PROTOCOL 11

NON-TRAUMATIC CARDIOPULMONARY ARREST

1. Initiate cardiopulmonary resuscitation (CPR). If patient has been in arrest for more than 4 minutes without CPR, complete **5 CYCLES of CPR** (2 minutes), prior to rhythm check.

2. Follow the appropriate sub-protocol:

   a. Ventricular Fibrillation / Pulseless Ventricular Tachycardia
   (Protocol 12)

   b. Asystole / Pulseless Electrical Activity
   (Protocol 13 /14)

FOR ALL CARDIAC ARRESTS

N.B. **ETT DOSING** OF DRUGS IS TWICE THE AMOUNT OF THE USUAL IV DOSE FOLLOWED BY 10 - 20 ML OF NORMAL SALINE FLUSH.

IV DRUG BOLUSES ARE FOLLOWED BY A 20 - 30 ML BOLUS OF .9% NORMAL SALINE. WHEN PRACTICAL, ELEVATION OF THE ARM IS RECOMMENDED.

CONSIDER **TERMINATION OF RESUSCITATION,** PROTOCOL 15

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PEDIATRIC PROTOCOL 11a

NON-TRAUMATIC CARDIOPULMONARY ARREST

1. Initiate cardiopulmonary resuscitation (CPR). If patient has been in arrest for more than 4 minutes without CPR, complete **5 CYCLES of CPR** (2 minutes), prior to rhythm check.

2. Follow the appropriate sub-protocol:

    a. Ventricular Fibrillation / Pulseless Ventricular Tachycardia
    (Protocol 12a)

    b. Asystole / Pulseless Electrical Activity
    (Protocol 13a /14a)

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PROTOCOL 12 — VENTRICULAR FIBRILLATION OR PULSELESS VENTRICULAR TACHYCARDIA

1. **DEFIBRILLATE (a); CONTINUE CPR** immediately after defibrillation;

2. When possible during CPR, initiate airway control, monitor adequate ventilation and oxygenation, and obtain IV access.

3. After **5 CYCLES of CPR** (2 minutes), check rhythm **(b, c)**

4. **DEFIBRILLATE (a); CONTINUE CPR** immediately after defibrillation.

5. **EPINEPHRINE** 1:10,000 1.0 mg (10 ml) IV **(d, e)** or ETT **(f)**; repeated once during every 5 cycles of CPR.

   OR

   VASOPRESSIN 40 units IV **(d, e)** may be given in place of the 1st or 2nd dose of **EPINEPHRINE**.

6. After **5 CYCLES of CPR** (2 minutes), check rhythm.**(b, c)**

7. **DEFIBRILLATE (a); CONTINUE CPR** immediately after defibrillation.

8. When possible during cycles of CPR administer an antidysrhythmic:

   a. **AMIODARONE** 300 mg IV **(d, e, g)**; if necessary, repeat at 150 mg IV.

   OR

   b. **LIDOCAINE** 1.5 mg/kg IV **(d, e, g)** or ETT **(f)**; same dose may be repeated in 3 minutes.

9. After **5 CYCLES of CPR** (2 minutes), check rhythm.**(b, c)**

10. Consider **MAGNESIUM SULFATE** 1 - 2 gm IV over 5 minutes **(d)** for known hypomagnesaemia or multifocal ventricular tachycardia (Torsades de Pointes).

11. **DEFIBRILLATE (a); CONTINUE CPR** immediately after defibrillation.

NOTE

a. **DEFIBRILLATION** is at 360 joules (monophasic) **OR** 120-200 joules (biphasic), or as per manufacturer's recommendation

b. Assessment of rhythm should take no longer than 10 seconds. If at any time rhythm has converted to a **NON-SHOCKABLE RHYTHM**, go to **PROTOCOL 13 /14**

c. If the rhythm converts to supraventricular and the patient **HAS NOT** received an anti-arrhythmic, administer **LIDOCAINE** 1 mg/kg IV and a drip of **LIDOCAINE** at 2 mg/min.

d. Administer drug during CPR as soon as possible after rhythm check confirms **SHOCKABLE RHYTHM**.

e. **IV DRUG BOLUSES** are followed by a 20 - 30 ml bolus of .9% Normal Saline. When practical, elevation of the arm is recommended.

