

PARAMEDIC TIP SHEET #1:

12 Lead ECG Acquisition

Indications

12 Lead ECG provides a means of obtaining diagnostic quality electrocardiographic information. It is most useful in the diagnosis of:

- ◆ **acute myocardial infarction, and**
- ◆ **cardiac ischemia.**

However, a great deal of additional clinical information may be obtained from the 12 Lead ECG including indications of:

- ◆ axis deviation
- ◆ fascicular block
- ◆ previous injury
- ◆ dysrhythmias

The acquisition of the 12 Lead ECG should not cause significant delay in the care and transport of the patient with a clinical presentation of cardiac ischemia or AMI. Prehospital acquisition of the 12 lead ECG has been demonstrated to reduce the time to in-hospital thrombolytic therapy. In some EMS systems, the 12 lead ECG may actually dictate the transport receiving facility. In others, receipt of the 12 lead ECG by the receiving facility may result in implementation of specific personnel and equipment procedures in preparation for the patient. Regardless of the facility, the effective and early use of 12 lead ECG information will most likely shorten the time to definitive therapy including reperfusion therapy in the acute myocardial infarction patient.

Methods

The following 12 Lead ECG acquisition method assumes that initial care of the patient with possible cardiac ischemia has already begun.

1. Attach ECG electrodes at the appropriate chest locations. Proper electrode placement and attachment are critical to obtaining accurate, diagnostic quality ECGs. Avoid placing electrodes on bone or surfaces with uncontrollable movement (e.g. abdominal wall, muscle with tremor).
 - ❑ V1 – 4th intercostal space to the right of the sternum
 - ❑ V2 – 4th intercostal space to the left of the sternum
 - ❑ V3 – Midpoint between V2 and V4
 - ❑ V4 – 5th intercostal space at the left midclavicular line
 - ❑ V5 – 5th intercostal space at the anterior axillary line approximately midpoint between V4 and V6
 - ❑ V6 – 5th intercostal space at the left mid-axillary line
 - ❑ RA – Right arm, preferably lower arm anterior surface (upper arm deltoid is acceptable)
 - ❑ LA – Left arm, preferably lower arm anterior surface (upper arm deltoid is acceptable)
 - ❑ LL – Left lower leg medial surface is preferred (left thigh is acceptable)
 - ❑ RL – Right lower leg medial surface is preferred (right thigh is acceptable)
 - ❑ V4R – 5th intercostal space at the right midclavicular line
2. Attach the 10 lead wires of the 12 Lead ECG device to the appropriate electrodes.
3. If time permits or if required, enter patient information. Many computer algorithms require age, sex, race and weight information for the most accurate interpretation.
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12 Lead ECG Acquisition (continued)

4. Place the patient supine (if possible) with legs uncrossed and arms at the patient's sides.
5. Advise the patient to refrain from moving or speaking (normal respirations only) during the ECG acquisition.
6. Review the quality of the ECG. If adequate, proceed forward. If not, then repeat the process after correcting the most likely causes of ECG artifact.
7. Once the acquisition is complete, advise the patient that he/she may now move or speak.
8. Print the desired number of paper copies (usually a min. of 2). On some devices, the ECG may not be stored in the internal memory unless the operator specifically directs this action.
9. If right-sided leads are desired, place electrodes on the right side of the chest wall in a mirror image of the left-sided electrodes. In many patients, only V4R is desired in which case only one electrode and lead wire are required on the right side of the chest.
10. Once the ECGs are obtained, many EMS systems require connection of the 12 lead acquisition device to a telephone line for transmission to the receiving hospital or medical control facility.
11. After all ECG acquisitions have been obtained and stored, the lead wires may be removed. It is not necessary to remove the electrodes. In fact, some hospitals prefer that they be left in place for comparison of electrode placement.
12. Continue with other appropriate care.

Tips

- ◆ The most common causes of 12 lead ECG artifact include:
 - ⇒ Poor contact between the skin and the electrode
 - ⇒ Patient movement (or acquiring the ECG in a moving vehicle)
 - ⇒ Faulty lead wires or lead wire connections
 - ⇒ Inappropriate electrode placement
- ◆ Take care of lead wires and avoid storing them in compressed or severely angled positions. This may lead to accidental breakage or shorting.
- ◆ Replace/repair lead wire connectors if broken or unable to make good contact.
- ◆ Use high quality electrodes. Using electrodes that don't stick well or are difficult to apply will only result in wasted time and increased frustration on your part.
- ◆ Frequently check the 12 Lead ECG device for proper operation and ensure periodic maintenance is performed on the device.
- ◆ Use the device frequently. This will build your comfort level with the device and allow you to perform acquisition much more efficiently.