Original Article: Heart Rehabilitation

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ABSTRACT

In the process of rehabilitation after myocardial infarction, the person returns to the desired physiological-psychological state of recreational occupation. Rehabilitation begins in the hospital immediately after admission. About the physiological anatomy of the coronary heart disease, risk factors, treatment of coronary artery disease, behavioral counseling at home at this stage. If there are no complications, the patient is usually discharged two weeks later. Before discharge, a restricted exercise program is performed to determine the strength and capacity of the patient's heart. Avoid smoking and walk as much as you can. During this time, the patient is monitored regularly by a home care nurse each week. See a doctor 8 to 10 weeks after a heart attack for a complete physical examination, including an EKG, exercise test, blood lipids, and chest radiographs. The rehabilitation program is usually long-term and at this stage it is necessary to follow the rehabilitation or refer the patient to educational and medical centers for more support and troubleshooting. No matter how seemingly safe the disease and its symptoms, the ground floor is still desirable for heart patients. As far as possible, heart patients should not live on crowded and noisy streets. You should avoid installing a loud alarm on the door of the house, which causes the patient to jump suddenly.

Introduction

Patients undergoing treatment with anticoagulants should use an electric razor [1-3]. Rinse with mild water in winter, wash your patient in a warm place. Water should be used that has a moderate temperature (35 degrees or less than 38 degrees). Sauna bath is strictly forbidden [4-6].

Sexual relations: It is possible from 5 to 8 weeks after MI. Having a rest before sexual activity, avoiding drinking alcohol helps prevent chest pain [7-9].

Professional activity: The best time to return to work is 8-9 weeks after MI [10-12].

Climate: Heart patients suffer from extreme heat and cold. The heat causes the superficial arteries to dilate and blood to flow to the surface. Excessive sweating results from decreased urination [13-15], which is very dangerous for a defective heart. It is recommended to choose an

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environment that has a mild climate, is not windy and is not humid [16-18]. Avoid going to high places or too close to the sea. The place should be as close as possible to medical centers, and in any case [19-21], he should feel comfortable in that place.

Diet: Fatty, high-salt foods should be avoided as much as possible. Consume less caffeinated beverages [22-24]. The use of drugs and stimulants for heart patients is not recommended at all, except in cases where it is not used as treatment by a doctor [25-27]. The patient should be taught to lose weight gradually, because rapid weight loss raises blood fats [28].

Medication and medical care instructions

Clothing: Clothing for heart patients in summer should be loose and light in winter, warm and light [29-31]. In winter, wool socks are essential to prevent atherosclerosis. In summer, a suitable hat is needed to prevent sunlight on the head, especially for people with high blood pressure to prevent brain complications [32-34].

Exercise activity: Individual exercise in the form of exercise for some patients who are young and their complications and injuries are reduced or have a permanent heart complication [35-37], will be allowed with the permission and choice of exercise by the doctor and under his supervision. The best exercise for heart patients is walking outdoors [38-40].

Family environment: It is necessary for family members to behave reasonably and correctly towards the patient. Avoid any collision that causes turbidity [41-43].

Leisure: Unemployment, horseback riding will not be an obstacle for short and quiet walks. Riding a motorcycle is not recommended for heart patients in some cases. Strict gardening is prohibited. Only pruning flowers and plants is recommended [44-46]. Activities that increase the work of the heart are prohibited, and cycling in patients with heart disease, provided that it is on steep roads and high head, and as soon as you feel the slightest shortness of breath or chest pain, leave it and go to extremes. Otherwise, it will not be an obstacle [47-49].

Travel: Travel during the day and sitting is much better and safer than at night, provided that the travel time is not more than 8-7 hours. Driving less than 6 months after a heart attack, even if the patient does not feel any discomfort, is not allowed [50-52]. Any patient who suffers from shortness of breath with the slightest effort, as well as edema in the legs, should definitely be at complete rest, driving is dangerous for him [53-55].

The purpose of heart rehabilitation

The purpose of heart rehabilitation is to develop and improve the quality of life. Individual goals, limit the effects and progression of atherosclerosis, and return the patient to work and lifestyle before the illness, improve psychosocial status and prevent heart disease.

The first stage of rehabilitation: when the patient is hospitalized. Education is based on individual priorities of self-care and mostly refers to behavioral changes to reduce risks [56].

The second stage of rehabilitation: After discharge, the patient usually lasts 4 to 6 weeks and may take more than 6 months [57-59].

