PERFORMING THE ELECTROCARDIOGRAM pdf

1: Lead ECG Placement

An electrocardiogram is a simple, painless test that measures your heart's electrical activity. It's also known as an ECG or EKG. Every heartbeat is triggered by an electrical signal that.

An electrocardiogram ECG is one of the simplest and fastest tests used to evaluate the heart. Electrodes small, plastic patches that stick to the skin are placed at certain spots on the chest, arms, and legs. The electrodes are connected to an ECG machine by lead wires. The electrical activity of the heart is then measured, interpreted, and printed out. No electricity is sent into the body. Natural electrical impulses coordinate contractions of the different parts of the heart to keep blood flowing the way it should. An ECG records these impulses to show how fast the heart is beating, the rhythm of the heart beats steady or irregular , and the strength and timing of the electrical impulses as they move through the different parts of the heart. Changes in an ECG can be a sign of many heart-related conditions. Why might I need an electrocardiogram? Some reasons for your doctor to request an electrocardiogram ECG include: What are the risks of an electrocardiogram? Risks associated with ECG are minimal and rare. You will not feel anything during the ECG, but it may be uncomfortable when the sticky electrodes are taken off. If the electrode patches are left on too long they may cause tissue breakdown or skin irritation. There may be other risks depending on your specific medical condition. Be sure to discuss any concerns with your doctor before the test. Certain factors or conditions may interfere with or affect the results of the ECG. These include, but are not limited to: Obesity Pregnancy Fluid buildup in the abdomen ascites Anatomical considerations, such as the size of the chest and the location of the heart within the chest Movement during the test Exercise or smoking before the test Certain medicines Electrolyte imbalances, such as too much or too little potassium, magnesium, or calcium in the blood How do I get ready for an electrocardiogram? Your doctor or the technician will explain the test to you and let you ask questions. Generally, fasting not eating is not required before the test. Tell your doctor of all medicines prescribed and over-the-counter , vitamins, herbs, and supplements that you are taking. Tell your doctor if you have a pacemaker. Based on your medical condition, your doctor may request other specific preparation. What happens during an electrocardiogram? An electrocardiogram ECG may be done on an outpatient basis or as part of your hospital stay. Generally, an ECG follows this process: You will be asked to remove any jewelry or other objects that may interfere with the test. You will be asked to remove clothing from the waist up. The technician will ensure your privacy by covering you with a sheet or gown and exposing only the necessary skin. You will lie flat on a table or bed for the test. If your chest, arms, or legs are very hairy, the technician may shave or clip small patches of hair, as needed, so that the electrodes will stick closely to the skin. Electrodes will be attached to your chest, arms, and legs. The lead wires will be attached to the electrodes. The ECG will be started. It will take only a short time for the tracing to be completed. Once the tracing is completed, the technician will disconnect the leads and remove the skin electrodes. What happens after an electrocardiogram? You should be able to go back to your normal diet and activities, unless your doctor tells you differently. Generally, there is no special care after an electrocardiogram ECG. Tell your doctor if you develop any signs or symptoms you had before the ECG for example, chest pain, shortness of breath, dizziness, or fainting. Your doctor may give you other instructions after the test, depending on your particular situation. Next steps Before you agree to the test or the procedure make sure you know:

PERFORMING THE ELECTROCARDIOGRAM pdf

2: Electrocardiography - Wikipedia

Steps to Perform an Electrocardiogram Inform your patient about the test and the risks involved. Ask your patient to remove electrical equipment such as mobile phones or watches that may interfere with the signal when performing the Electrocardiogram.

What happens during an electrocardiogram? An EKG is quick, painless, and harmless. After you change into a gown, a technician attaches 12 to 15 soft electrodes with a gel to your chest, arms, and legs. The technician may have to shave small areas to ensure the electrodes stick properly to your skin. Each electrode is about the size of a quarter. These electrodes are attached to electrical leads wires , which are then attached to the EKG machine. Make sure to lie as still as possible and breathe normally. After the procedure, the electrodes are removed and discarded. The entire procedure takes about 10 minutes. However, some heart problems come and go. In these cases, you may need longer or more specialized monitoring. Stress test Some heart problems only appear during exercise. Electrodes attached to your chest record information on a portable, battery-operated monitor that you can carry in your pocket, on your belt, or on a shoulder strap. Some event recorders activate automatically when they detect symptoms. Other event recorders require you to push a button when you feel symptoms. You can send the information directly to your doctor over a phone line. What risks are involved? There are few, if any, risks related to an EKG. Some people may experience a skin rash where electrodes were placed, but this usually goes away without treatment. People undergoing a stress test may be at risk for heart attack, but this is related to the exercise, not the EKG. An EKG simply monitors the electrical activity of your heart.