Protocol 12 continued on next page

NOTE

f. **ETT DOSING** of drugs is twice the amount of the usual IV dose followed by 10 - 20 ml of normal saline flush.

g. If after receiving an anti-arrhythmic drug the rhythm converts to supraventricular, administer a drip of the effective antidysrhythmic:

LIDOCAINE:

At 3 mg/min if 1 - 2 mg/kg of Lidocaine was used.

At 4 mg/min if 3 - 4 mg/kg of Lidocaine was used.

AMIODARONE:

1.0 mg/min.

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PEDIATRIC PROTOCOL 12a — VENTRICULAR FIBRILLATION OR PULSELESS VENTRICULAR TACHYCARDIA

1. **DEFIBRILLATE** 2 J/kg **(a); CONTINUE CPR** immediately after defibrillation;

2. When possible during CPR, initiate airway control, monitor adequate ventilation and oxygenation, and obtain IV or IO access.

3. After **5 CYCLES of CPR** (2 minutes), check rhythm **(b, c)**.

4. **DEFIBRILLATE** 4 J/kg **(a); CONTINUE CPR** immediately after defibrillation.

5. **EPINEPHRINE** 0.01 mg/kg (1:10,000) IV, IO **(d, e)** or 0.1 mg/kg (1:1,000) ETT **(f)**; repeated once during every 5 cycles of CPR.

6. After **5 CYCLES of CPR** (2 minutes), check rhythm **(b, c)**.

7. **DEFIBRILLATE (a); CONTINUE CPR** immediately after defibrillation.

8. When possible during cycles of CPR administer an antidysrhythmic **(g)**:

   a. **AMIODARONE** 5 mg/kg IV, IO **(d, e)**

   OR

   b. **LIDOCAINE** 1.0 mg/kg IV, IO **(d, e)** or ETT **(f)**

9. After **5 CYCLES of CPR** (2 minutes), check rhythm.**(b, c)**

10. Consider **MAGNESIUM SULFATE** 50 mg/kg IV, IO over 5 minutes (maximum 2gms) **(d, e)** for known hypomagnesaemia or multifocal ventricular tachycardia (Torsades de Pointes).

11. **DEFIBRILLATE (a); CONTINUE CPR** immediately after defibrillation.

NOTE

a. **DEFIBRILLATION** dose is the same for both monophasic and biphasic units.

b. Assessment of rhythm should take no longer than 10 seconds. If at any time rhythm has converted to a **NON-SHOCKABLE RHYTHM**, go to **PROTOCOL 13a /14a**

c. If at any point the rhythm converts to supraventricular and the patient HAS NOT received **LIDOCAINE**, administer **LIDOCAINE** 1.0 mg/kg IV and then start a **LIDOCAINE** drip at 20 mcg/kg/min.

d. Administer drug during CPR as soon as possible after rhythm check confirms **SHOCKABLE RHYTHM**.

e. **IV/IO DRUG BOLUSES** are followed by a 20 - 30 ml bolus of .9% Normal Saline. When practical, elevation of the limb is recommended.

f. **ETT DOSING** of drugs is twice the amount of the usual IV dose unless otherwise indicted, followed by 10 - 20 ml of normal saline flush.

g. If at any point after the administration of **LIDOCAINE** the rhythm converts to supraventricular, start a **LIDOCAINE** drip at 20 - 50 mcg/kg/min.

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PROTOCOL 13	ASYSTOLE
PROTOCOL 14	**PULSELESS ELECTRICAL ACTIVITY (PEA)**

1. **CONTINUE CPR**; when possible during CPR, initiate airway control, monitor adequate ventilation and oxygenation, and obtain IV access.

2. Search for and treat for contributing factors; address as appropriate**.(a)**

3. **EPINEPHRINE** 1:10,000 1.0 mg (10 ml) IV **(b)** or ETT **(c)**; repeated once during every 5 cycles of CPR.

OR

VASOPRESSIN 40 units IV **(b)** may be given in place of the 1st or 2nd dose of **EPINEPHRINE**.

4. **IV FLUID CHALLENGE of .9% NORMAL SALINE**, rapid infusion. May be repeated as needed.

5. **ATROPINE** 1.0 mg IV **(b)** or ETT **(c)** for Asystole or PEA with a ventricular rate less than 60 bpm. Dose may be repeated every 3 minutes to a maximum 3 mg.