Electrocardiography

It is the recording of waves caused by the electrical activity of the heart muscle, which is done by placing an electrode on the surface of the chest and around the heart [60].

Depolarization and repolarization

Resting muscle cells have an electric charge, so that the outer surface of the cell membrane has a positive electric charge and the inner surface has a negative electric charge [61-63]. The cause of electric force in cells is the difference in the concentration of electrolytes, especially potassium ions inside and outside the cell. Sodium is another element that is involved in changes in the electrical charge of a resting or active cell. Stimulation of the heart muscle cell causes the electrical charge of the cell to change and its outer surface [64-66], which had a positive charge at rest, to have a negative charge, and its inner surface, which had a negative charge, to have a positive charge. This change starts from the point of stimulation and changes the electrical charge of the whole cell. This is called depolarization [67-69]. When each myocardial cell depolarizes, the electrical charge inside the cell becomes positive. In the next step, the cell's electrical charge returns to its original state, and this is called repolarization. The movements of sodium and potassium ions at this stage will be the opposite of the depolarization stage, and thus the cell will return to its original rest [70-72]. Here's how to record electrical current in a normal muscle cell: If you place an electrode on the surface of a resting muscle cell and connect it to a galvanometer, no waves are generated. Because the potential of the outer surface between two points outside the cell is zero [73-75]. When the cell is stimulated, sodium penetrates from the outside of the cell into it, and as a result, the inside of the cell has a positive electric charge relative to the outside of the cell, which is called the depolarization phase. This electrical stimulation flows from the beginning of the cell to the end of the cell. In the next stage, potassium is expelled from inside the cell and the charge inside the cell is changed from positive to negative, which is called repolarization [76-78].

Reasons for using electrocardiogram

- ✓ Diagnosis of the extent and extent of myocardial infarction.
- ✓ Diagnosis of various heart rhythm disorders.
- ✓ Diagnosis of atrial and ventricular hypertrophy.
- ✓ Diagnosis of pericarditis.
- ✓ Diagnosis of general diseases that affect the heart in some way.
- ✓ Diagnosis of acute pulmonary embolism.
- ✓ Determining the effect of heart drugs, especially digitalis and quinidine.
- ✓ Evaluation of electrolyte disturbances, especially changes in potassium and calcium on heart activity.
- ✓ Evaluate syncope attacks [79].
- ✓ Assess pain above the umbilicus.
- ✓ Preoperative evaluation.
- ✓ Assess high blood pressure or enlarged heart.
- ✓ Evaluation of artificial pacemaker performance.
- ✓ Determining the direction of the heart in terms of anatomy [80].

Electrocardiographic device

The electrocardiograph has 4 limb electrodes that are marked with black (right foot), green (left foot), red (right hand) and yellow (left hand), respectively, and in addition to the same colors in all types of devices each of the relevant slips is also marked with English letters. In this way, the black fish are distinguished by two letters RF (Right Foot) [81-83], green or Left Food (LF) and red or RA (Right Arm) and yellow or LA (Left Arm). These plugs (electrodes) will be attached to the limbs by special bracelets with metal plates, which will be the first 6 of the limbs. In a complete electrocardiographic strip, our next 6 or 6 derivations are thoracic or pericordial [84-86].

Types of organ derivations

Standard bipolar derivatives: The bipolar derivatives first described by Einhon consist of three derivatives and are called leads I, II, III or L1 L3, L2 and represent the potential difference between two points of Is the body [87-89].

- ✓ Lead I is the potential difference between the left hand and the right hand.
- ✓ Lead II, potential difference between right hand and left foot.
- ✓ Lead III, potential difference between left hand and left foot [90].

The right foot is also connected to the ground wire by an electrode and does not interfere with wave generation. The site of attachment of the electrode to the hands or feet is usually in the wrist area, but they can be attached to any other location, such as the arms or thighs, and if one has amputated arms and legs, the electrode is attached to the rest of the amputated area [91].

Reinforced unipolar derivatives: Unipolar derivatives were introduced by Wilson in 1932. In these derivatives, one end of the galvanometer is connected to a point on the body, such as the limbs or chest, and the other end is connected to the zero point, which includes:

- ✓ Corresponding to the right hand (AVR).
- ✓ Corresponding to the left foot (AVF).
- ✓ Corresponding to the left hand (AVL).

Derivations of the thorax or pericordial leads, known as V1-V6, are located on the chest wall, respectively.