PERFORMING THE ELECTROCARDIOGRAM pdf

3: How to perform an Electrocardiogram

The electrocardiogram (ECG or EKG) is a diagnostic tool that is routinely used to assess the electrical and muscular functions of the heart. While it is a relatively simple test to perform, the interpretation of the ECG tracing requires significant amounts of training. Numerous textbooks are devoted.

What is an EKG: Testing for heart and blood vessel disorders with an electrocardiogram EKG is non-invasive and is used to assess the condition of the heart and blood vessels. The medical assistant is responsible for obtaining a good-quality EKG without avoidable artifacts. An artifact is an abnormal signal that does not reflect electrical activity of the heart during the cardiac cycle. What is an EKG? The EKG is one of the most valuable diagnostic tools for evaluating the electrical pathways through the heart. An EKG is a test that measures the electrical activity of the heartbeat. With each beat, an electrical impulse travels through the heart, and the wave causes the muscle to squeeze and pump blood from the heart. The EKG can measure how fast the heart beats and how well the chambers conduct electrical energy. Before any EKG is performed, it is important for the medical assistant to interview the patient to obtain the medications they are currently taking. This will help to identify any changes or abnormalities that may arise in the EKG tracing. The physical, performed by the medical assistant, will provide vital signs from the patient that include weight, blood pressure, heart rate, respiratory rate, and body temperature to further supplement the EKG results. Prior to the EKG, the medical assistant will want to obtain current symptoms and a family history of cardiovascular disorders. Before performing the EKG, the medical assistant will want to make sure that no other machines in the room are causing any electric interference. The medical assistant will turn on the EKG machine and explain the procedure to the patient, answering any questions the patient may have. The patient will be asked to remove all jewelry, socks and shoes and lay down on the table on his or her back. The medical assistant will ask the patient to breathe normally while laying still. The EKG has 12 leads that produce a two-dimensional record of the impulse waves. Each lead records the electrical impulse through the heart from a different angle, giving the physician a complete view of the heart. The cables will then be attached to the electrodes. All artifacts are identified and eliminated if possible. After the EKG is complete, the medical assistant will remove electrodes allowing the patient privacy to get dressed. When to Perform an EKG? An EKG can be performed during a routine physical examination or screening evaluation for patients with hereditary predisposition to cardiovascular issues. The EKG is also administered as part of a cardiac exercise stress test. An EKG should be ordered if the patient is experiencing any symptoms of cardiovascular issues including chest pain, shortness of breath, dizziness, fainting or palpitations. Learning how to perform an EKG will be taught during a medical assisting program at a vocational institution. Students will perform EKGs under the supervision of instructors. The student will prepare both the patient and the EKG machine in an effort to learn how to perform the EKG with the least number of artifacts. The student will also learn how to record the EKG. Did learning about EKGs interest you? Ready for an exciting new career in the medical assisting field? Contact PCI Health Training Center for more information on how to become a medical assistant and start a rewarding career today. Inquiries regarding policy may be directed to TitleIXCoordinator pcihealth. For more information about our graduation rates, the median debt of students who complete the program, and other important information, please visit our website at www.

PERFORMING THE ELECTROCARDIOGRAM pdf

4: What Is An Electrocardiogram (Electrocardiography, ECG) - You Ask MD Answers

Continued. Like the standard EKG, it's painless. The electrodes from the monitor are taped to your skin. Once they're in place, you can go home and do all of your normal activities except shower.

