The Phillips MRX device (default monitor for EMRS) has a separate SOP which includes a pacing section. This SOP purely refers to the Zoll device.

Aims

This document discusses the transcutaneous pacing facilities using the Zoll defibrillator currently in use with EMRS.

Background

Patients in complete heart block may require temporary pacing transcutaneously prior to undergoing formal permanent pacemaker (PPM) insertion at a definitive care centre. Unless a functional transvenous pacing wire has been inserted at the referring site, the patient may require transcutaneous pacing (TCP) by EMRS during transport to definitive care. The “E series” Zoll (manual) defibrillator/pacing devices currently used as a backup monitor by EMRS have been cleared for use on Military aircraft and SAS-A & SAS-B helicopters.

Application

EMRS Team Members
SAS Paramedics
Patients appropriate for retrieval team activation

Patients in complete heart block or those patients whose bradycardia demands measures beyond that of drug intervention to achieve adequate cardiac output.

Advice to GP/Hospital referrer prior to team arrival:

- Arrange for transvenous pacing if equipment & expertise available
- Support heart rate and blood pressure according to the current ALS algorithm for bradycardia
- Continuous ECG/SpO2/Heart Rate/BP monitoring
- 12 lead ECG & repeat at 30min intervals
- Consider brady-arrhythmia may be part of ACS and treat accordingly
- Look for electrolyte abnormalities and treat accordingly
- If transcutaneous pacing is available and is required, institute its use with sedation for patient comfort as required

Medical management on scene

The patient should be fully assessed on arrival. The treatment instituted to this point by the referring centre should be noted.

1. Resuscitate as necessary according to ALS guidelines

2. If the patient has had transvenous or transcutaneous pacing, the following should be checked:
   - The effectiveness of this intervention i.e. that the pacing is achieving both electrical and mechanical capture and that the patient’s clinical condition reflects this
   - 12 lead ECG
   - Any bloods/investigations if done already (eg: Troponin; U&E)

If transvenous:

- The position of the pacing wire on the CXR.
- Ensure no immediate complication of the procedure (eg: Pneumothorax)

If transcutaneous:

- The condition/length of use of the pads (replace if have been used for ≥ 8 hours of continuous pacing)
- Position of pads – Front & back positioning of pads is optimal for pacing
- Patient comfort – check for need for sedation/analgesia to achieve effective pacing
Having decided clinically on the need for transcutaneous pacing, the following steps should be taken when setting up the Zoll E series defibrillator/pacer device:

a) Dry and prepare patient’s chest for application of Stat-Padz **AND** 3 (or 5) Lead ECG. **Both** are needed to pace in either Demand or Standby mode. On the rare occasion that asynchronous pacing is used, the ECG will not be applied.

b) Explain to the patient that it feels uncomfortable during the pacing period

c) Check “stat padz” multi-function electrodes (MFE) expiry date

d) Connect the MFE cable to the Zoll device multi-function cable (white opaque connector on MFE to red connector on Zoll)

e) Apply the MFE to the patient as per the instructions on the packaging. The pads should be placed in the anterior-posterior orientation for pacing. If AP positioning not possible then consider apex-sternum positioning (less effective for pacing). Ensure adhesion to skin.

f) If the MFE pads are not making good contact with the patient, the messages “CHECK PADS” and “POOR PAD CONTACT” are alternately displayed and the energy will not be delivered.

g) If a short circuit exists between the MFE pads, the message “DEFIB PAD SHORT” is displayed.

h) The following steps can be applied to optimise the set-up of the device for pacing:
i) Once electrical and mechanical capture has been confirmed, dial the mA up 10% from capture threshold as a safety margin

The 4:1 button may be pushed at anytime to allow for review of the underlying rhythm.

The Zoll device can perform 3 different types of pacing:

1) **Demand Pacing**: Most frequent form of ventricular pacing. The Pacing rate is set above patient’s rate (or lack thereof) and the Pacer Output dial is turned to increase the mA in attempt to obtain capture and pace the ventricles.

2) **Stand-by Pacing**: Setting the Pacing rate and Pacer output at a back-up rate less than a patient’s intrinsic heart rate. The Pacing rate will initially be set above the patient’s heart rate and pacer output (mA) is increased to achieve 100% capture. The Pacing rate is then decreased to desired rate below the patient’s intrinsic heart rate. Should the HR drop, the stand-by pacer will initiate impulses and begin to pace.

3) **Asynchronised Pacing**: Rarely used. This form of pacing is performed when no ECG electrodes can be placed due to burns, trauma or interference. The async on/off softkey button is pressed and async mode is displayed. No Pacing spike or electrical capture will be seen on the screen. Mechanical capture will only be proven, by palpating a pulse if one is achieved
Triage

The normal referral pathways for the referring site should be followed where possible and the local cardiology unit capable of permanent pacemaker insertion should be the destination of choice.

In the situation where a patient may have had an acute coronary syndrome, that patient may require PCI and as such, must be triaged to a centre capable of providing this.

Bibliography