

Purpose: This procedure is to allow for the performance of appropriate electrical therapy (defibrillation, synchronized cardioversion, external pacing, automatic external defibrillation, and cardiac monitoring) according to Marquette County EMS Medical Control protocols.

Defibrillation - Manual

Note: This procedure is to be used in conjunction with the appropriate protocol by Paramedics only.

- A. Indications: Ventricular fibrillation, pulseless ventricular tachycardia
- B. Technique:
 - 1. Confirm unresponsiveness and absence of pulse and respirations.
 - 2. Initiate CPR
 - 3. Turn defibrillator on.
 - 4. Place "hands-off" electrodes in appropriate position on patient's chest to determine patient's cardiac rhythm.
 - a. One pad to right of upper sternum below clavicle and other pad just to left of heart apex.
 - 5. Confirm that sync switch is "off".
 - 6. Charge defibrillator to energy level specified in appropriate protocol.
 - 7. Recheck rhythm.
 - 8. "Clear" the area.
 - 9. Discharge the electrical charge by pressing the shock button.
 - 10. Watch for evidence of muscle contraction when shock delivered.
 - 11. Immediately change to next energy level and charge defibrillator
 - 12. Recheck rhythm.
 - 13. Confirm presence or absence of pulse.
 - 14. If VF or pulseless VT persist re-shock as outlined in appropriate protocol.
 - 15. Continue to treat the patient according to the appropriate protocol.
- C. Precautions
 - 1. Treat the patient, not the monitor.
 - 2. Dry the chest wall if wet or diaphoretic.
 - 3. Nitroglycerin paste and pads should be removed.
 - 4. Avoid placing the defib pads over a pacemaker generator or any medication patch. Anterior and posterior placement of defib pads is appropriate depending on pacemaker placement.
 - 5. If visible muscle contraction of the patient did not occur, defibrillation did not occur; check equipment.
 - 6. Ensure that no other individuals are in contact with the patient or the defibrillator prior to delivering the electrical shock.
 - 7. Defibrillation may not be successful in hypothermic patients.
- D. Complications
 - 1. Accidental shock of adjacent individual.
 - 2. Skin burns resulting from inadequate contact between paddles and skin or due to inadequate conducting gel or dry conductive pads.

Cardioversion

Note: This procedure is to be used in conjunction with the appropriate protocol by Paramedics.

A. Indications: Pulsed, unstable ventricular tachycardia; unstable supraventricular tachycardia. Must never be undertaken without direct order from base physician.

B. Technique:

1. Initiate IV prior to procedure if time permits.
2. Sedate the patient, if appropriate, according to the appropriate protocol.
3. Select a lead which gives upright QRS complex.
4. Turn sync switch "on". Ensure that sync "light" coincides with QRS complex. It should blink with each QRS complex.
5. Place conductive pads on patient's chest.
 - a. one defib pad to right of upper sternum below clavicle and other pad just to left of heart apex.
6. Charge defibrillator to energy level as specified in appropriate protocol.
7. Recheck rhythm.
8. "Clear" the area.
9. Discharge the electrical charge by simultaneously pressing and holding the defibrillator buttons until the charge is delivered; it may take several seconds for the charge to be delivered.
10. Watch for evidence of muscle contraction when shock delivered.
11. If no shock is delivered and the patient is in a wide complex tachycardia, turn off the "synch" switch and defibrillate the patient.
12. If shock is delivered, but the rhythm does not convert, re-cardiovert according to the appropriate protocol.
13. If the patient is cardioverted into or progresses into ventricular fibrillation, turn off the sync switch and follow the appropriate cardiac protocol.

C. Precautions

1. May be contraindicated in patients with digitalis toxicity.
2. The same precautions as for defibrillation occur.
3. If the defibrillator does not discharge on sync with the tachycardia, turn off the sync switch and defibrillate the patient as outlined in appropriate cardiac protocol.
4. If a sinus rhythm is achieved by cardioversion, even briefly, and then reverts to previous rhythm, repeat the cardioversion at the same setting as was initially successful.
 - a. If conversion only occurs for a brief period, going to higher energy levels will be of no additional value. After a couple of short duration conversions, consider alternate treatments for presenting problem. (IE. Lidocaine or adenosine, etc.)
5. Beware of patients with chronic atrial fibrillation. (often present with atrial fib with rapid ventricular response) They will not cardiovert easily and may even get worse from cardioversion. Ask for a history of an irregular heartbeat.