Other acute ischemic heart diseases I In simple terms, the intent of this regulation is â€" pay the interpretation used to diagnose and treat the patient. Professional component billing based on a review of the findings of these procedures without a complete, written report similar to that which would be prepared by a specialist in the field, does not meet the conditions for separate payment of the service. Absent these circumstances, reimbursement can only be made for the interpretation and report that directly contributed to the diagnosis and treatment of the patient. CPT modifier 77 should not be used solely because two interpretations were performed. When only one claim for an interpretation is received, it must be presumed that the one service submitted was a service to the individual beneficiary rather than a quality control measure. The claim may be paid if it otherwise meets any applicable reasonable and necessary test. When multiple claims for the same interpretation are received, payment is generally made for the first claim received by the MAC. Payment must be made for the interpretation and report that directly contributed to the diagnosis and treatment of the individual patient. This interpretation may be an oral report to the treating physician that will be written at a later time. If the first claim received is from a radiologist, MACs generally pay the claim because they would not know in advance that a second claim would be forthcoming. When MACs receive the claim from the emergency room ER physician and can identify that the two claims are for the same interpretation, they must determine whether the claim from the ER physician was the interpretation that contributed to the diagnosis and treatment of the patient and, if so, pay that claim. Documentation may be submitted with the initial claim, or if a denial is received, the documentation should be submitted with the request for redetermination. The documentation submitted must support that the interpretation results were provided in time to contribute to the diagnosis and treatment of the patient. This documentation may be submitted with the initial claim or if requesting an appeal, must be submitted with the appeal request. Including the time of the report submission to the treating physician might be one method to demonstrate that the report was sufficiently timely to be used in diagnosis or treatment. Interpretations provided days or hours after the care of the patient, would not meet policy requirements. The Medicare IOM, in the same reference as noted above, indicates that the two parties should reach an accommodation about who should bill for these interpretations. Doing so can reduce or eliminate the need to submit additional documentation and reduce or eliminate the need to submit appeals. Below are a few examples: Palmetto GBA receives separate claims for CPT code from a radiologist and a physician who treated that patient in the ER, both with a date of service of January 1. The first claim processed in the system is paid and the second claim will be identified as a possible duplicate. If documentation was submitted with either the first or second claim, it will be reviewed for payment determination. If the documentation submitted does not show that the interpretation was provided in time to contribute to the diagnosis and treatment of the patient, or if no documentation was submitted the claim will be denied as a duplicate. A physician sees a beneficiary in the ER on January 1 and orders a single view chest X-ray. The physician reviews the X-ray, treats, and discharges the beneficiary. Palmetto GBA receives a claim from a radiologist for CPT code indicating an interpretation with written report with a date of service of January 3. Palmetto GBA receives a claim from a radiologist for CPT code indicating an interpretation with written report with a date of service of January 3 and a claim from the physician who saw the beneficiary in the ER billing for CPT code with a date of service of January 1. The first claim received by Palmetto GBA will be paid, unless documentation is submitted with the claim to the contrary. If the first claim is from the treating physician in the ER, and there is no indication the claim should not be paid, e. Palmetto GBA will deny a claim subsequently received from a radiologist for the same interpretation as a quality control service to the hospital rather than a service to the individual beneficiary. In situations such as this, both claims can be paid. Claim Submission Instructions For claims submitted electronically, the unusual circumstances must be submitted in the appropriate documentation record or may be submitted via fax. Failure to use CPT modifier

