CARDIOVERSION - SYNCHRONIZED

POLICY:

An RN may perform a synchronized cardioversion according to ACLS protocol or under the direction of a physician. Synchronized cardioversion, done on an elective basis, must be done in the Intensive Care Unit. All physicians doing elective cardioversion, synchronized, must have cardioversion privileges as established by the Credentials Committee. At the discretion of the attending physician, a second physician skilled in airway management may be available to administer the sedative and to manage the airway. It is recommended that Respiratory Therapy be present to assist with airway management. A patent IV, O2, and emergency equipment and meds must be available. Sedation prior to synchronized emergency cardioversion will not be administered without a Physician being present.

PURPOSE:

Deliver a synchronized charge to the myocardium on the R wave to correct a tachy-dysrhythmia.

SUPPORTIVE DATA:

1. The charge simultaneously depolarizes the entire myocardium, thereby interrupting re-entry circuits, and establishes electrical homogeneity. As a result the SA node resumes control of rhythm.
2. Synchronization with the QRS complex permits timing the electrical discharge so that it appears outside the vulnerable period of the T-wave of the ECG.
3. Cardioversion is often effective in terminating atrial tachycardia, atrial flutter, atrial fibrillation, ventricular tachycardia, and supraventricular tachycardia.
4. Digitalis should be withdrawn at least 24 hrs prior to cardioversion as indicated. Digoxin increases sensitivity of the heart to cardioversion, so may require lower energy levels.
5. Synchronized cardioversion may be either an elective or an emergency procedure to terminate tachy dysrhythmias. The physician usually performs in non-emergent patient, and the ACLS certified nurse may perform the procedure in emergency.
6. Explain procedure and obtain written consent in the non-emergent situation and attempt to in the emergent situation.
7. If time and clinical condition permit, premedicate patient.
8. Energy delivery would be provided in one of two modes: monophasic shock or biphasic shock, depending on the model of defibrillator, i.e. monophasic or biphasic.
EQUIPMENT LIST: (Refer to MMSC-ICU Cardioversion Check Sheet. (9-97)

Cardioverter/defibrillator capable of delivering a synchronized shock: monophasic or biphasic
Paddles - anterior - posterior or transverse
ECG recorder and monitor
Emergency pacing equipment
Conductive medium
Oxygen therapy equipment
Resuscitator bag
Resuscitation pads – adult multi-function electrodes
Emergency cart and medications
Functioning IV (will need 2 IV's if receiving incompatible IV medications)
B/P cuff/NIBP
Pulse oximeter
Intubation Box, suction equipment
Conscious sedation flow sheet MR-135

CONTENT:

Procedure Steps                                      Key Points
1. Patient is given a full explanation of what is to be done, and permit is signed for procedure. 1. Explanation of procedure reduces some anxiety and allows knowledgeable consent. In an emergency, time may not allow for a written permit.
2. Obtain a 12 lead ECG precordial view per physician order. 2. Recording of the precordial view provides a baseline to be compared with that of post-cardioversion ECG.
3. Secure patient's IV line. 3. To provide access route for medication administration of medications and anesthetic.
4. Follow cardioversion check sheet for complete setup.
5. Place in supine position or position per physician preference.
6. Make certain patient is well oxygenated (anesthesiologist or respiratory therapist may do).
   Have available appropriate sized oral airway and resuscitation bag with connecting tubing for use in maintaining airway.
7. Assess patient, including vitals, mental status, rhythm and peripheral pulses prior to cardioversion. Utilize conscious sedation adult/pediatric sheet (MR-135).
8. Apply appropriate blood pressure cuff.
9. Remove medicated patches, dentures or prosthesis.
   Have suction set-up available with Yankauer tip (turn on).
10. All electrical equipment not necessary or not electrically isolated, should be disconnected from patient. No one should be in contact with patient.
5. Facilitate a clear recording, proper paddle placement.
6. Unless contraindicated, O₂ therapy 5-10 min. before cardioversion promotes myocardial oxygenation. In the presence of electrical arcing O₂ may support combustion.
7. This data will serve as a baseline for post- cardioversion evaluation.
9. Reduces risk of airway obstruction. May not always be appropriate as airway support is sometimes enhanced by dentures. Metal backing material of medication patches may be dangerous with electric current.
10. Reducing the amount of electrical equipment used may reduce the change of microshocks or current leaks.
   Electrical current follows the path of least resistance, this measure reduces risk of accidental microshock or macroshock.
11. Prepare cardioversion equipment
   A. Attach to ECG monitor, selecting a lead with a distinct tall R wave and a T wave of small magnitude or in a direction opposite to the R wave
   B. Check monitor for presence of artifact. Change leads if artifact is present.
   C. Connect the sync cable to the room’s monitor and ECG cable to defibrillator.
   D. Assure heart rate alarms in patient’s room are on.

