Cardiac Monitoring: protocol

Related Standards and Resources:
1. NCS5074 - ST Segment Monitoring: Initiating
2. IDG1164 - Cardiac Arrest (Code Blue) Initiating (SPH and MSJ)
3. NCS6067 - Bradycardia (Cardiac Wards)
4. NCS6074 – Physical Assessment (Critical Care Areas)
5. NCS6367 – Physical Assessment (Cardiac Ward)
6. NCS6097 – Myocardial Ischemia; Management of in CICU
7. NCS6227 – Chest Pain (Outside Critical Care) Care of patient
8. NCS6235 – Vasoadaptive Agents (Infusion) on Cardiology Ward (5A) Administration
9. NCS6347 - Epicardial Pacing and Pacing Wire Care on Cardiac Wards, protocol
10. QT Monitoring – in development
11. Philips MX40 Instructions for Use (found on units 5AB)

Skill Level: Specialized
Registered Nurses who have completed a recognized cardiac monitoring course or equivalent and who successfully completed a written exam. Review of each nurse’s competence in rhythm recognition will be conducted and documented every 2 years. Nurses must possess competency in identifying the rhythms listed in Appendix B and instituting appropriate interventions. Additional competencies may be required in specific units (e.g. ST segment monitoring in CICU/CSICU/CSSU).

Need to Know:
Cardiac monitoring allows continuous monitoring of the heart’s electrical activity to detect abnormalities in conduction (arrhythmias) or evidence of ischemia (critical care areas only), to assess effect of arrhythmias or ischemia on hemodynamic status, and monitor effectiveness of anti-arrhythmic medications.

Cardiac monitoring can be done using direct attachment to a bedside monitor (“hard-wire” monitoring) or wireless transmission of signals to a receiver/monitor (telemetry). Although hard-wire cardiac monitoring usually produces a more stable and clearer ECG tracing than telemetry, it limits patients’ ability to ambulate. Careful skin preparation and electrode placement can minimize ECG waveform distortion during telemetry monitoring.

Any patient that is transported out of a critical care unit must remain on ECG monitoring using a portable monitor, unless there is a specific physician’s order stating otherwise. For patients on telemetry, the physician must indicate whether monitoring may be discontinued during transport.

Information Specific to Telemetry Monitoring
Telemetry may be initiated as per Cardiac Surgery Clinical Pathway guidelines or with a physician’s order. Physician’s orders should include the following:
1. Reason for telemetry and categorization of monitoring requirements into one of the following:
   a. Class I – Patient to be monitored at all times, including transport off unit
b. Class II – Telemetry may be suspended for transport off unit. Telemetry discontinued after 48 hours if no arrhythmias noted.

2. In the case of deteriorating hemodynamic status (decreased LOC, decreased BP, respiratory distress and/or angina with suspected arrhythmia, unexplained low flow on VAD parameters), a nurse may initiate telemetry independently. Chest pain or other signs of ischemia without evidence of change in rhythm (e.g. a significant increase or decrease in heart rate) does not necessarily warrant initiation of telemetry. Refer to Chest Pain (Outside Critical Care) protocol and Myocardial Ischemia Management protocol for appropriate nursing interventions.

All patients on telemetry require patent intravenous access.

**PRACTICE GUIDELINE**

**Initiating cardiac monitoring:**

1. Prepare skin. Only use sites where there is adequate skin integrity
2. Position electrodes*:
   a. Right Arm (White) - just below the right clavicle
   b. Left Arm (Black) - just below the left clavicle
   c. Right Leg (Green) - on the right lower chest, level of lowest rib on the thorax or on the hip
   d. Left Leg (Red) - on the left lower chest, level of lowest rib on the thorax or on the hip
   e. V₃** (Brown) - halfway between V₂ and V₄, see diagram. See NCS5074 - ST Segment Monitoring for more information.