77 and submit the necessary documentation will result in denial of the service. Limitations of liability and refund requirements apply. Should you receive a denial of service that you do not agree with you may request a redetermination of the claim. Regardless of physician type or specialty, when requesting redetermination documentation must be submitted. Electrocardiography is a graphic record of electrical potentials produced by cardiac tissue. An electrographic tracing is created when electrical impulses produced by the heart spread to the body surface where they are detected by electrodes connected to a recording device. A qualified physician or NPP who is licensed by his state to perform these services must make an interpretation. The ECG is valuable in the evaluation and management of primary diseases of the heart, pericardium and coronary arteries. Electrocardiography may be useful in management of diseases that are not primarily cardiac but which frequently affect the heart either directly or indirectly. The following are indications for which the ECG is appropriate: Cardiac ischemia or infarction new symptoms or exacerbations of known disease. Anatomic or structural abnormalities of the heart such as congenital, valvular or hypertrophic heart disease. Rhythm disturbances and conduction system disease. Chest and central nervous system trauma. Use of medications or exposure to toxic substances that affect the heart. Systemic diseases that involve the heart. Evaluation and management related to invasive cardiac procedures. Evaluation of implanted electronic cardiac pacemakers. Preoperative management of selected patients. Patients with cardiac ischemia often present with chest pain. Not infrequently, patients with cardiac ischemia present with symptoms including atypical chest discomfort that are atypical for, but which may actually represent myocardial ischemia or infarction. The ECG may be utilized in the evaluation of patients with chest pain typical or atypical or other symptoms that are atypical but may be due to cardiac ischemia when an alternate explanation for the symptoms is not apparent. Whereas there is no argument that the ECG is an important diagnostic tool, coverage cannot be provided for ECGs performed when there is no clear relationship to treatment or diagnosis of a specific disease or injury, or a sign, symptom or complaint is apparent. Payment for the services affected by this LCD must be made only for those services that directly contribute to the diagnosis and treatment of an individual patient. Services provided that do not directly contribute to the diagnosis or treatment of an individual patient such as ECGs that are performed routinely upon admission to a facility or routinely performed prior to surgery are not medically necessary and will be denied when billed and coded appropriately. Preoperative electrocardiography is an important part of assessment of risk of preoperative cardiac morbidity. Important considerations include patient-specific predictors as well as surgery-specific risks. Preoperative ECGs performed in circumstances other than those listed above are considered screening and should be billed accordingly. Patient-specific predictors are such things as age, absence or presence of cardiac disease or dysfunction, current and recent stability of cardiac symptoms and syndromes, and the absence or presence of comorbid conditions known to increase the risk that undisclosed cardiac disease is present. Surgery-specific risks relate to the type of surgery and its associated degree of hemodynamic stress. High-risk procedures include major emergency surgery, aortic and major vascular surgeries, peripheral vascular surgery and prolonged procedures associated with large fluid shifts or blood loss. Intermediate-risk procedures include carotid endarterectomy, prostate surgery, orthopedic procedures, head and neck procedures, intraperitoneal and intrathoracic surgery. Low-risk procedures include endoscopy, superficial procedures, cataract surgery and breast surgery. Medicare generally does not cover screening for heart disease. All other electrocardiography performed on asymptomatic individuals is considered screening regardless of the presence of risk factors for cardiac disease such as family history, hypertension, diabetes mellitus, hyperlipidemia or advanced age in circumstances where information obtained from the electrocardiogram does not directly affect management of the underlying disease. Generally, one interpretation should be paid per ECG tracing. Examples of such non-covered over-reading services include those that are performed by a physician whether or not that physician is treating the patient in such a manner that the interpretation is unavailable to the treating physician timely for use in decision-making regarding patient care i. Contractors shall consider a service to be reasonable and necessary if the contractor determines that the service is: Not experimental or investigational exception: Appropriate, including the duration and frequency that is considered appropriate for the service, in terms of whether it is: Ordered and furnished by qualified personnel. At least as beneficial as an existing and available medically appropriate

alternative.

PERFORMING THE ELECTROCARDIOGRAM pdf

5: ELECTROCARDIOGRAM PROCEDURE * | Student Health Center Manuals

An electrocardiogram (also called an ECG or EKG) is a test that the doctor uses to measure the electrical signals that control your heartbeat. The EKG can show the rate at which your heart beats, if the rhythm is irregular, and the strength and timing of the electrical signals that make your heart beat.

