a patient with a confirmed blood glucose level less than 70 mg/dl.

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VENTRICULAR FIBRILLATION / PULSELESS VENTRICULAR TACHYCARDIA

B	EMT – B	B
I	EMT – I	I
P	EMT – P	P
M	MED CONTROL	M

UNIVERSAL PATIENT CARE PROTOCOL

Criteria for Death — Yes → Withhold Resuscitation CONTACT MEDICAL CONTROL

Criteria for DNR — Yes → Review DNR Comfort Care Guidelines CONTACT MEDICAL CONTROL

CPR x 5 cycles / 2 minutes, then check pulse and rhythm

Return Of Spontaneous Circulation Go To POST RESUSCITATION CARDIAC CARE PROTOCOL

Apply AED / Cardiac Monitor Defibrillator → Confirm V-Fib / Pulseless V-Tach

Defibrillate – Biphasic: 200J / Monophasic: 200J, 300J, 360J

Resume effective CPR / 2 minutes, then check pulse & rhythm

AIRWAY PROTOCOL — IV PROTOCOL — IO PROTOCOL

Continue effective CPR / 2 minutes, then check pulse & rhythm

EPINEPHRINE 1 mg IV / IO 1:10,000 Solution
Repeat every 3 - 5 minutes
Or
VASOPRESSIN 40 U IV / IO – Max 1 Dose

Defibrillate – Biphasic: 200J / Monophasic 200J, 300J, 360J

Continue effective CPR / 2 minutes, then check pulse & rhythm

Give Antiarrhythmic during CPR

AMIODARONE
300 mg IVP
May repeat @ 150 mg IV
in 3 - 5 minutes
Or

LIDOCAINE
1 – 1.5 mg/kg IV
Repeat 0.5–0.75 mg/kg
in 3 – 5 minutes

Defibrillate – Biphasic: 200J / Monophasic 200J, 300J, 360J

Continue effective CPR / 2 minutes, then check pulse & rhythm

TRANSPORT ← CONTACT MEDICAL CONTROL → Consider Termination of Resuscitative Efforts

