Manual defibrillation procedure steps

Treatment of life-threatening cardiac dysthymia should not be confused with defibulation. DefibrillationVide position and placement of the defibrillator electrode. Defibrillation is the treatment of life-threatening cardiac dysthyria, in particular ventricular fibrillation (VF) and non-perfusion ventricular tachycardia (VT). The defibrillator delivers a dose of electric current (often called countercos) to the heart. Although this process is not fully understood, it depolarizes a large amount of the heart muscle, ending with dysrhythmia. Subsequently, the body's natural pacemaker in the synorate nodules of the heart is able to restore normal sinus rhythm. The heart on which the asysol (flat line) is located cannot be restarted by a defibrillator, but will be treated with cardiopulmonary resuscitation (CPR). Unlike defibrillation, synchronized electrical cardioversion is an electric current delivered in sync to the heart cycle. Although a person may still be in critical condition, cardioversion is usually aimed at putting an end to poor cardiac dysritmia, such as supraventricular tachycardia. Defibrillators may be external, transverse or implantable (implantable cardioverter defibrillator), depending on the type of device used or needed. Some external installations, known as automated external defibrillators (AEDs), automate the diagnosis of treatable rhythms, which means that non-specifics or passers-by can successfully use them with little or no training. Medical use of defibrillation is often an important step in cardiopulmonary resuscitation (CPR). CPR is an algorithm aimed at restoring cardiac and pulmonary function. Defibrillation is shown only in certain types of cardiac dysthyria, in particular ventricular fibrillation (VF) and pulsed ventricular tachycardia. If the heart has completely stopped, as in asysyl or pulsed electrical activity (PEA), defibrillation is not shown. Defibrillation is also not indicated if the patient is conscious or pulsed. An improper stun can cause dangerous dysthymia, such as ventricular fibrillation. Survival rates for out-of-hospital cardiac arrests are low, often less than 10%. The result for in-hospital cardiac stops is 20% higher. In the group of people present with cardiac arrest, a specific heart rate can significantly affect survival. Compared to people present with a non-shocking rhythm (e.g. asystole or PEA), people with a shock rhythm (e.g. VF or pulsed ventricular tachycardia) improved survival rates ranging from 21-50%. The types of this section need additional quotes to verify. Please help improve this article by adding quotes in Sources. Non-sources of materials can be challenged and removed. (August 2014) (Learn, as well as to remove this pattern message) The Guide to the external defibrillator Guide to external defibrillators require the expertise of a medical professional. They are used in conjunction with an electrocardiogram that can be separate or built-in. The health care provider first diagnoses the heart rate and then manually determines the stress and timing of the electric shock. These wards are mainly located in hospitals and in some ambulances. For example, every NHS ambulance in the United Kingdom is equipped with a manual defibrillator for use by physicians and technicians. In the United States, many advanced ambulances and all paramedics are trained to recognize deadly arrhythmias and deliver appropriate electrical therapy with a manual defibrillator when needed. (quote necessary) Manual internal defibrillator Guide internal defibrillators deliver shock through paddles placed directly on the heart. They are mainly used in the operating room and, in rare cases, in the emergency room during an open heart procedure. Automated External Defibrillator (AED) Main article: Automated external AED defibrillator installed outside vets in a rural village. The public-friendly Automated external defibrillators are designed for use by unprepared or briefly trained laymen. AEDs contain heart rate analysis technology. As a result, it does not require a qualified health care provider to determine whether the rhythm is shocking. By making these units public, AEDs have improved results for sudden out-of-hospital cardiac arrest. Trained health care providers have more limited use for AEDs than manual external defibrillators. Recent studies show that AEDs does not improve outcomes in patients with cardiac arrest in hospital. AED has set the voltage and does not allow the operator to change the voltage depending on the need. AEDs can also delay the delivery of effective PPC. To diagnose rhythm, AEDs often require chest compression and life-saving breathing. For these reasons, some organs, such as the European Resuscitation Council, recommend the use of manual external defibrillators over AEDs if manual external defibrillators are readily available. Automated external defibrillator ready for use. The pads are pre-connected. This model is semi-automatic due to the presence of a shock button. Because early defibrillation can significantly improve VF results, AEDs have become publicly available in many easily accessible areas. AEDs were included in the Basic Life Support Algorithm (BLS). Many first responders, such as firefighters, police officers and security guards, are equipped AEDs can be fully automatic or semi-automatic. Semi-automatic AED automatically diagnoses heart rhythms and determines whether shock is needed. If If Shock is recommended, the user must press a button to manage the shock. Fully automated AED automatically diagnoses the heart rate and advises the user to retreat while the shock is automatically given. Some types of AED are equipped with advanced features such as manual override