Inferior leads Leads II, III and aVF Look at electrical activity from the vantage point of the inferior surface diaphragmatic surface of heart Lateral leads I, aVL, V5 and V6 Look at the electrical activity from the vantage point of the lateral wall of left ventricle Septal leads V1 and V2 Look at electrical activity from the vantage point of the septal surface of the heart interventricular septum Anterior leads V3 and V4 Look at electrical activity from the vantage point of the anterior wall of the right and left ventricles Sternocostal surface of heart In addition, any two precordial leads next to one another are considered to be contiguous. For example, though V4 is an anterior lead and V5 is a lateral lead, they are contiguous because they are next to one another. Cardiac electrophysiology The formal study of the electrical conduction system of the heart is called cardiac electrophysiology EP. An electrophysiology study involves a formal study of the conduction system and can be done for various reasons. During such a study, catheters are used to access the heart and some of these catheters include electrodes that can be placed anywhere in the heart to record the electrical activity from within the heart. Some catheters contain several electrodes and can record the propagation of electrical activity. Interpretation[edit] Interpretation of the ECG is fundamentally about understanding the electrical conduction system of the heart. Normal conduction starts and propagates in a predictable pattern, and deviation from this pattern can be a normal variation or be pathological. An ECG does not equate with mechanical pumping activity of the heart, for example, pulseless electrical activity produces an ECG that should pump blood but no pulses are felt and constitutes a medical emergency and CPR should be performed. Ventricular fibrillation produces an ECG but is too dysfunctional to produce a life-sustaining cardiac output. Certain rhythms are known to have good cardiac output and some are known to have bad cardiac output. Ultimately, an echocardiogram or other anatomical imaging modality is useful in assessing the mechanical function of the heart. Like all medical tests, what constitutes "normal" is based on population studies. The heartrate range of between 60 and beats per minute bpm is considered normal since data shows this to be the usual resting heart rate. In order to understand the patterns found, it is helpful to understand the theory of what ECGs represent. The theory is rooted in electromagnetics and boils down to the four following points: For example, depolarizing from right to left would produce a positive deflection in lead I because the two vectors point in the same direction. In contrast, that same depolarization would produce minimal deflection in V1 and V2 because the vectors are perpendicular and this phenomenon is called isoelectric. Normal rhythm produces four entities â€” a P wave, a QRS complex, a T wave, and a U wave â€” that each have a fairly unique pattern. The P wave represents atrial depolarization. The QRS complex represents ventricular depolarization. The T wave represents ventricular repolarization. The U wave represents papillary muscle repolarization. However, the U wave is not typically seen and its absence is generally ignored. Changes in the structure of the heart and its surroundings including blood composition change the patterns of these four entities. Electrocardiogram grid[edit] ECGs are normally printed on a grid. The horizontal axis represents time and the vertical axis represents voltage. The standard values on this grid are shown in the adjacent image: The "large" box is represented by a heavier line weight than the small boxes. Not all aspects of an ECG rely on precise recordings or having a known scaling of amplitude or time. For example, determining if the tracing is a sinus rhythm only requires feature recognition and matching, and not measurement of amplitudes or times i. An example to the contrary, the voltage requirements of left ventricular hypertrophy require knowing the grid scale. Rate and rhythm[edit] In a normal heart, the heart rate is the rate in which the sinoatrial node depolarizes as it is the source of depolarization of the heart. Heart rate, like other vital signs like blood pressure and respiratory rate, change with age. In adults, a normal heart rate is between 60 and bpm normocardic where in children it is higher. A complication of this is when the atria and ventricles are not in synchrony and the "heart rate" must be specified as atrial or ventricular e. In normal resting hearts, the

physiologic rhythm of the heart is normal sinus rhythm NSR. Generally, deviation from normal sinus rhythm is considered a cardiac arrhythmia. Thus, the first question in interpreting an ECG is whether or not there is a sinus rhythm. Once sinus rhythm is established, or not, the second question is the rate. For a sinus rhythm this is either the rate of P waves or QRS complexes since they are 1-to If the rate is too fast then it is sinus tachycardia and if it is too slow then it is sinus bradycardia. If it is not a sinus rhythm, then determining the rhythm is necessary before proceeding with further interpretation. Some arrhythmias with characteristic findings: Absent P waves with "irregularly irregular" QRS complexes is the hallmark of atrial fibrillation A "saw tooth" pattern with QRS complexes is the hallmark of atrial flutter Sine wave pattern is the hallmark of ventricular flutter Absent P waves with wide QRS complexes and a fast heart rate is ventricular tachycardia Determination of rate and rhythm is necessary in order to make sense of further interpretation. Axis[edit] The heart has several axes, but the most common by far is the axis of the QRS complex references to "the axis" imply the QRS axis. Each axis can be computationally determined to result in a number representing degrees of deviation from zero, or it can be categorized into a few types. The QRS axis is the general direction of the ventricular depolarization wavefront or mean electrical vector in the frontal plane. It is often sufficient to classify the axis as one of three types: The normal QRS axis is generally down and to the left, following the anatomical orientation of the heart within the chest. An abnormal axis suggests a change in the physical shape and orientation of the heart or a defect in its conduction system that causes the ventricles to depolarize in an abnormal way.