6. After each **5 CYCLES of CPR** (2 minutes), check rhythm.**(d)**

NOTE

a. If any of these factors are present: hypovolemia, hypoxia, hydrogen ion (acidosis), hyper / hypokalemia, hypoglycemia, hypothermia, toxins, tamponade, tension pneumothorax; thrombosis (coronary and pulmonary), or trauma, treat / transport accordingly.

b. **IV DRUG BOLUSES** are followed by a 20 - 30 ml bolus of .9% Normal Saline. When practical, elevation of the arm is recommended.

c. **ETT DOSING** of drugs is twice the amount of the usual IV dose followed by 10 - 20 ml of normal saline flush.

d. Assessment of rhythm should take no longer than 10 seconds. If at any time rhythm has converted to a **SHOCKABLE RHYTHM**, go to **PROTOCOL 12**

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PEDIATRIC PROTOCOL 13a	**ASYSTOLE**
PEDIATRIC PROTOCOL 14a	**PULSELESS ELECTRICAL ACTIVITY (PEA)**

1. **CONTINUE CPR**; when possible during CPR, initiate airway control, monitor adequate ventilation and oxygenation, and obtain IV or IO access.

2. Search for and treat for contributing factors; address as appropriate**.(a)**

3. **EPINEPHRINE** 0.01 mg/kg (1:10,000) IV / IO **(b)** or 0.1 mg/kg (1:1,000) ETT **(c)**; repeated once during every 5 cycles of CPR.

4. **IV or IO FLUID CHALLENGE of .9% NORMAL SALINE** 20 ml/kg, rapid infusion IV / IO. May be repeated as needed.

5. After each **5 CYCLES of CPR** (2 minutes), check rhythm.**(d)**

NOTE

a. If any of these factors are present: hypovolemia, hypoxia, hydrogen ion (acidosis), hyper / hypokalemia, hypoglycemia, hypothermia, toxins, tamponade, tension pneumothorax; thrombosis (coronary and pulmonary), or trauma, treat / transport accordingly.

b. **IV DRUG BOLUSES** are followed by a 20 - 30 ml bolus of .9% Normal Saline. When practical, elevation of the limb is recommended.

c. **ETT DOSING** of drugs is twice the amount of the usual IV dose followed by 10 - 20 ml of normal saline flush.

d. Assessment of rhythm should take no longer than 10 seconds. If at any time rhythm has converted to a **SHOCKABLE RHYTHM**, go to **PROTOCOL 12a**

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PROTOCOL 16 — VENTRICULAR TACHYCARDIA WITH A PULSE; STABLE (a)

1. Initiate Routine Medical Care.
2. Obtain a **12 LEAD EKG (b)**
3. If **VENTRICULAR TACHYCARDIA** (VT):
   a. **AMIODARONE** 150 mg/ 20 ml IV over 10 minutes **(c);** May repeat if VT persists, up to a total maximum dose of 2.2 gm / 24 hrs

MEDICAL CONTROL OPTIONS

- Repeat of any of the above standing orders.
- **ADENOSINE** 6 mg or 12 mg IV; if ineffective, may immediately repeat at 12 mg bolus up to total dose of 30 mg; follow each dose with 20 ml .9% Normal Saline bolus.
- **AMIODARONE INFUSION** of 1.0 mg/min D_5W. **(c)**
- **CARDIOVERSION (e)**
- For sedation for **CARDIOVERSION**; consider:
  - **DIAZEPAM** 5 - 10 mg slow IV (not to exceed 5 mg/min)
  - **MIDAZOLAM** 2 - 5mg slow IV
  - **MORPHINE SULFATE** 5 - 10 mg IV
- **LIDOCAINE** 0.5 - 1.5 mg/kg IV. **(c)**.
- **LIDOCAINE INFUSION** at 2 - 4 mg/min. **(c)**
- **MAGNESIUM SULFATE** 1 - 2 grams IV over 5 minutes.
- **PROCAINAMIDE INFUSION** 1 - 4 mg/min IV infusion. **(c, d)**
- **PROCAINAMIDE** 20 mg/min IV **(c)**, to a maximum dose of 17 mg/kg. **(d)**

NOTE

a. **STABLE** denotes **NO** signs or symptoms of **POOR PERFUSION,** including acute altered mental status, ongoing chest pain, hypotension or other signs of shock.

b. If at any time the rhythm is determined to be a **NARROW COMPLEX TACHYCARDIA**, go to **Protocol 22**

c. It is recommended that not more than one antidysrhythmic agent be used on any patient.

d. Stop **PROCAINAMIDE** if hypotension occurs, or if the QRS widens more than 50%, or if VT resolves.