or AN ECG display. Implantable cardioverter defibrillator Home article: Implantable cardioverter defibrillator also known as automatic internal heart defibrillator (AICD). These devices are implants similar to pacemakers (and many of them can also function as a pacemaker). They constantly monitor the patient's heart rate and automatically inject shocks at various life-threatening arrhythmias, according to the device's programming. Many modern devices can distinguish between ventricular fibrillation, ventricular tachycardia and more benign arrhythmias such as supraventricular tachycardia and atrial fibrillation. Some devices may try overdrive to walk up to synchronized cardioversion. When life-threatening arrhythmia is ventricular fibrillation, the device is programmed immediately for an unsynchronized shock. There are cases where ICD patients can shoot permanently or inappropriately. This is considered a medical emergency because it depletes the battery life of the device, causes significant discomfort and anxiety for the patient, and in some cases can actually cause life-threatening arrhythmias. Some medical personnel are currently equipped with a ring magnet to fit over the device, which effectively disables the device impact function while still allowing the pacemaker to function (if the device is so equipped). If the device is shocking often but appropriately, EMS personnel can control the sation. Wearable cardioverter defibrillator Home article: wearable cardioverter defibrillator wearable cardioverter defibrillator is a portable external defibrillator that can be worn at risk by patients. The device monitors the patient 24 hours a day and can automatically deliver a two-phase shock if VF or VT is detected. This device is mainly indicated in patients who are not direct candidates for ICD. The internal defibrillator is often used to defibrillate the heart during or after heart surgery, such as heart bypass surgery. Electrodes consist of round metal plates that come into direct contact with the myocardium. The human interface This section does not provide any sources. Please help improve this section by adding links to reliable sources. Non-sources of materials can be challenged and removed. (August 2014) (Learn how and when to delete this template message) The relationship between the defibrillator and the patient consists of a couple each of which is provided by an electrically conductive gel to ensure a good connection and to minimize electrical resistance, also called breast movement (despite DC discharge) that will burn the patient. The gel can be either moist (by the consistency of surgical lubricant) or hard (similar to candy gums). Solid gel is more convenient, as there is no need to clean the used gel from human skin after defibrillation. However, the use of solid gel poses a higher risk of burns during defibrillation, as hydro-gel electrodes more evenly conduct electricity into the body. Paddle electrodes, which were the first type developed, come without gel, and should have the gel applied in a separate step. Self-adhesive electrodes come preinstalled with the gel. There is a general division of opinions about what type of electrode is superior in hospital settings; The American Heart Association advocates neither, and all modern hand defibrillators used in hospitals allow you to quickly switch between self-adhesive pads and traditional paddles. Each type of electrode has its pros and cons. Paddle electrodes AED with electrodes attached. The most famous type of electrode (widely depicted in films and on television) is a traditional metal paddle with an insulated (usually plastic) handle. This type should be carried in place on the patient's skin with approximately 25 pounds of strength while a shock or a series of shocks comes in. Paddles offer several advantages over self-adhesive pads. Many hospitals in the United States continue to use paddles, with disposable gel pads attached in most cases, due to the inherent speed at which these electrodes can be placed and used. This is crucial during cardiac arrest, as every second of non-transfusion means tissue loss. Modern paddles allow monitoring (electrocardiography), although in hospital situations, individual monitoring leads are often already in place. The paddles are reusable, cleaned after use and stored for the next patient. The gel is therefore not preapplied, and must be added before these paddles are used on the patient. Paddles can usually only be found on manual external units. Self-adhesive electrodes New types of resuscitation electrodes are designed as a adhesive pad that includes either a solid or a wet gel. They are removed from their support and applied to the patient's chest when deemed necessary, just like any other sticker. The electrodes are then connected to the defibrillator, just as the paddle will. If defibrillation is required, the machine is charged and the impact is delivered, without the need to apply any additional gel or get and place any paddles. Most adhesive electrodes are designed for use not only for defibrillation, but also for transcotel pace and synchronized electrical cardioversion. These adhesive pads are on most and semi-automatic units and replace paddles completely in non-hospital conditions. In the hospital, in cases where cardiac arrest may occur (but has not yet occurred), pads can be placed preventively. The pads also offer an advantage for the unprepared user, as well as for medics working in sub-optimal field conditions. The pads do not require additional leads to be attached to monitor, and they do not require any force to be used as the impact is delivered. Thus, adhesive electrodes minimize the risk of the operator falling into physical (and therefore electrical) contact