D. Complications

1. Same as for defibrillation.

Pacing – External Transcutaneous

Note: This procedure is to be used in conjunction with appropriate protocol by Paramedics only.

A. Indications:(See Special Notes) Symptomatic Heart Blocks & Bradycardias

B. Technique:

1. Ensure continuous ECG monitoring during procedure.
2. Utilizing 4 lead EKG cables along with pacing pads.
3. Consider sedation, if time permits.
4. Prep patient skin:
 - a. Clip/shave hair (if pads won't adhere).
 - b. Dry skin, if diaphoretic.
5. Apply Pacing Electrodes
 - a. Anterior - Posterior Preferred
 - i. Negative: L Anterior chest, halfway between Xiphoid process and L nipple, with upper edge of electrode below nipple line.
 - ii. Positive: L Posterior beneath scapula and lateral to spine
 - b. Secondary position - pads in same place as for defibrillation.
6. Push Pacer button.
7. If QRS complexes are present, make sure QRS or EKG are in most positive, upright position (so machine can sense their presence).
 - a. "Sense" marker should appear on each QRS. If not adjust EKG size until "sensing" occurs. If still unable to obtain "sense" switch to another lead.
8. Set External Pacemaker Rate to 70 BPM to begin.
9. Set Milliamp (MA) at zero.
10. Slowly dial up MA until evidence of electrical capture has occurred.
 - a. Dial up at increments of 20 MA for unconscious patients and 5 MA for conscious patients.
 - b. Use only minimal MA needed for capture.
11. Run EKG strip and save.
12. Ensure adequate capture including electrical and mechanical capture.
 - a. Electrical: Visible pacer spike immediately followed by wide QRS and Broad T waves.
 - b. Mechanical: Palpable Pulses; LOC; BP
13. If mechanical capture is not obtained, return immediately to CPR and contact medical control.

C. Precautions

1. Use of external transcutaneous pacemakers can cause painful muscle contractions. Consider the use of sedation in awake patients.

D. Contraindications

1. Wet environment
2. Burns to the chest (relative)

E. Special Notes:

1. Do not delay pacing while awaiting IV access or atropine to take effect if patient is symptomatic.
2. Pacing is indicated in asystole when the patient goes into asystole in front of you or something you do puts the patient in asystole (e.g. defibrillation). If the initial presenting rhythm is asystole in a patient who been down for a number of minutes, defer pacing as an initial intervention.
3. The critical detail related to the effectiveness of external pacing clearly evolves around the element of time. The sooner external pacing is applied, the better the patient outcome.

Automatic External Defibrillation (AED)

See appropriate protocol for specifics

ECG Monitoring

- A. Indications: All patients presenting with cardiac related symptoms, neurological deficits, unconsciousness, cardiac arrest, shortness of breath, abnormal vital signs, any other signs or symptoms deemed significant.
- B. Precautions:
 - 1. Cardiac monitoring is not a primary consideration in the trauma setting.
- C. Special Notes:
 - 1. Code summary or rhythm strips documenting initial EKG and all significant changes must be attached the original run report. A code summary should also be left in the emergency dept.
 - 2. AED level EMS providers that have not had formal training in ECG interpretation should not interpret rhythms either over radio or on run report.

12 Lead ECG

- A. Indications: All patients presenting with Cardiac related symptoms, neurological deficits, unconsciousness, shortness of breath (potentially cardiac related), abnormal vital signs, any other signs or symptoms deemed significant.
- B. The patient may be prepared while enroute and then stop to conduct the 12 lead for time efficiency. The 12 lead shall be conducted as above indicated. Ideally send the 12 lead via telemetry. In addition leave a code summary with the receiving hospital.
- C. Patients refusing transport: If a patient presenting with symptoms outlined under indications is refusing to go to the hospital, acquire a 12 lead EKG prior to obtaining signed refusal. Send the 12 lead to the appropriate hospital prior to leaving patient. If 12 lead shows a problem and patient is still refusing to go to hospital, EMS personnel must make sure patient is specifically told of findings on 12 lead interpretation. Ideally put the medical control physician on the phone with the patient.

Authentication And Approval:



5/6/2008

Marquette County EMS Medical Director

Date:

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