Protocol 16continued on next page

NOTE

e. Doses of energy for **CARDIOVERSION** depends on the underlying rhythm**:**

- **A-Fib, Stable/Monomorphic VT - begin** at 100 joules (monophasic) **OR** 100-120 joules (biphasic), or as per manufacturer's recommendation. If there is no change after initial attempt, escalate energy sequentially to 200; 300 and 360 joules (monophasic) or 120 – 200 (biphasic), or as per manufacturer's recommendation, until effective.
- **A-Flutter, SVT –** begin at 50 joules (monophasic) **OR** as per manufacturer's equivalent recommendation for biphasic. If there is no change after initial attempt, follow dosing under A-Fib.
- **Unstable/Polymorphic VT** – begin at 360 joules (monophasic) **OR** 120 joules (biphasic), or as per manufacturer's recommendation, until effective.

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PEDIATRIC PROTOCOL 16a — VENTRICULAR TACHYCARDIA WITH A PULSE; STABLE (a)

1. Initiate Routine Medical Care.
2. Obtain a **12 LEAD EKG (b)**
3. If patient remains hemodynamically **STABLE (a)**, **CONTACT MEDICAL CONTROL**

MEDICAL CONTROL OPTIONS

- **ADENOSINE** 0.1 mg/kg (maximum 1st dose 6 mg) by rapid bolus IV / IO; May double 1st dose (maximum 2nd dose 12 mg) and give once.
- **AMIODARONE** 5mg/kg IV / IO over 20-60 minutes **(d)**
- **PROCAINAMIDE** 15 mg/kg IV / IO over 30-60 minutes **(d, e)**
- **SYNCHRONIZED CARDIOVERSION** 0.5 to 1 J/kg; if not effective increase to 2 J/kg **(c)**
- For sedation for **CARDIOVERSION**; consider:
  - **DIAZEPAM** 0.1 mg/kg IV / IO over 2 minutes
  - **MIDAZOLAM**

    6 mos to 5 years: 0.05 - 0.1 mg/kg IV / IO over 2 minutes

    6 years to 12 years: 0.025 - 0.05 mg/kg IV / IO over 2 minutes

    13 years to 15 years: 2 - 5 mg IV / IO over 2 minutes
  - **MORPHINE SULFATE** 0.1 mg/kg IV / IO

NOTE

a. **STABLE** denotes **NO** signs or symptoms of **POOR PERFUSION,** including acute altered mental status, ongoing chest pain, hypotension or other signs of shock.

b. If at any time the rhythm is determined to be a **NARROW COMPLEX TACHYCARDIA**, go to **Protocol 22a**.

c. If patient presents with hypotension, unconsciousness, pulmonary edema, or if **SYNCHRONOUS CARDIOVERSION** cannot be accomplished for technical reasons, use **ASYNCHRONOUS CARDIOVERSION**.

d. It is recommended that not more than one antiarrhythmic agent be used on any patient.

e. Stop **PROCAINAMIDE** if hypotension occurs, or if the QRS widens more than 50%, or if the VT resolves.

New 10-07

PROTOCOL 17 — VENTRICULAR TACHYCARDIA WITH A PULSE; UNSTABLE (a)

1. Apply cardiac monitor to determine rhythm.**(b)**

2. **SYNCHRONOUS CARDIOVERSION (c, d)**

3. If rhythm **FAILS TO COVERT** to a supraventricular rhythm **AND** remains in an **UNSTABLE (a) WIDE COMPLEX TACHYCARDIA**, administer:

    a. **AMIODARONE** 150mg / 20 ml IV over 10 minutes **(e)**; may be repeated every 10 minutes.

    OR

    b. **LIDOCAINE** 1.5 mg/kg IV **(e)**; may be repeated in 5 - 10 minutes **ONCE**.