PERFORMING THE ELECTROCARDIOGRAM pdf

6: Electrocardiogram | Johns Hopkins Medicine Health Library

An electrocardiogram (ECG) is one of the simplest and fastest tests used to evaluate the heart. Electrodes (small, plastic patches that stick to the skin) are placed at certain locations on the chest, arms, and legs.

ECGs are often performed to monitor the health of people who have been diagnosed with heart problems, to help assess artificial cardiac pacemakers or to monitor the effects of certain medications on the heart. Always let your doctor know what medications you are taking before you have an ECG, and if you have any allergies to adhesive tapes that may be used to attach electrodes. When you go for an ECG test, you will need to remove your upper clothing so that electrodes can be attached to your chest and limbs. For women, wearing a separate top with trousers or a skirt can allow easy access to the chest. The selected sites are shaved, if necessary. Electrodes sensors are attached to the chest, arms and legs with suction cups or sticky gel. These electrodes detect the electrical currents generated by the heart â€" these are measured and recorded by the electrocardiograph. The three major types of ECG are: No movement is allowed during the test, as electrical impulses generated by other muscles may interfere with those generated by your heart. You are free to move around normally while the monitor is attached. This type of ECG is used for people whose symptoms are intermittent stop-start and may not show up on a resting ECG, and for people recovering from heart attack to ensure that their heart is functioning properly. You record your symptoms in a diary, and note when they occur so that your own experience can be compared with the ECG cardiac stress test â€" this test is used to record your ECG while you ride on an exercise bike or walk on a treadmill. This type of ECG takes about 15 to 30 minutes to complete. Immediately after an ECG procedure When the procedure is completed, the electrodes are removed. An ECG is completely painless and non-invasive, as the skin is not penetrated. The doctor can interpret the results of your ECG straight away based on your medical history, symptoms and clinical examination. It does not send electric current to the body. Some people may be allergic or sensitive to the electrodes, which can cause local skin reddening. Some of the various heart problems that can be diagnosed by ECG include: A person with heart disease may have a normal ECG result if the condition does not cause a disturbance in the electrical activity of the heart. Other diagnostic methods may be recommended if heart disease is suspected. Treatment for a heart condition depends on the diagnosed condition but may include:

PERFORMING THE ELECTROCARDIOGRAM pdf

7: What is an EKG: A Medical Assisting Guide - PCI Health

The lead ECG is a standard diagnostic tool for EMTs and paramedics to screen patients for possible cardiac ischemia. Learn about correct ECG placement, importance and use.