- ✓ V1) in the fourth intercostal space on the right side of the sternum.
- ✓ V2) in the fourth intercostal space on the left side of the sternum.
- ✓ V3) Between V2 and V4.
- ✓ V4) in the fifth intercostal space on the left mid-clavicle line (MCL).
- ✓ V5) in the fifth intercostal space on the left anterior axillary line (AAL).
- ✓ V6) the fifth left intercostal space in the mid axillary line (MAL).
- ✓ V7) the fifth left intercostal space in the posterior axillary line (PAL).
- ✓ V8) the fifth left intercostal space in the posterior scapular line of the PSL.
- ✓ V9) Left Border of the spine.

In addition to the V1 and 2 V front heart leads, there are other leads such as V4R and V3R.

- ✓ V3R) a positive electrode is placed on the right side of the chest and similar to the V3 lead.
- ✓ V4R) a positive electrode is placed on the right side of the chest and similar to the V4 lead (Figure 1).

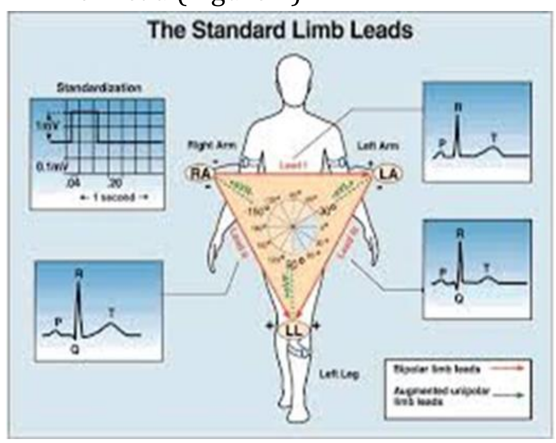

Figure 1: Standard limb leads

Electrocardiographic paper

The electrocardiogram paper is checkered with the smallest squares being one millimeter by one millimeter. Each of the five small squares is surrounded by bolder lines, creating larger squares. The speed of the paper is usually 25 mm per second, but it can be increased if necessary. For example, 50 millimeters per second, which will probably make the components of the electrocardiogram a little clearer and reduce the possibility of incorrect measurement of the components. If the paper speed is 25 mm, the width of each small cell is 0.4 seconds. On the other hand, the height of every 10 small houses is equal to one millivolt, which is usually measured before performing electrocardiography by standardizing the device, which is one millivolt every 10 millimeters. When necessary, for example, when the complexes are long and sometimes exceed the paper limit, the height is adjusted to 5 mm with a special adjusting screw equivalent to one millivolt, and usually to be marked with a special marker button to standardize several lines. Draw a parallel representing one millivolt at the beginning of the ECG. It should be noted that the device must be calibrated before starting the ECG registration.

Details of an electric shock to the heart

Stimulation of the sinus node causes electrical stimulation of the atria and creates a P wave, which is a wave of atrial depolarization. Then the ventricular depolarization wave occurs as a set of QRS complex and subsequently the ventricular repolarization wave is seen as a T wave. Sometimes another small wave occurs after the T wave, called the U wave. The reason for this wave is the repolarization of papillary muscles in the heart. At intervals of these waves when there is no proper electrical activity, the electrocardiogram draws a horizontal straight line called the isoelectric line.

Wave

This wave is produced due to depolarization of the atria and the amplitude of the p-wave is 2-3 mm. The p-wave time is about 0.11-0.4 seconds. The p-wave is positive in AVF, V3-V6, and D1 to D2 derivatives, and negative in AVR derivations and mostly in V1. In derivation D3 is often biphasic. Its tip is usually limited and should not be sharp or serrated. If the wave was negative in leads 1 and 2, it is possible that either the patient's heart was on the right side or the leads were closed incorrectly. If the P-wave becomes wide and serrated, it is due to the enlargement of the left atrium due to stenosis and mitral regurgitation.

QRS complex

This complex, which is the most important component of the electrocardiogram, is related to ventricular depolarization and is a sign of ventricular myocardial stimulation.

The method of naming the complex

- ✓ The first descending (negative) wave is called the Q wave.
- ✓ The first ascending (positive) wave is called the R wave.
- ✓ The second descending (negative) wave after the R wave is known as the S wave.
- ✓ If the next positive waves appear, they are called 'R or R', and the next negative waves are called 'S' and 'S.
- ✓ If we have only one rising wave R, its starting and ending points are called S and Q, respectively, and if we have only a negative wave, it is called QS.