4. If rhythm **CONVERTS** to a **SUPRAVENTRICULAR** rhythm prior to any drug administration, administer:

    a. **AMIODARONE** 150 mg/ 20ml IV over 10 minutes and then an infusion of 0.5 mg/min in D_5W. **(e)**

    OR

    b. **LIDOCAINE** 1.0 mg/kg IV and then an infusion of 2 mg/min. **(e)**

5. Obtain a **12 LEAD EKG** to determine the rhythm **(b)**

MEDICAL CONTROL OPTIONS

- Repeat of any of the above standing orders.
- **ADENOSINE** 6 mg or 12 mg IV; if ineffective, may immediately repeat at 12 mg bolus up to total dose of 30 mg; follow each dose with 20 ml .9% Normal Saline bolus.
- **AMIODARONE** 150 mg/ 20 ml IV over 10 minutes **(e)**.
- **AMIODARONE INFUSION** of 1.0 mg/min D_5W. **(e)**
- For sedation for **CARDIOVERSION**; consider:
    - **DIAZEPAM** 5 - 10 mg slow IV (not to exceed 5 mg/min)
    - **MORPHINE SULFATE** 5 - 10 mg IV
    - **MIDAZOLAM** 2 - 5mg slow IV
- **LIDOCAINE** 0.5 - 1.5 mg/kg IV. **(e)**.
- **LIDOCAINE INFUSION** at 2 - 4 mg/min. **(e)**
- **MAGNESIUM SULFATE** 1 - 2 grams IV over 5 minutes.
- **PROCAINAMIDE** 20 mg/min IV until the **WIDE COMPLEX TACHYCARDIA** resolves or up to 17mg/kg. **(e, f)**
- **PROCAINAMIDE INFUSION** 1 - 4 mg/min IV infusion. **(e, f)**

Protocol 17 continued on next page

NOTE

a. **UNSTABLE** denotes signs or symptoms of **POOR PERFUSION,** including acute altered mental status, ongoing chest pain, hypotension or other signs of shock.

b. If at any time the rhythm is determined to be a **NARROW COMPLEX TACHYCARDIA**, go to **Protocol 22**.

c. Doses of energy for **CARDIOVERSION** depends on the underlying rhythm**:**

- **A-Fib, Stable/Monomorphic VT - begin** at 100 joules (monophasic) **OR** 100-120 joules (biphasic), or as per manufacturer's recommendation. If there is no change after initial attempt, escalate energy sequentially to 200; 300 and 360 joules (monophasic) or 120 – 200 (biphasic), or as per manufacturer's recommendation, until effective.
- **A-Flutter, SVT –** begin at 50 joules (monophasic) **OR** as per manufacturer's equivalent recommendation for biphasic. If there is no change after initial attempt, follow dosing under A-Fib.
- **Unstable/Polymorphic VT** – begin at 360 joules (monophasic) **OR** 120 joules (biphasic), or as per manufacturer's recommendation, until effective.

d. If patient presents with hypotension, unconsciousness, pulmonary edema, or if **SYNCHRONOUS CARDIOVERSION** cannot be accomplished for technical reasons, use **ASYNCHRONOUS CARDIOVERSION**.

e. It is recommended that not more than one antiarrhythmic agent be used on any patient.

f. Stop **PROCAINAMIDE** if hypotension occurs, or if the QRS widens more than 50%, or if the VT resolves.

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PEDIATRIC PROTOCOL 17a — VENTRICULAR TACHYCARDIA WITH A PULSE; UNSTABLE (a)

1. Initiate Routine Medical Care

2. Apply cardiac monitor to determine rhythm.**(b)**

3. **SYNCHRONOUS CARDIOVERSION** 0.5 J/kg – 1 J/kg; if no change, repeat at 2 J/kg **(c)**

4. If it does not delay **CARDIOVERSION,** administer **ADENOSINE** 0.1 mg/kg IV/IO first to determine if the rhythm is SVT with aberrant conduction.

5. If rhythm **FAILS TO COVERT** after 2nd **CARDIOVERSION** to a supraventricular rhythm **AND** remains in an **UNSTABLE (a) WIDE COMPLEX TACHYCARDIA**, administer:

   a. **AMIODARONE** 5mg/kg IV/IO over 20-60 minutes **(d)**

   OR

   b. **PROCAINAMIDE** 15 mg/kg IV/IO over 30-60 minutes **(d, e)**

6. Obtain a **12 LEAD EKG** to determine the rhythm **(b)**

MEDICAL CONTROL OPTIONS

- Repeat of any of the above standing orders.
- For sedation for **CARDIOVERSION**; consider:
  - **DIAZEPAM** 0.1 mg/kg IV / IO over 2 minutes
  - **MIDAZOLAM**

    6 mos to 5 years: 0.05 - 0.1 mg/kg IV / IO over 2 minutes

    6 years to 12 years: 0.025 - 0.05 mg/kg IV / IO over 2 minutes

    13 years to 15 years: 2 - 5 mg IV / IO over 2 minutes
  - **MORPHINE SULFATE** 0.1 mg/kg IV / IO
- **LIDOCAINE** 0.5 - 1.5 mg/kg IV. **(e)**.
- **LIDOCAINE INFUSION** at 2 - 4 mg/min. **(e)**
- **MAGNESIUM SULFATE** 1 - 2 grams IV over 5 minutes.