- *Cath lab and CSICU may use a different electrode placement due to procedure requirements, or sternal incision and chest drains.
- All units: V₁ recommended precordial lead in pts with arrhythmia-related diagnosis or post-cardiac surgery (after leaving CSICU)
- Critical care units: V₃ recommended precordial lead in pts with primary diagnosis of, or at significant risk for ischemia; this placement is also suggested for such patients on 5A and 5B

3. Admit the patient to cardiac monitoring system as per manufacturer’s instructions.
4. Use the following guidelines when admitting to the monitoring system on 5AB:

   **Name:**
   - Enter patient last name. Add a first initial if there are similar or identical surnames on the unit.
   - To disguise a patient’s name (i.e. the patient does not want their surname visible on the screen or patient is classified ‘do not disclose’), enter “Patient A” as an alias.
in the ‘Name’ field. When disguising more than one name, use “Patient B”, “Patient C”, etc.

**Code Status:**
- DNAR status is **not** to be indicated in the screen notes. Enter DNAR status in the ‘Resuscitation’ field only.

**Screen Notes:**
- The ‘Screen Notes’ field option should be used for the following information only; Class I, temp paced, name alert.

**Battery charging for 5AB telemetry system**
1. When patients are on telemetry, the telemetry pack’s battery needs to be changed at the beginning of each shift (07 & 1900). Depleted batteries need to be placed on the charging station to be recharged.

**Initial Assessment:**
1. Analyze rhythm by measuring the following:
   a. Rate (atrial and ventricular)
   b. Regularity
   c. PR interval
   d. QRS duration
   e. QT interval (protocol in development)
2. Identify rhythm

**Note:** If a rate or interval is not measurable, indicate this by writing “n/a” in the applicable space. Do not leave any spaces blank.

**Ongoing Assessment**
1. For all alarms assess patient first for response to arrhythmia (vital signs, LOC, SOB, chest pain), artifact, loose/missing electrode
2. Analyze rhythm strip at the beginning of shift and with any change in rhythm
3. Assess vital signs as per unit protocol and PRN while on cardiac monitor
4. Assess skin for irritation under electrodes during the first 24 hours. Electrodes are replaced every 24 to 48 hours hours at 0700, (beginning of day shift) or as needed.

**Interventions:**
1. Call **CODE BLUE** for any sudden extreme deterioration in condition (e.g., decreased level of consciousness, respiratory distress, symptomatic decreased BP)
2. Set/review heart rate limits appropriate to patient’s clinical condition and rhythm at the beginning of the shift and PRN
3. Notify MD of any unexpected change in rhythm
4. If patient unstable call for assistance and **NOTIFY MD IMMEDIATELY;** provide supportive care; intervene as per protocol for Bradycardia (Cardiac Wards), or Temporary Epicardial Pacing
5. Nurses may independently discontinue cardiac monitoring after 48 hours without a change from patient’s baseline rhythm for Class II patients only. A specific order is required for all other patients.

6. See Appendix A for additional cardiac monitoring troubleshooting

**Patient/Family Education:**
- Explain the purpose of monitoring
- Inform patients on 5AB that their surname will be visible to the public on the nursing station and hallway monitors. If patient does not want their surname on the monitor, disguise patient’s name using the instructions described under 3 in the Practice Guideline.
- Review activity allowed
- Reassure patient that the monitor is being observed even when the nurse is not with the patient
- Explain importance of reporting to nurse feelings of chest discomfort, rapid heartbeat, nausea, dizziness, sweatiness or shortness of breath

**Documentation:**
1. ECG Rhythm Strip Flow Sheet - mount completely analyzed ECG rhythm strip every shift and with any change in rhythm
2. Record assessments, nursing interventions and patient’s response on unit specific documentation forms.

**References:**

**Persons/Groups Consulted:**
Holly Andrews, Clinical Nurse Leader, 5A Cardiology
Joanne Dechant, Nurse Educator, 5CD
Jennifer A. Gibson, RN, MSN, Nurse Educator, CICU
Marianne Lesage, Nurse Educator, CSICU
Marie McCoy, Nurse Educator, Cardiology & Cardiac Surgery Wards

**Author(s):**
Susan Roth, Nurse Educator, Cardiology & Cardiac Surgery Wards
Martha Mackay, Clinical Nurse Specialist, Cardiology

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### Appendix A: Trouble Shooting Cardiac Monitors