How to read an Electrocardiogram ECG. Basic principles of the ECG. The normal ECG Author s: With modern machines, surface ECGs are quick and easy to obtain at the bedside and are based on relatively simple electrophysiological concepts. However junior doctors often find them difficult to interpret. This is the first in a short series of articles that aim to: Help readers understand and interpret ECG recordings. Reduce some of the anxiety juniors often experience when faced with an ECG. Basic principles What is an ECG? An ECG is simply a representation of the electrical activity of the heart muscle as it changes with time, usually printed on paper for easier analysis. Like other muscles, cardiac muscle contracts in response to electrical depolarisation of the muscle cells. It is the sum of this electrical activity, when amplified and recorded for just a few seconds that we know as an ECG. Basic Electrophysiology of the Heart see Figure 1 The normal cardiac cycle begins with spontaneous depolarisation of the sinus node, an area of specialised tissue situated in the high right atrium RA. A wave of electrical depolarisation then spreads through the RA and across the inter-atrial septum into the left atrium LA. The atria are separated from the ventricles by an electrically inert fibrous ring, so that in the normal heart the only route of transmission of electrical depolarisation from atria to ventricles is through the atrioventricular AV node. The AV node delays the electrical signal for a short time, and then the wave of depolarisation spreads down the interventricular septum IVS , via the bundle of His and the right and left bundle branches, into the right RV and left LV ventricles. Hence with normal conduction the two ventricles contract simultaneously, which is important in maximising cardiac efficiency. After complete depolarisation of the heart, the myocardium must then repolarise, before it can be ready to depolarise again for the next cardiac cycle. The wave of electrical depolarisation spreads from the atria down though the IVS to the ventricles. So the direction of this depolarisation is usually from the superior to the inferior aspect of the heart. The direction of the wave of depolarisation is normally towards the left due to the leftward orientation of the heart in the chest and the greater muscle mass of the left ventricle than the right. This overall direction of travel of the electrical depolarisation through the heart is known as the electrical axis. A fundamental principle of ECG recording is that when the wave of depolarisation travels toward a recording lead this results in a positive or upward deflection. When it travels away from a recording lead this results in a negative or downward deflection. Six of these are recorded from the chest overlying the heart â€" the chest or precordial leads. Four are recorded from the limbs â€" the limb leads. It is essential that each of the 10 recording electrodes is placed in its correct position, otherwise the appearance of the ECG will be changed significantly, preventing correct interpretation. The limb leads record the ECG in the coronal plane, and so can be used to determine the electrical axis which is usually measured only in the coronal plane. A horizontal line through the heart and directed to the left exactly in the direction of lead I is conventionally labelled as the reference point of 0 degrees 0 o. A detailed explanation of how to determine the axis is beyond the scope of this article but the principles mentioned here should help readers to understand the concepts involved. Transverse section of the chest showing the orientation of the six chest leads in relation to the heart Voltage and timing intervals It is conventional to record the ECG using standard measures for amplitude of the electrical signal and for the speed at which the paper moves during the recording. Easy appreciation of heart rates and cardiac intervals and Meaningful comparison to be made between ECGs recorded on different occasions or by different ECG machines. The amplitude, or voltage, of the recorded electrical signal is expressed on an ECG in the vertical dimension and is measured in millivolts mV. On standard ECG paper 1mV is represented by a deflection of 10 mm. An increase in the amount of muscle mass, such as with left ventricular hypertrophy LVH , usually results in a larger electrical depolarisation signal, and so a larger amplitude of vertical deflection on the ECG. An essential feature of the ECG is that the electrical activity of the heart is shown as it varies with time. In other words we can think of the ECG as a graph, plotting electrical activity on the vertical axis against time on the horizontal axis. Standard ECG paper moves at 25 mm per second during real-time recording. This means

that when looking at the printed ECG a distance of 25 mm along the horizontal axis represents 1 second in time. ECG paper is marked with a grid of small and large squares. Each small square represents 40 milliseconds ms in time along the horizontal axis and each larger square contains 5 small squares, thus representing ms. Standard paper speeds and square markings allow easy measurement of cardiac timing intervals. Sample of standard ECG paper showing the scale of voltage, measured on the vertical axis, against time on the horizontal axis The normal ECG It will be clear from above that the first structure to be depolarised during normal sinus rhythm is the right atrium, closely followed by the left atrium. So the first electrical signal on a normal ECG originates from the atria and is known as the P wave. Although there is usually only one P wave in most leads of an ECG, the P wave is in fact the sum of the electrical signals from the two atria, which are usually superimposed. There is then a short, physiological delay as the atrioventricular AV node slows the electrical depolarisation before it proceeds to the ventricles. Depolarisation of the ventricles results in usually the largest part of the ECG signal because of the greater muscle mass in the ventricles and this is known as the QRS complex. In the case of the ventricles, there is also an electrical signal reflecting repolarisation of the myocardium. This is shown as the ST segment and the T wave. The ST segment is normally isoelectric, and the T wave in most leads is an upright deflection of variable amplitude and duration see Figures 5 and 6. The major waves of a single normal ECG pattern Figure 6. Example of a normal 12 lead ECG; notice the downward deflection of all signals recorded from lead aVR. This is normal, as the electrical axis is directly away from that lead Normal intervals The recording of an ECG on standard paper allows the time taken for the various phases of electrical depolarisation to be measured, usually in milliseconds. Normal range â€” ms 3 â€” 5 small squares on ECG paper. Normal range up to ms 3 small squares on ECG paper. Each second of time is represented by mm 5 large squares along the horizontal axis. So if the number of large squares between each QRS complex is:

PERFORMING THE ELECTROCARDIOGRAM pdf

8: ECG test - Better Health Channel

Did you know you could browse the Trending page to see recently popular videos?