12. Turn power switch on several minutes prior to use. Turn synchronizer on and verify sync on R wave.

13. Anesthesiologist or physician will pre medicate. Assess patient's LOC and respirations. RN may administer medication under physician direction and supervision. See MR-135.

14. Prepare paddles by applying conductive pads to chest surface or conductive medium to paddles.

15. Recommended paddle placement is anterior-apex. The anterior paddle is placed to right of the upper part of the sternum below the clavicle and the apex paddle to the left of the nipple with the center of the paddle in the midaxillary line. Alternative approach is to place one paddle anteriorly over the left precordium and the other posteriorly behind the heart, in the left intrascapular location.

15a. Should physician prefer using resuscitation pads, choose pads appropriate to patient (adult or pediatric) and appropriate to function (multi function, biphasic, cardioversion, defibrillation and external pacing).

15b. Remove paddle cable coupling from face of defibrillator. Snap in PACE/DEFIB cable coupling.

15c. Open package of pacing multifunction pads.

15d. Apply to chest pressing firmly to skin smoothing any air pockets to outer edges.

15e. Connect electrode cords included with pads to PACE/DEFIB cable.

16. Charge cardioversion machine to prescribed voltage - turn selector dial to the prescribed number of watts/sec. If Biphasic mode cardioversion, see #21 below.

17. Place paddles firmly into position against the chest, using approximately 25-30 lbs. of pressure. Make sure paddles do not touch each other and do not touch electrodes or medicated patches such as NTG.

11. The synchronizer times the electrical current to be delivered only on the patient's R wave. Improper synchronization can lead to discharge on the T wave and result in ventricular fibrillation. Proper electrode placement and contact are critical. Artifact can result in electrical current being delivered at an improper time during the cardiac cycle. Defibrillator alarms are preset at 30 bpm and 150 bpm.

12. Most equipment requires a warm up period in the synchronizing mode, the machine will sense an R wave and discharge the preset electrical currents.

13. Electrical shocks vary from being uncomfortable to being painful, depending upon the patient and voltage used. If a short acting anesthetic agent is given, it is recommended that an anesthesiologist or nurse anesthetist be present.

14. Conductive medium decreases resistance of skin to current flow. Adequate coverage of metal surfaces will prevent burns and allow for optimal flow to the myocardium.

15. Paddles should be placed in a position that will maximize current flow through the myocardium. Avoid placement of paddles over permanent pacemaker.

15a. Position pads so electric shock is delivered anterior/posteriorly to depolarize maximum volume of myocardium.

15c. Do not apply if gel is dry. Dry skin surface if necessary and if excess hair is present, trim area if time allows. Remove any medicated patches.

16. Normally a low watt/sec. selection is used initially, then increased in increments. The larger the voltage the more tissue trauma and greater patient discomfort. See #21 below.

