State of Colorado
Department of Public Health and Environmental

Emergency Medical Services Division

EMT-Intermediate

Advanced Life Support

Algorithms

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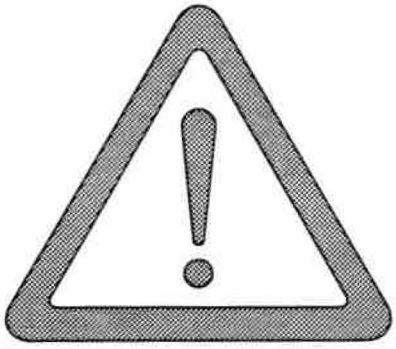

The following Algorithms have been based off the current American Heart Association ACLS Standards. Approval by Physician advisor is imperative prior to implementation of these new standards.

Medical Resource Consultation, Inc.
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Lakewood, Co 80232
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April 1993

REFERENCE:

American Heart Association: Currents in emergency cardiac care. Winter 1992. Volume 3 Number 4 pp. 12-15

Ventricular Fibrillation
Pulseless Ventricular Tachycardia
(VF/VT) Algorithm

ABC's

(a) Perform CPR until defibrillator attached
use "quick look paddles" if available
(CPR should **not** delay defibrillation)

VF/VT present on defibrillator

Defibrillate up to 3 times if needed for persistent
VF/VT (200 J, 200-300 J, 360 J)

Establish base contact

Persistent or recurrent VF/VT	Return of spontaneous circulation	P.E.A. go to P.E.A. Algorithm	Asystole go to Asystole Algorithm

- Continue CPR
- Intubate at once
- Obtain IV access

(b) Epinephrine 1mg IVP repeat every 3-5 min.

- Defibrillate 360 J within 30-60 sec. after each dose of medication

(c) Admin. probable
(d) meds. Class IIa in recurrent or persistent VF/VT

- Assess vital signs
- Support airway
- Support breathing
- Provide medications appropriate for blood pressure, heart rate, & rhythm

Class I: definitely helpful
Class IIa: acceptable, probably helpful
Class IIb: acceptable, possibly helpful
Class III: not indicated, may be harmful

(a) Precordial thump is a Class IIb action in witnessed arrest, no pulse, and no defibrillator immediately available.

(b) The recommended dose of epinephrine is 1 mg IV every 3-5 min. If this approach fails, several Class IIb dosing regiments can be considered dependent upon M.D. advisor approval.
- Intermediate: epinephrine 2-5 mg IV push every 3-5 min.
- Escalating: epinephrine 1mg - 3mg - 5mg IV push 3 min apart
- High: epinephrine 0.1 mg/kg IV push, every 3-5 min.

(c) Sodium bicarbonate (1 mEq/kg) Class I if patient has known preexisting hyperkalemia.

(d) Lidocaine 1.5 mg/kg IV push. Repeat in 3-5 min. to total loading dose of 3 mg/kg

Sodium Bicarbonate (1 mEq/kg IV)

Class IIa
- If known preexisting bicarbonate responsive acidosis
- If overdose with tricyclic antidepressants
- To alkalinize the urine in drug overdoses

Class IIb
- If intubated and continued long arrest interval
- Upon return of spontaneous circulation after long arrest interval

Class III
- Hypoxic lactic acidosis

Pulseless Electrical Activity (PEA) Algorithm

Includes:
- Electromechanical dissociation (EMD)
- Pseudo - EMD
- Idioventricular rhythms
- Ventricular escape rhythms
- Bradyasystolic rhythms
- Postdefibrillation idioventricular rhythms

Continue CPR

Intubate at once

Obtain IV access

Establish base contact

Consider possible causes
(Parentheses = possible therapies and treatments)

- Hypovolemia (volume infusion)
- Hypoxia (ventilate)
- Cardiac tamponade (rapid transport)
- Tension pneumothorax (rapid transport)
- Hypothermia
- Massive pulmonary embolism (rapid transport)
- Drug overdoses as tricyclics, digitalis, beta-blockers, calcium channel blockers
- (a)Hyperkalemia
- (b)Acidosis (hyperventilate)
- Massive acute myocardial infarction

(c)Epinephrine 1 mg IVP
repeat every 3-5 min.

(d)If absolute bradycardia (<60 beats/min) relative bradycardia, give atropine 1 mg IV
Repeat every 3-5 min to total of 0.04 mg/kg

Class I:	definitely helpful
Class IIa:	acceptable, probably helpful
Class IIb:	acceptable, possibly helpful
Class III:	not indicated, may be harmful

(a) Sodium bicarbonate (1 mEq/kg) Class I if patient has known preexisting hyperkalemia.

