Cardiac monitoring

A cardiac monitor is a valuable diagnostic tool that provides a continuous trace of the electrical activity within the heart. This bedside monitor provides a visual display of the patient's heart rhythm. It is most commonly used in emergency rooms, operating theatres and critical care areas. An advantage of cardiac monitoring is that arrhythmias can be identified quickly. However, it must be stressed that in the event of a cardiac arrhythmia taking place, the trace recorded through a single lead cardiac monitor is not enough for accurate interpretation of the rhythm. Therefore, a standard 12-lead ECG should be recorded as soon as possible (Resuscitation Council UK, 2006). The monitor can be set to sound off an alarm if there are any changes in the heart rhythm.

Indications for cardiac monitoring

- Chest pain
- Myocardial infarction
- Heart failure
- Palpitations
- History of syncope
- Shock
- During cardiopulmonary resuscitation
- Observation of patients undergoing surgery under general anaesthesia or regional anaesthetic blocks
- Observation of post operative patients
- Observation of patients with severe electrolyte imbalances
Health and safety

As electrical equipment is involved in cardiac monitoring, there are some important health and safety issues which need to be considered when using the equipment.

- Ensure that the equipment is in good working order and has been regularly checked.
- Do not place any fluids on the machine.
- Ensure that the patient is safely positioned on bed/couch and at a correct height for the operator.
- Use a new set of disposable electrodes for each patient.
- Make sure to leave the machine in good working order. If any faults are detected they should be reported to the relevant depart as soon as possible.
- If a cardiac monitor develops a fault it should be removed from service.
Positioning the electrodes

It is recommended by the Resuscitation Council UK (2006), that the electrodes are placed over bone rather than muscle to reduce the electrical interference produced by muscle movement. One suggested set of placement is shown in figure 1.

Figure 1: Diagram showing a suggested set of electrodes placement for cardiac monitoring

Most monitors have three leads and they are connected as shown in the diagram.

Red: right shoulder
Yellow: left shoulder
Green: lower left chest wall

Most ECG cables are colour coded which facilitates their correct placement. Red relates to the right arm cable, yellow relates to the left arm cable and green relates to the leg lead. The cables from the electrodes may terminate in a single cable which is then plugged into the appropriate port on the monitor.
Cardiac monitoring – procedure

Initiating the procedure

- Wash hands according to recommended guidelines. This will help reduce the risk of cross infection.
- Introduce yourself by full name and post.
- Identify the patient by asking them to state their name, date of birth and first line of address and check all information against patient identification wrist band. This is done to ensure that cardiac monitoring will be carried out on the right patient.
- Explain the procedure to the patient and gain the patient’s consent.
- If possible, review the patient’s notes checking diagnosis and current treatment.

Performance of task

- Draw curtains around the patient’s bed or close the door if the patient is in a side room. It is important to ensure patient’s privacy and dignity.
- Request the patient to remove clothing from upper half of their body. Female patients should remove clothing from the upper half of their body but the bra does not need to be removed.
- Ensure the patient is lying or sitting in a comfortable position. Ideally, the patient should be in a supine position.
- Ensure that the skin is dry and not greasy. Clean electrode sites with an alcohol swab. If needed, shave of any hair. Shaving the electrode sites will improve contact and reducing artefacts. Secondly it will be less uncomfortable for the patient when the electrodes are removed.
- Apply electrodes accurately as shown in Figure 1. Smooth down the adhesive rather than the central gel disc. Putting too much pressure on the gel disc can result in a decrease in conductivity and adherence.
- Connect the monitor leads to the electrodes. Check that the correct lead is attached to its associated electrode. However, if ‘snap-on’ (press stud style) electrodes are used, attach them to the leads before applying to the patient.
• Switch on the monitor and select the required monitoring lead – usually lead II. Ensure that an ECG trace is obtained and clearly displayed. Check for any abnormalities on the ECG trace.

• Set the alarms within the correct safe parameters. There may be written hospital protocols for this purpose. Follow the locally agreed protocols that are appropriate for the patient and their condition.

• Secure the leads so they will not tug on the electrodes. Position the monitor so it is clearly visible to the staff.

• Record in the notes that monitoring has commenced and make a note of the ECG rhythm at the time.

• Check the patient’s welfare.

Aftercare

• Check the electrode sites regularly for any redness or itching.

• If the patient complains of itching and the skin looks inflamed, the electrodes may need to be removed and placed at a different site.
Troubleshooting

Flatline ECG trace
Check carefully to ensure the patient has not had a cardiac arrest.
If patient’s condition is unchanged, the most probable cause is mechanical.
Ensure the most appropriate lead has been selected – usually Lead II.
Check the gain (the size of the QRS complex) on the monitor; it may need to be increased.
Check all the connections between the leads and the electrodes, and to the monitor.

Poor quality trace
Check all connections.
Check the brightness on the display.
Make sure the electrodes are in date and still moist.
Ensure ECG gain is set correctly.

Wandering baseline
This is usually caused by patient movement.
If patient has a tremor, is anxious or cold, try and reassure them and keep them warm.

Electrical interference
If possible, remove any other bedside equipment causing interference.
References:

- Boleyn, M. Cardiac Monitor.
  Available at: http://www.enotes.com/nursingencyclopedia/cardiac-monitor.
  [Accessed 12 August 2010]