Electrical Therapy

Aliases: AED, Cardioversion, defibrillation, pacing

I. Precautions for all Electrical Therapy

1. Dry the chest-wall if wet or diaphoretic
2. Nitroglycerin paste should be removed; paddles should not be placed over nitroglycerin patches.
3. Avoid placing the paddles over a pacemaker or an implantable cardioverter defibrillator (ICD).
4. Ensure no provider or bystander contact with the patient or the pads during defibrillation.

II. Automatic External Defibrillation (AED)

1. Do NOT apply AED to patient with LVAD, go **LVAD-Procedure Protocol**.
2. The AED shall be applied only to patients found in cardiopulmonary arrest.
3. Interruptions to CPR should be kept to a minimum.
4. The AED should not be used on patients found lying on conductive surfaces or patients in moving vehicles.
5. For all patients, anterior/posterior placement of pads is preferred and should be used, if possible.
6. There are no age or weight limits for AED use.
7. In pediatric patients, attenuated pads should be used, if available. If adult pads are used in pediatric patients, pads must be placed in an anterior/posterior configuration.
8. The word “shock” instead of defibrillation shall be used in this section as devices utilize this verbiage.
9. Follow the **Adult or Pediatric Cardiac Arrest-Treatment Protocol** .
10. Stop CPR to analyze patient and shock once, if indicated.
11. Continue CPR immediately after the shock, or immediately if no shock is indicated and continue for 2 minutes (5 cycles) or when AED initiates analysis.
12. If no pulse, analyze the patient and repeat one shock, if indicated.
13. If patient converts to a non-shockable rhythm at any time, continue CPR until AED prompts to check the patient.
14. Should a patient who is successfully defibrillated arrest again, analyze the patient again.

III. Manual Defibrillation

1. Indications:
   A. Ventricular fibrillation
   B. Pulseless ventricular tachycardia
   C. Unstable irregular wide complex tachycardia
2. Technique:
   A. Turn defibrillator on.
   B. Apply defibrillator pads according to manufacturer specifications. For all patients, anterior/posterior placement of pads is preferred and should be used, if possible.

C. Charge defibrillator to energy level specified in appropriate protocol or according to manufacturer specifications.
D. Verify shockable rhythm.
E. Assure that no one is touching the patient.
F. Defibrillate patient.
G. Immediately initiate or resume CPR.
H. Repeat defibrillations at 2-minute intervals if the patient remains in a shockable rhythm per protocol.
I. Continue to treat the patient according to the appropriate protocol.
J. For refractory v-fib after 3 shocks, consider double sequential defibrillation per **Double Sequential Defibrillation-Procedure Protocol** (MCA Optional Protocol)
    i. If a second monitor is NOT available, consider a vector change:
        1. If pads in the anterior/posterior position: apply a new set of pads in the anterior/lateral position.
        2. If pads in the anterior/lateral position: apply a new set of pads in the anterior/posterior position.

3. Precautions
    A. If visible muscle contraction of the patient did not occur, defibrillation did not occur, check equipment.
    B. If pediatric pads were used with an AED prior to ALS management, continue using AED or use ALS monitor with appropriate pads. Do not use attenuated pediatric AED pads with an ALS monitor.

IV. Synchronized Cardioversion

1. Indications: Hemodynamically unstable patient with the following rhythms:
    A. Regular Wide Complex Tachycardia (Presumed Ventricular Tachycardia).
    B. Narrow Complex Tachycardia (Supraventricular Tachycardia (SVT) or Atrial Fibrillation with a rapid ventricular response).
2. Contraindications: Heart rate < 150 unless ordered by Medical Control
3. Technique:
    A. Consider IV sedation per **Patient Procedural Sedation-Procedure Protocol.**
    B. Turn on defibrillator (monophasic or biphasic)
    C. Attach monitor leads to the patient and ensure proper display of the patient's rhythm.
    D. Turn SYNC on, assure that QRS complex is marked
    E. Apply defibrillator paddles/pads according to manufacturer specifications.
    F. Charge defibrillator to energy level specified in appropriate protocol or according to manufacturer specifications.
    G. Check Rhythm.
    H. Assure that no one is touching the patient.
    I. Cardiovert patient
    J. Recheck pulse and rhythm.
    K. If rhythm does not convert, repeat cardioversion according to the appropriate protocol.
    L. Recheck the "sync mode" after each synchronized cardioversion as many defibrillators default back to unsynchronized mode.

M. If ventricular fibrillation occurs, deactivate synchronized mode and defibrillate.

4. Precautions
   A. Ensure sync mode has been selected.
   B. In "sync" mode, the button(s) may need to be held until cardioversion is delivered per manufacturer's instructions. If cardioversion is not delivered the first time, repeat the sequence per manufacturer's instructions.
   C. 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.

V. Transcutaneous Pacing (TCP)

1. Indications: Symptomatic Bradycardia with inadequate perfusion.
2. Technique:
   A. Monitor rhythm.
   B. Follow manufacturer's guidelines for pacing. For some monitors, ECG electrodes must be in place, along with pacing pads or combo-pads, in order for the pacer to function.
   C. Apply pacing electrodes per manufacturer's instructions.
   D. Consider sedation, per **Patient Procedural Sedation-Procedure Protocol.**
   E. If QRS complexes are present, select a lead in which the QRS is the most positive or upright (so machine can sense their presence).
   F. Set external pacemaker rate to 60 bpm to begin.
   G. Initiate pacing and increase milliamp (mA) output until evidence of capture has occurred.
   H. Increase at increments of 20 mA for unconscious patients and 5 mA for conscious patients.
      a. Use minimal mA needed for mechanical capture.
   I. Run a rhythm strip and save.
   J. Assure adequate electrical and mechanical capture.
      a. Electrical:
         1. Visible pacer spike immediately followed by wide QRS and broad T waves.
      b. Mechanical:
         1. Palpable Pulses, improved LOC; improved BP; improved patient color.
   K. If mechanical capture is not obtained, contact medical control. Perform CPR if appropriate.
3. Contraindications
   A. Wet environment
   B. Burns to the chest (relative)

VI. Special Considerations for Electrical Therapy:

1. Electrical therapy may not be successful in hypothermic patients.