17. Firm pressure establishes good contact. Current should flow across axis of cardiac muscle mass, regardless of paddle position used.
18a. Check EKG rhythm on monitor, activate ECG recorder. Check for synchronization indication superimposed on patients R wave as presented on the ECG oscilloscope.

18b. If pads are used in place of paddles, activate SYNC button on face of defibrillator noting synchronized markings on R wave on oscilloscope. Use charge button on face of monitor.

19a. Stand clear of bed and give command to stand clear – depress discharge buttons on both paddles at the same time. Keep both firmly depressed until the current is delivered. The shock needs to be synchronized with an R wave.

19b. When using pads push the two ‘discharge’ buttons present on the top of cable coupling. Give command to stand clear before pressing the two ‘discharge’ buttons.

20. Access ECG rhythm to ascertain post-cardioversion rhythm - may need to repeat procedure as prescribed to terminate tachydysrhythmia.

21a. Biphasic cardioversion closely follows the synchronized cardioversion procedure in preparation.

21b. Paddles may be used or multifunction electrode pads may be used as with previous descriptions of procedure.

21c. Select #1 DEFIB function soft key, then SYNC soft key on the monitor face to activate synchronization with the R wave.

21d. Energy selection by way of soft key ‘Energy Select’ up or down is accomplished either on the face of the monitor or on sternal paddle.

21e. ‘SYNC XXXj sel,’ for example, will appear on monitor screen if display shows ‘DEFIB,’ press soft key SYNC.

21f. Charging cardiovertor/defibrillator and discharging for biphasic mode is described in previous steps 18 and 19.

   1. Airway patency
   2. Respiratory rate and depth, BP, & heart rate
   3. Lung sounds
   4. Need for supplemental O₂
   5. SaO₂ readings
   6. ECG monitoring

23. Record ECG rhythm by 12-lead ECG as ordered

18. ECG rhythm may change prior to cardioversion. This ensures proper synchronization.

19. Electrical current follows the path of least resistance - this measure reduces risk of accidental microshock or macroshock.

20. Cardioversion may convert original ECG rhythm, have no effect, or produce a lethal dysrhythmia. Monitor defaults to defibrillation - if additional synchronized shocks are needed - activate SYNC button.

21a. Biphasic synchronized cardioversion is reportedly more effective in patients with high chest wall impedance. Biphasic electrical delivery mode affords success with less energy or current.

21b. Standard ECG leads are recommended during synchronized cardioversion since typically the signal quality is superior.

21d. Joules are determined by attending physician in biphasic mode.

21e. Biphasic energy selection typically in levels 70j, 120j, 150j.

22. Sedation may contribute to respiratory depression and decreased level of consciousness. Airways support is often needed for a short period post-conversion. Assess hemodynamic stability with new rhythm. Assess for possibility of CVA as mural thrombus may be ejected from left ventricle or pulmonary embolus as thrombus ejected from right ventricle due to more efficient contraction of heart.

23. This validates effects of cardioversion and allows assessment of myocardial damage.
24. Observe skin on chest wall for presence of burns. Clean medium off chest wall.
   24. Chest wall should be cleaned of any conductive medium and skin kept clean and dry to prevent further irritation.
25. Reorient and support patient as necessary.
   25. Initially post-cardioversion patient may be sedated and disoriented.
26. Clean and restock equipment.
   26. Equipment should be clean and prepared for further use.
27. Charge for the cardioversion procedure on the "Procedures and Supply Form" under the ICU section.

DOCUMENTATION:

Nurses Notes, Conscious Sedation Adult/Pediatric MR-135.