In examining the QRS complex, the following points should be considered:

A) The duration of the QRS complex, the normal value of which is 0.05 to 0.1 seconds, which is the time from the beginning of the QRS to its end. If the QRS lasts longer than 0.12 seconds, it is abnormal and is usually seen in branch block or ventricular arrhythmias.

B) The voltage or amplitude of the QRS wave is completely variable, but if it has a height of less than 5 ml in standard derivatives, this is abnormal and it is called low voltage. This condition is seen in diffuse and advanced coronary heart disease, ventricular failure, pericardial fluid, myxedema (hypothyroidism), as well as in obese people or people with pulmonary emphysema, etc. Determining the maximum voltage is difficult because it is sometimes seen in the normal heart with a 20- or 30-mm amplitude in derivation c). In anterior myocardial infarctions, the normal voltage usually does not exceed 25 to 30 mm. Too much or too little voltage depends on many factors, including the thickness of the chest wall, which indicates low voltage in obese people and high voltage in lean people, but it should be noted that if the voltage is higher than normal, hypertrophy may be a problem. The ventricles are involved. Other factors, such as the distance of the electrodes from the heart, also affect the wave voltage.

C) In thoracic derivatives, the wave deformation is such that the V1 wave has a small R and a deep S, and vice versa, the V6 has a small Q, a long R and a small S. Gradually, R rises higher than V1 as we move towards V6, so that it reaches a maximum at V5 and V6 and, conversely, decreases from depth S to a minimum at V5 and V6. The size of R and S in V3 and V4 are almost equal and this area is called the transcendental zone. It is abnormal if the location of the passage area in the anterior heart derivatives changes, ie to the right or left, and raises the possibility of some diseases, such as left or right ventricular hypertrophy.

D) The Q wave is important in the diagnosis of myocardial infarction and a distinction must be made between normal and abnormal Q, and the disappearance of this wave in places where it should be present naturally is the reason for the abnormality of the cardiogram electrode. It should be noted that Q waves may be observed naturally (part of QS) in leads III, AVF, AVL, AVR and V1 and sometimes V2, and also q waves as part of QR waves in leads AVF, AVL, I II, III Left thoracic valves V5-V6 are seen. These Q waves have a time of less than 0.04 seconds.

Distance (PR INTERVEL) PR

This is the distance from the beginning of the p wave to the beginning of the QRS complex. This interval is the time it takes for stimulation from the sinus node to reach the ventricular myocardial fibers. The normal PR interval is 0.12 to 0.2 seconds. This distance is slightly less in children. This distance is prolonged in ventricular atrial blocks and is shortened in cases such as Wolff, Parkinson's, and White syndrome, where there is an additional conduction relationship between the atrium and the ventricle.

ST segments

It is a piece of isoelectric line between the QRS complex and the T wave. This piece starts immediately from the end of the QRS complex and this point is called the j point. It is the beginning of the ST segment and its end is the beginning of the T wave. The rise and fall of the ST segment and the wave are of great diagnostic importance for ischemia and infarction. The slight rise of this piece is sometimes seen in normal people, especially black people, and its fall is called ST fall.

T wave

This wave represents ventricular repolarization and is examined from three perspectives.

T-wave time: its height and general shape in derivatives V6, D1, D2 to AVF-V3 are positive in AVF negative and in other derivatives, so that if in AVF and AVL the size of R is longer than 5 mm, the T wave It is positive, but if it is less, it may be negative.

T-waveform: It is usually slightly symmetrical, ie it starts slowly and ends faster, and its peak is circular. Sharp and toothed T is usually abnormal.

T-wave height: does not exceed 5 mm in standard derivations and 10 mm in frontal derivations. A long T-wave may be seen in hyperkalemic infarction.

QT distance

This distance is from the beginning of Q to the end of the T wave and is the full duration of ventricular systole. QT duration varies due to factors such as heart rate, age, and gender. This distance with the rate also varies. Changes in this distance help diagnose some diseases. For example, with digital consumption, too much potassium or calcium in the blood reduces this gap. Congestive heart failure, myocardial infarction, hypoxemia, and increased use of drugs such as quinidine and procaine amide.

Conclusion

The U-wave is a small, assisted voltage wave that is sometimes seen following the T-wave. Its direction is usually the same as the direction of the T wave, ie if the T wave is positive, the U wave is positive and vice versa. The most obvious U-wave is seen in V3 derivation. In hypokalemia, the U-wave becomes more pronounced. In ischemia, the myocardium becomes negative as a T-wave, and drug factors such as digitalis, quinidine, epinephrine, and diseases such as thyrotoxicosis may increase the height of the wave.

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