Snap lead attachment into base of portable unit. Assure patient there is no danger or pain involved. Make the patient comfortable lying down on the exam table. Expose the arms and legs. If necessary shave the electrode areas before cleaning the exposed skin with alcohol for proper electrode adhesion. Attach the limb leads. V1 Fourth intercostal space at right border of the sternum V2 Fourth intercostal space at left border of the sternum V3 Midway between position V2 and position V4 V4 At the mid-clavicular line in the fifth intercostal space V5 At the anterior axillary line on the same horizontal level as V4 V6 At the mid-axillary line on the same horizontal level as V4 and V5 Attach the chest leads. Confirm that standard vital signs obtained and entered into chart note, included current height and weight. If not, perform vitals before starting EKG. Confirm chart note is closed before starting EKG. If done as a nursing visit or through Psychiatry, see below. We do not routinely submit all EKGs for review by an outside specialist. The need for outside review is at the discretion of the ordering clinician. Requests for interpretation by a specialist are documented on the tracing by the ordering clinician, then tracked by the Health Information Management HIM Department. Documentation for lead and RR consists of four steps: Auto-generated interpretation appears on document. No auto-generated interpretation appears on document; Comment section directly opens during Review process. Specialist adds interpretation in Comments and Signs electronic documents. Health Information Management HIM notifies ordering clinician when lead and RR has been reviewed and signed by the outside specialist, making it ready for acknowledgement. Ordering clinician Acknowledges interpreted lead and RR. If an urgent interpretation is indicated, the Medical Director will communicate directly with the outside specialist. As part of a physical prior to be being seen by a clinician i. Nurse performs lead and RR, designating the Medical Director as the ordering clinician. If no order exists on the Procedure Sheet, charges must be entered separately. EKGs ordered by Psychiatry: The nursing order is placed by the psychiatrist.

9: How to Set Up a 12 Lead Ekg: 10 Steps (with Pictures) - wikiHow

Below is a list of guidelines that will help reduce artifact when performing ECG's. Patient Positioning Place the patient in a supine or semi-Fowler's position.

PERFORMING THE ELECTROCARDIOGRAM pdf

Only With the Heart The Gods, and other Lectures The gap between worlds Self-representationalism and the phenomenology of consciousness Bernard Shaw and Alfred Douglas, a correspondence Religion in the Pacific era New Compleat Astrologer Mario, the Magnificent Mario, el magnifico The shorter German verse texts The history of silk, cotton, linen, wool, and other fibrous substances Sport psychology concepts and applications 7th edition Surviving New Zealand Scandinavia in the Revolutionary era, 1760-1815 V. 12. Romeo and Juliet. Comedy of errors. Titus Andronicus. Pericles. Conditional formatting in excel 2007 tutorial The pharmacopoeia of the Royal College of Physicians of London, MDCCCIX Ncert books for ias preparation Methods of Study and Memory Development Linear aggregation theory in cell biology Health Initiatives for Youth A field guide for forest indicator plants, sensitive plants, and noxious weeds of the Shoshone National F 2005 dodge caravan owner manual Allen Ginsburg collected poems, 1947-1997 The quarter-life breakthrough Postal Exam 3 Audio CD Combo Audi A4, S4: Official Factory Repair Manual: 1996, 1997, 1998, 1999, 2000 The Bhagavad Gita Or The Lords Lay With References To The Christian Scriptures Chapter 6: How To Overcome Resistance: Collecting Shane Stevens The Art Science of Developing Software (Inside the Minds series) Topics in polynomials Path to priesthood Spinocerebellar Degenerations: The Ataxias and Spastic Paraplegias Complex special situations. Playing the odds nora roberts Listening : big ears are pretty Mrs. Alice E. Travers. Message from the President of the United States, returning House bill no. 6753, wi Edouard Vuillard: Painter-Decorator Worlds best storage shelving projects Pseudoangiomatous stromal hyperplasia.