REFERENCE:
   2000 ACLS Manual,
   Nursing Procedures, Springhouse Corp. 2000 pp. 399, 400
Reassure and Instruct patient

___ Conscious Sedation Form Signed
___ Permit for Procedure form signed
___ Procedure and Supply form filled out
___ Lab results and old charts with present chart
___ Verify pt NPO for 6-8 hours
___ Respiratory Care notified
___ Relocate ECG electrodes as necessary
___ Start IV (NaCl or LR 500cc IV bag) LEFT hand possible
___ If IV already established, hang 500cc bag and verify healthy patent IV site.
___ NiBP cuff on RIGHT arm
___ SpO2 / SAO2 probe on pt and functioning
___ Check orders for pre-medications and initiate
___ Verify pt.’s current medications and treatment plan
___ O2 nasal cannula 2-4 litres
___ AMBU bag with mask and O2 connected & turned on ready for use
___ Intubation box open at bed side
   __ Laryngoscope and blade per doctor request out and checked, light bulb works
   __ #7 ETT out (DO NOT open)
   __ 10 cc syringe
   __ Tape out
   Suction set-up with Yankuer tip and turned on
___ Room cleared of unnecessary items
___ Bed pulled out from wall -and- head board removed
___ Alcohol swabs available and out ready
___ MONITOR / Defibrillator checked and operating -- Best lead for pt is identified
___ Sync cable connected to monitor
___ Sufficient paper in monitor - paper feed operating correctly
___ Paddles out and gel applied
___ Sync button in ON
___ Towels and washcloths available

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MARSHALLTOWN MEDICAL & SURGICAL CENTER
MARSHALLTOWN IA 50158

CONSCIOUS (MODERATE) SEDATION
ADULT/PEDIATRIC

MR- 135 Revised 2018

DATE:_______ TIME:_______

Health History (check if present) __Allergies______
__Asthma/Respiratory problems______
__Kidney problems______
__Diabetes______
__Recent Resp infection______
__Cardiopulmonary problems______
__Hypertension______
__Liver Failure______
__Increased intracranial pressure______
__Exposure to Contagious Disease______
__Other______

Peds only

Height_______ Weight_______

Current Medications:

Procedure:

___ Patient/Family Education ___ Reversal Agents Present
___ NPO since ___ Monitor Alarms Set and ON
___ Emergency Equipment Immediately Accessible
___ Oxygen Available ___ ROM Neck Verified

MAXIMUM INITIAL DRUG DOSAGES

Demerol 25-50 mg IV Dexametomidine 2mg
Morphine Sulfate 1mg IV Sedo 2mg
Ketamine 0.4mg Versed 4mg
Midazolam 1mg IV Fentanyl 50 mcg

IMMEDIATE PRE-PROCEDURE BASELINE ASSESSMENT - Time:_______ B/P:_______ P:_______ R:_______ SpO2_______

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<thead>
<tr>
<th>ALDRETE PAR SCORE</th>
<th>Pre</th>
<th>Post</th>
<th>30 min</th>
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<tbody>
<tr>
<td>Activity</td>
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<tr>
<td>Ability to move all extremities voluntarily</td>
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<td>Ability to move 2 extremities voluntarily</td>
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<tr>
<td>Unable to move extremities voluntarily</td>
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<td>Respiration</td>
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<td>Ability to breathe deeply and cough</td>
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<td>Circulation</td>
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<td>BP: 20% of pre-sedation level</td>
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<td>BP: 21-49% of pre-sedation level</td>
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<td>BP: 50% of pre-sedation Level</td>
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<td>Consciousness</td>
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<td>Arousable on Calling</td>
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<td>O2 Saturation (SpO2)</td>
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<tr>
<td>Maintains SpO2 &gt;99% on room air</td>
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<td>Needs 4 L/min rate of oxygen</td>
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<td>SpO2 &gt;99%, even with O2 drop</td>
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TOTAL

If O2 sat drops below 95%, start O2 at 3 L/min and notify MD
If COPD patient, MD consulted for O2 order

Time | B/P | P | R | Rhythm | O2 Sat | Loc | Narrative | Initials |

Level of Consciousness Key:

2. Fully Awake
1. Arousable on Calling
0. Not Responding

Patient must score 6 or more for 20-30 minutes prior to discharge