(b) **Sodium Bicarbonate (1 mEq/kg IV)**

Class IIa
- If known preexisting bicarbonate responsive acidosis
- If overdose with tricyclic antidepressants
- To alkalinize the urine in drug overdoses

Class IIb
- If intubated and continued long arrest interval
- Upon return of spontaneous circulation after long arrest interval

Class III
- Hypoxic lactic acidosis

(c) The recommended dose of epinephrine is 1 mg IV every 3-5 min. If this approach fails, several Class IIb dosing regiments can be considered dependent upon M.D. advisor approval.
- Intermediate: epinephrine 2-5 mg IV push every 3-5 min.
- Escalating: epinephrine 1mg - 3mg - 5mg IV push 3 min apart
- High: epinephrine 0.1 mg/kg IV push, every 3-5 min.

(d) Shorter atropine dosing intervals are possible helpful in cardiac arrest (Class IIb)

Asystole Treatment Algorithm

Continue CPR

Intubate at once

Obtain IV access

Establish base contact

Confirm asystole in more than one lead

Consider possible causes
Hypoxia
Hyperkalemia
Hypokalemia
Preexisting acidosis
Drug overdose
Hypothermia

(a) & (b) Epinephrine 1 mg IVP
repeat every 3-5 min

(c) & (d) Atropine 1 mg IVP
repeat every 3-5 min
up to a total of 0.04 mg/kg

(e) Consider termination of efforts

Class I:	definitely helpful
Class IIa:	acceptable, probably helpful
Class IIb:	acceptable, possibly helpful
Class III:	not indicated, may be harmful

(a) The recommended dose of epinephrine is 1 mg IV every 3-5 min. If this approach fails, several Class IIb dosing regiments can be considered dependent upon M.D. advisor approval.
- Intermediate: epinephrine 2-5 mg IV push every 3-5 min.
- Escalating: epinephrine 1mg - 3mg - 5mg IV push 3 min apart
- High: epinephrine 0.1 mg/kg IV push, every 3-5 min.

(b) Sodium bicarbonate (1 mEq/kg) Class I if patient has known preexisting hyperkalemia.

(c) Shorter atropine dosing intervals are Class IIb in asystolic arrest

(d) **Sodium Bicarbonate (1 mEq/kg IV)**

Class IIa
- If known preexisting bicarbonate responsive acidosis
- If overdose with tricyclic antidepressants
- To alkalinize the urine in drug overdoses

Class IIb
- If intubated and continued long arrest interval
- Upon return of spontaneous circulation after long arrest interval

Class III
- Hypoxic lactic acidosis

(e) If patient remains in asystole or other agonal rhythms after successful intubation and intial medications and no reversible causes are indentified, consider termination of resuscitative efforts by a phsician. Consider interval since arrest. This is dependent upon M.D. advisor approval.

Bradycardia Algorithm

(patient is not in cardiac arrest)

Determine if patient is symptomatic

- Assess ABC's
- Secure airway
- Administer oxygen
- Start IV
- Attach monitor
- Assess vital signs
- Perform physical examination

Bradycardia, either absolute (<60 beats/min) or relative

(a) Serious signs or symptoms

No → Observe & consider transport

Yes → ***Establish base contact***

(b) & (c) Atropine 0.5-1.0 mg

(a) Serious signs or symptoms must be related to the slow rate. Clinical manifestations include:
- Symptoms (chest pain, shortness of breath, decreased level of consciousness)
- Signs (low B/P, shock, pulmonary congestion, CHF, acute MI)

(b) Atropine should be given in repeat doses in 3-5 min up to a total of 0.04 mg/kg. Consider shorter dosing intervals in severe clinical conditions. It has been suggested that atropine should be used with caution in atrioventricular (AV) block at the His-Purkinje level (type II AV block and new third-degree block with wide QRS complexes) (Class IIb)

(c) Never treat third-degree heart block plus ventricular escape beats with lidocaine!

Ventricular Tachycardia With Pulses

(patient is not in cardiac arrest)

Assess Patient

- Assess ABC's
- Secure airway
- Administer oxygen
- Start IV
- Attach monitor
- Assess vital signs
- Perform physical examination

Establish base contact

Lidocaine
1 - 1.5 mg/kg IV push

Lidocaine
Repeat Every 5 - 10 minutes
0.5 - 0.75 mg/kg IV push
Maximum total 3 mg/kg

The patient should be continually assessed for pulses. If patient becomes pulseless during medication therapy, refer to Ventricular Fibrillation/ Pulseless Ventricular Tachycardia Algorithm.