NOTE

a. **UNSTABLE** denotes signs or symptoms of **POOR PERFUSION,** including acute altered mental status, ongoing chest pain, hypotension or other signs of shock.

b. If at any time the rhythm is determined to be a **NARROW COMPLEX TACHYCARDIA**, go to **Protocol 22a**.

c. If patient presents with hypotension, unconsciousness, pulmonary edema, or if **SYNCHRONOUS CARDIOVERSION** cannot be accomplished for technical reasons, use **ASYNCHRONOUS CARDIOVERSION**.

Pediatric Protocol 17a continued on next page

NOTE

d. It is recommended that not more than one antiarrhythmic agent be used on any patient.

e. Stop **PROCAINAMIDE** if hypotension occurs, or if the QRS widens more than 50%, or if the VT resolves.

New 10-07

PROTOCOL 18 — SUSPECTED MYOCARDIAL INFARCTION

1. Obtain a **12 LEAD EKG**

2. **ASPIRIN** 81 mg tablets (up to 4 tablets) if the patient hasn't taken any aspirin that day.

3. If chest pain is present, administer **NITROGLYCERIN** 0.4 mg SL tablets or spray **(a)**; May be repeated every 5 minutes if SBP remains **>** 100 mmHg.

MEDICAL CONTROL OPTIONS

- Repeat of any of the above standing orders
- **MORPHINE SULFATE** 2 - 5 mg IV; repeated as directed.

NOTE

a. **NITROGLYCERI**N should be given with caution to patients taking erectile dysfunction (ED) medications (i.e. Viagra, Cialis, Levitra), or suspected inferior wall or right ventricle (RV) myocardial infarctions (MI)

N.B. SEE **APPENDIX C** FOR CONSIDERATION OF THROMBOLYTIC THERAPY ELIGIBILITY

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PROTOCOL 19 — BRADYDYSRHYTHMIAS

1. FOR PATIENTS WITH SYMPTOMATIC BRADYCARDIA:

    a. Obtain **12 LEAD EKG (a)**

1. IF SIGNS OR SYMPTOMS OF **POOR PERFUSION (b)** CAUSED BY THE BRADYCARDIA:

    a. Begin **TRANSCUTANEOUS PACING**, especially if high-degree block.

    b. Consider **ATROPINE** 0.5 mg IV / IO while setting up pacer **(a)**. If inadequate response, may repeat 0.5 mg IV every 3 minutes to a maximum of 3 mg.

    c. If pacing is ineffective, **CONTACT MEDICAL CONTROL.**

1. IF SIGNS OR SYMPTOMS OF **ADEQUATE PERFUSION:**

    a. Continue to monitor patient's vital signs and EKG.

MEDICAL CONTROL OPTIONS

- Repeat of any of the above standing orders.
- For sedation for **TRANSCUTANEOUS PACING**; consider:
    - **DIAZEPAM** 5 - 10mg slow IV / IO;
    - **MIDAZOLAM** 2 - 5mg slow IV / IO; or
    - **MORPHINE SULFATE** 5 - 10 mg IV / IO
- **FLUID CHALLENGE** of 0.9% Normal Saline (300 – 500 ml rapid infusion)
- **DOPAMINE HCL** 400 mg in 250 ml of 0.9% Normal Saline IV / IO; initial rate of 2 - 10 mcg/kg/min titrated upwards every 5 minutes in increments of 5 mcg/kg/min until the desired therapeutic effect is achieved (maximum dose of 25 mcg/kg/min).
- **EPINEPHRINE** 1:10,000 1.0 mg/ 250 ml Normal Saline (4 mcg/ml) IV / IO; administer at a rate of 2 - 10 mcg/min, titrated to SBP 100.