VENTRICULAR FIBRILLATION / PULSELESS VENTRICULAR TACHYCARDIA

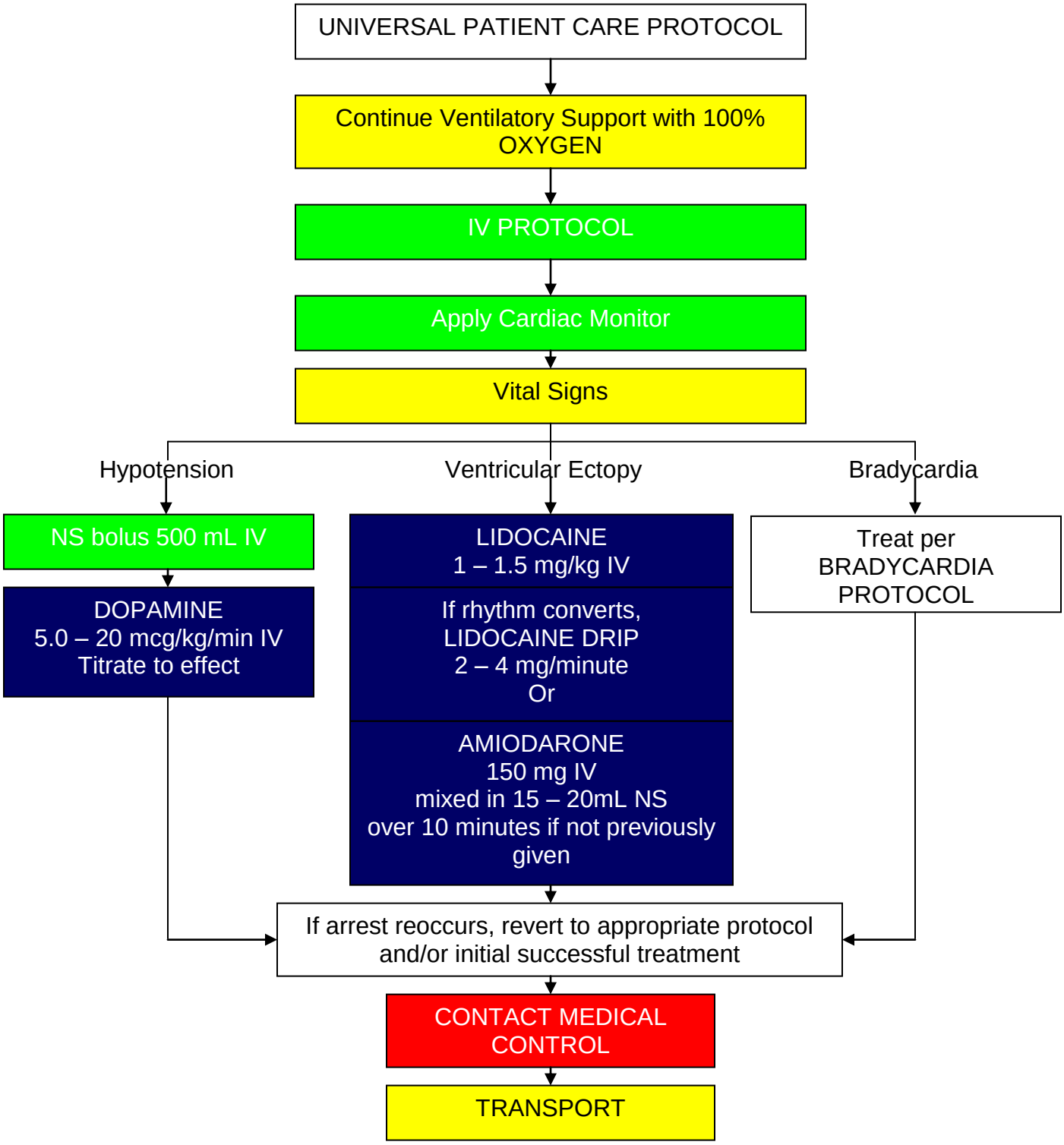
HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Estimated down time • Past medical history • Medications • Events leading to arrest • Renal failure / dialysis • DNR or living will	• Unresponsive • Apneic • Pulseless • Ventricular fibrillation or ventricular tachycardia on EKG/monitor	• Asystole • Artifact /Device failure • Cardiac • Endocrine / Metabolic • Drugs • Pulmonary

KEY POINTS

- Exam: Mental Status, Neck, Skin, Lungs, Heart, Abdomen, Extremities, Neuro.
- Effective CPR should be as continuous as possible with a minimum of 5 cycles or 2 minutes.
- Reassess and document endotracheal tube placement and $ETCO_2$ frequently: after every move and at transfer to ED staff.
- Polymorphic V-Tach (Torsades de Pointes) may benefit from administration of magnesium sulfate.
- If the patient converts to another rhythm, or has a return of circulation, refer to the appropriate protocol and treat accordingly.
- If the patient converts back to ventricular fibrillation or pulseless ventricular tachycardia after being converted to ANY other rhythm, defibrillate at the previous setting used.
- Defibrillation following effective CPR is the definitive therapy for ventricular fibrillation and pulseless ventricular tachycardia.
- Vasopressin is not repeated. If given, epinephrine may be used 5 minutes after vasopressin if still in arrest; 1 mg of epinephrine 1:10,000 would then be administered every 3-5 minutes.

POST – RESUSCITATION CARDIAC CARE

B	EMT – B	B
I	EMT – I	I
P	EMT – P	P
M	MED CONTROL	M



POST – RESUSCITATION CARDIAC CARE

HISTORY	SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS
• Respiratory arrest • Cardiac arrest	• Return of pulse	• Continue to address specific differentials associated with the original arrhythmia

KEY POINTS

- Exam: Mental Status, Neck, Skin, Lungs, Heart, Abdomen, Extremities, Neuro.
- Most patients immediately post-resuscitation will require ventilator assistance.
- The condition of post-resuscitation patients fluctuates rapidly and continuously, and they require close monitoring.
- Appropriate post-resuscitation management can best be planned in consultation with Medical Control.
- This is the period of time between restoration of spontaneous circulation and the transfer of care at the Emergency Department. The focus is aimed at optimizing oxygenation and perfusion.
- Adequate oxygenation is the key to a good outcome.