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Solution</th>
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</thead>
<tbody>
<tr>
<td>False high heart rate alarm</td>
<td>• Monitor interprets peaked T waves as QRS complexes, double counting</td>
<td>• Reposition electrodes</td>
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<tr>
<td></td>
<td>• Skeletal muscle activity</td>
<td>• Place electrodes away from major muscle masses</td>
</tr>
<tr>
<td>False low heart rate alarm</td>
<td>• Shift in electrical axis from patient movement, making QRS complexes too</td>
<td>• Reapply electrodes</td>
</tr>
<tr>
<td></td>
<td>small to register</td>
<td>• Set size or gain control so height of complex is greater than 1</td>
</tr>
<tr>
<td></td>
<td>• Low amplitude QRS</td>
<td>millivolt</td>
</tr>
<tr>
<td></td>
<td>• Poor contact between electrode and skin</td>
<td></td>
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<tr>
<td>Low amplitude or no waveform</td>
<td>• Size or gain control dial set too low</td>
<td>• Increase size or gain control</td>
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<tr>
<td></td>
<td>• Poor contact between skin and electrode; dried gel, broken or loose lead</td>
<td>• Check connections on all lead wires and monitoring cable.</td>
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<tr>
<td></td>
<td>wires, poor connection between patient and monitor, malfunctioning monitor,</td>
<td>• Reapply electrodes if required</td>
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<tr>
<td></td>
<td>physiological loss of QRS amplitude</td>
<td>• Check battery and replace if necessary</td>
</tr>
<tr>
<td>Wandering baseline</td>
<td>• Poor position or contact between electrodes and skin</td>
<td>• Reposition or replace electrodes</td>
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<tr>
<td></td>
<td>• Thoracic movement</td>
<td>• Reposition electrodes</td>
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<tr>
<td>Artifact (waveform interference)</td>
<td>• Patient experiencing seizures, chills or anxiety</td>
<td>• Notify doctor and treat patient as ordered. Keep patient warm and</td>
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<tr>
<td></td>
<td>• Patient movement</td>
<td>• Help patient relax</td>
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<tr>
<td></td>
<td>• Electrodes applied improperly</td>
<td>• Check electrode placement &amp; readjust as necessary</td>
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<tr>
<td></td>
<td>• Static electricity</td>
<td>• Make sure cables do not have exposed connectors. Change static</td>
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<tr>
<td></td>
<td>• Electrical short circuit in lead wires or cable</td>
<td>causing bedclothes</td>
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<tr>
<td>Broken lead wire</td>
<td>• Lead wires and cables cleaned with alcohol or acetone cause brittleness</td>
<td>• Unplug bed or IV pumps.</td>
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<td></td>
<td></td>
<td>• Replace broke equipment. Send any broken equipment to Biomed department</td>
</tr>
<tr>
<td>Skin excoriation under electrode</td>
<td>• Patient allergic to electrode</td>
<td>• Replace wires, send broken wires to Biomed department</td>
</tr>
<tr>
<td></td>
<td>• Electrode left on skin too long</td>
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Appendix B: Specific ECG Abnormalities Which Nurses Must Be Competent in Recognizing

Normal rhythms
- Sinus rhythm
- Sinus bradycardia
- Sinus arrhythmia
- Sinus tachycardia

Intraventricular conduction defects
- Bundle-branch block
- Aberrant ventricular conduction

Bradyarrhythmias
- Inappropriate sinus bradycardia
- Sinus node pause or arrest
- Nonconducted atrial premature beats
- Junctional rhythm

AV blocks
- 1st degree
- 2nd degree
- Mobitz I (Wenckebach)
- Mobitz II
- Advanced (greater than 2:1)
- 3rd degree (complete AV block)

Tachyarrhythmias
- Supraventricular
- Paroxysmal supraventricular tachycardia
- Atrial fibrillation
- Atrial flutter
- Multifocal atrial tachycardia
- Atrial tachycardia with 2:1 block

Ventricular
- Accelerated ventricular rhythm
- Nonsustained/sustained monomorphic ventricular tachycardia
- Nonsustained/sustained polymorphic ventricular tachycardia
- Prolonged QT interval-associated ventricular ectopy, torsades de pointes
- Ventricular fibrillation
- Asystole, pulseless electrical activity

Premature complexes
- Supraventricular (atrial, junctional)
- Ventricular

**Pacemaker electrocardiography**
- Failure to capture
- Failure to pace (no pacer output)
- Failure to sense

**ECG abnormalities of acute myocardial ischemia**
- ST-segment elevation, depression
- T-wave inversion

**Other**
Muscle or other artifact simulating arrhythmias