NOTE

a. If STEMI present, avoid **ATROPINE**.

b. Signs of **POOR PERFUSION** includes acute altered mental status, ongoing chest pain, hypotension or other signs of shock.

c. If beta or calcium channel blocker overdose suspected, **CONTACT MEDICAL CONTROL**

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PEDIATRIC PROTOCOL 19a — BRADYDYSRHYTHMIAS

1. FOR PATIENTS WITH SYMPTOMATIC BRADYCARDIA:

    a. Obtain **12 LEAD EKG (a)**

2. IF SIGNS OR SYMPTOMS OF **POOR PERFUSION (b)** CAUSED BY THE BRADYCARDIA:

    a. If HR < 60 BPM despite oxygenation and ventilation, **START CPR**

    b. Administer **EPINEPHRINE** 0.01 mg/kg (1:10,000) IV / IO; or 0.1 mg/kg (1:1,000) ETT; repeat every 3 – 5 minutes.

    c. Consider **ATROPINE** 0.02 mg/kg IV / IO, 0.04 mg/kg ETT while setting up pacer **(a)**. If inadequate response, may repeat. (Minimum dose 0.1mg; Maximum dose 1 mg).

    d. Consider **TRANSCUTANEOUS PACING**, especially if high-degree block.

    e. If pacing is ineffective, **CONTACT MEDICAL CONTROL.**

3. IF SIGNS OR SYMPTOMS OF **ADEQUATE PERFUSION:**

    a. Continue to monitor patient's vital signs and EKG.

MEDICAL CONTROL OPTIONS

- Repeat of any of the above standing orders.
- For sedation for **TRANSCUTANEOUS PACING**; consider:
    - **DIAZEPAM** 0.1 mg/kg IV / IO over 2 minutes
    - **MIDAZOLAM**

        6 mos to 5 years: 0.05 - 0.1 mg/kg IV / IO over 2 minutes

        6 years to 12 years: 0.025 - 0.05 mg/kg IV / IO over 2 minutes

        13 years to 15 years: 2 - 5 mg IV / IO over 2 minutes
    - **MORPHINE SULFATE** 0.1 mg/kg IV / IO
- **FLUID CHALLENGE** of 0.9% Normal Saline 20 ml/kg.
- **EPINEPHRINE** 1:10,000 0.01 mg/kg IV / IO; or 1:1,000 0.1 mg/kg ET.

NOTE

a. If STEMI present, avoid **ATROPINE**.

b. Signs of **POOR PERFUSION** includes acute altered mental status, ongoing chest pain, hypotension or other signs of shock.

c. If beta or calcium channel blocker overdose suspected, **CONTACT MEDICAL CONTROL**

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PROTOCOL 22 — SUPRAVENTRICULAR TACHYCARDIA

1. Obtain a **12 LEAD EKG (a)**.

2. If SINUS TACHYCARDIA, **FLUID CHALLENGE** of 0.9% Normal Saline (300 – 500 ml rapid infusion)

3. If ATRIAL FLUTTER, ATRIAL FIBRILLATION or MULTIFOCAL ATRIAL TACHYCARDIA, administer:

   a. **DILTIAZEM** 0.25 – 0.35 mg/kg IV over 2 minutes

4. If JUNCTIONAL TACHYCARDIA (RE-ENTRANT SVT):

   a. Perform a **VAGAL MANEUVER** if possible to slow the rate; may be repeated if necessary.

   b. Administer **ADENOSINE** 6 mg rapid IV; if ineffective after 2 minutes, give **ADENOSINE** 12 mg rapid IV; may be repeated once if ineffective. Follow each dose with 10 ml 0.9% Normal Saline rapid bolus or flush.

5. IF PATIENT IS **UNSTABLE (b) AND UNCONSCIOUS**:

   a. **SYNCHRONOUS CARDIOVERSION (c)**

6. IF PATIENT IS **UNSTABLE (b) AND CONSCIOUS**:

   a. CONTACT MEDICAL CONTROL

MEDICAL CONTROL OPTIONS

- Repeat of any of the above standing orders.
- **AMIODARONE** 150 mg/ 20 ml IV over 10 minutes.
- **AMIODARONE INFUSION** of 1.0 mg/min
- **CARDIOVERSION (c)**
- For sedation for **CARDIOVERSION**; consider:
  - **DIAZEPAM** 5 - 10 mg slow IV (not to exceed 5 mg/min)
  - **MIDAZOLAM** 2 - 5mg slow IV
  - **MORPHINE SULFATE** 2 - 10 mg IV
- **CALCIUM CHLORIDE** 250 - 1,000 mg slow IV.
- **VERAPAMIL** 2.5 - 5 mg IV, administered at a rate of 5 mg over 2 minutes

NOTE

a. If at any time the rhythm is determined to be a **WIDE COMPLEX TACHYCARDIA**, go to **Protocol 16: Ventricular Tachycardia With A Pulse; Stable,** or **Protocol 17: Ventricular Tachycardia With A Pulse; Unstable**, as appropriate.

Protocol 22 continued on next page

NOTE

b. **UNSTABLE** denotes no signs or symptoms of **POOR PERFUSION,** including acute altered mental status, ongoing chest pain, hypotension or other signs of shock.

c. Doses of energy for **CARDIOVERSION** depends on the underlying rhythm**:**

- **A-Fib, Stable/Monomorphic VT - begin** at 100 joules (monophasic) **OR** 100-120 joules (biphasic), or as per manufacturer's recommendation. If there is no change after initial attempt, escalate energy sequentially to 200; 300 and 360 joules (monophasic) or 120 – 200 (biphasic), or as per manufacturer's recommendation, until effective.
- **A-Flutter, SVT –** begin at 50 joules (monophasic) **OR** as per manufacturer's equivalent recommendation for biphasic. If there is no change after initial attempt, follow dosing under A-Fib.
- **Unstable/Polymorphic VT** – begin at 360 joules (monophasic) **OR** 120 joules (biphasic), or as per manufacturer's recommendation, until effective.

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PEDIATRIC PROTOCOL 22a — SUPRAVENTRICULAR TACHYCARDIA

1. Initiate Routine Medical Care

2. Obtain a **12 LEAD EKG (a)**.

3. If SINUS TACHYCARDIA, **FLUID CHALLENGE** of 0.9% Normal Saline, 10 – 20 ml/kg IV / IO rapid infusion

4. If JUNCTIONAL TACHYCARDIA (RE-ENTRANT SVT):
   a. Perform a **VAGAL MANEUVER** if possible to slow the rate; may be repeated if necessary.
   b. Administer **ADENOSINE** 0.1 mg/kg IV / IO; if ineffective after 2 minutes, give **ADENOSINE** 0.2 mg/kg IV / IO; may be repeated once if ineffective. Follow each dose with 20 ml Normal Saline bolus. (Maximum single dose is 12 mg)

5. IF PATIENT IS **UNSTABLE (a) AND UNCONSCIOUS**:
   a. **SYNCHRONOUS CARDIOVERSION** 0.5 J/kg; if no change, 1 J/kg; if no change, repeat at 1 J/kg

6. IF PATIENT IS **UNSTABLE (a) AND CONSCIOUS**:
   a. CONTACT MEDICAL CONTROL

MEDICAL CONTROL OPTIONS

- Repeat of any of the above standing orders.
- **AMIODARONE** 5 mg/kg IV / IO over 20 - 60 minutes.
- For sedation for **CARDIOVERSION**; consider:
  - **DIAZEPAM** 0.1 mg/kg IV / IO over 2 minutes
  - **MIDAZOLAM**

    6 mos to 5 years: 0.05 - 0.1 mg/kg IV / IO over 2 minutes

    6 years to 12 years: 0.025 - 0.05 mg/kg IV / IO over 2 minutes

    13 years to 15 years: 2 - 5 mg IV / IO over 2 minutes
  - **MORPHINE SULFATE** 0.1 mg/kg IV / IO
- **CALCIUM CHLORIDE** 20 mg/kg IV/IO.
- **VERAPAMIL** (ages 1 - 15 years) 0.1 - 0.3 mg/kg IV / IO over 2 minutes; may repeat once in 30 minutes if no change (maximum dose 5 mg).

NOTE

a. If at any time the rhythm is determined to be a **WIDE COMPLEX TACHYCARDIA**, go to **Protocol 16a: Ventricular Tachycardia With A Pulse; Stable,** or **Protocol 17a: Ventricular Tachycardia With A Pulse; Unstable**, as appropriate.

Pediatric Protocol 22a continued on next page

NOTE

b. **UNSTABLE** denotes no signs or symptoms of **POOR PERFUSION,** including acute altered mental status, ongoing chest pain, hypotension or other signs of shock.

c. In infants with SVT associated shock, Adenosine administration may precede Cardioversion if vascular access is available, but Cardioversion should not be delayed while IV access is achieved.

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