with the patient on impact, allowing the operator to be up to several feet high. (The risk of electric shock for others remains the same, as is the risk of shock due to the misuse of the operator.) Self-adhesive electrodes are used only for disposable purposes. They can be used for multiple shocks during one course of treatment, but are replaced if (or in the case) the patient recovers, then re-introduces cardiac arrest. The placement of electrodes for the defibrillation of resuscitation electrodes is placed on one of two circuits. The front-back scheme is the preferred scheme for long-term placement of electrodes. One electrode is placed above the left precordium (the lower part of the chest, in front of the heart). Another electrode is placed on the back, behind the heart in the area between the shoulder blade. This placement is preferable because it is best for non-invasive walking. The front top circuit can be used when the front-rear circuit is inconvenient or unnecessary. In this diagram, the front electrode is placed on the right, below the collarbone. The electrode of the top is applied to the left side of the patient, just below and to the left of the pectoral muscle. This circuit works well for defibrillation and cardioversion, as well as for ECG monitoring. Researchers have created a software simulation system capable of displaying a person's breasts and determining the best position for an external or internal cardiac defibrillator. Defib with the shown platform. The shown model is biphase and any pad can be positioned as shown the mechanism of action the exact mechanism of defibrillation is not well understood. According to one theory, successful defibrillation affects most of the heart, resulting in insufficient enlargement of the remaining heart muscle to continue arrhythmia. The latest mathematical models of defibrillation give a new idea of how the heart tissue responds to a strong electric shock. The history defibrillators were first demonstrated in 1899 by two physiologists from the University they found that small electrical shocks can cause ventricular fibrillation in dogs, and that large charges will reverse the condition. In 1933, Dr. Albert, a heart specialist at Beth Davis Hospital in New York, and C. Henry, an electrical engineer, in search of an alternative to injecting powerful drugs directly into the heart, came up with electric shocks instead of drug injections. This invention was called Hyman Otor, where a hollow needle is used to pass an insulated wire into the heart area to deliver an electric shock. The hollow steel needle acted as one end of the chain and the tip of the insulated wire at the other end. Whether Otor was successful is unknown. The external defibrillator, known today, was invented by electrical engineer William Kuvenhoven in 1930. William studied the link between electrocution and its effects on a person's heart when he was a student at Johns Hopkins University School of Engineering. Studying helped him invent a device for an external heart jump. He invented the defibrillator and tested on a dog like Superior and Batelli. The first use on man was in 1947 by Claude Beck, Professor of Surgery at Case Western Reserve University. Beck's theory was that ventricular fibrillation often occurred in hearts that were fundamentally healthy, in his terms of the Heart, which are too good to die, and that there must be a way to save them. Bec first successfully used this technique on a 14-year-old boy who was working because of a birth defect in his chest. The boy's chest was surgically opened and a manual heart massage was performed for 45 minutes before the defibrillator arrived. Beck used internal paddles on both sides of the heart, along with procainamide, an antiarrhythmic drug, and made a return to perfusing the heart rate. These early defibrillators used alternating current from an outlet converted from 110-240 volts available in the line, to 300 to 1,000 volts, to heart exposure using paddle-type electrodes. The technique has often been ineffective in returning VF while morphological studies have shown damage to cardiac muscle cells posthumously. The nature of the AC machine with a large transformer has also made these units very difficult to transport and they tend to be large units on wheels. (quote necessary) Closed method until the early 1950s heart defibrillation was only possible when the thoracic cavity was opened during surgery. The technique used variable voltage from a source of 300 or more volts, received from the standard ac force power delivered to the sides of the open heart by electrodes, where each electrode was a flat or slightly concave metal plate with a diameter of about 40 mm. The device with a closed defibrillator, which applied a variable voltage of more than 1000 volts, carried out by externally applied electrodes through the chest to the heart, was first used by Dr. B. Eskim with the assistance of Klimov. , the USSR (now known as Bishkek, Kyrgyzstan) in the mid-1950s. The duration of AC beats is usually in the range milliseconds of milliseconds About the simplest (non-electronically managed) defibrillator design, depending on the induction (damping) producing Lone, Edmark or Gurwich Waveform Early successful experiments on successful defibrillation in the discharge of the capacitor performed on animals, reported N.L. Gurvich and G.S. Yuyev in 1939. In 1947, their work was registered in Western medical journals. Serial production of The Gurvich Pulse Defibrillator began in 1952 at the institute's electromechanical plant, and was designated by the model No.1-Z (No1, No.1, No.1, or in English, Impulse defibrillator 1, All-Union Electrical Institute). Detailed in Gurvich's 1957 book Heart Fibrillation and Defibrillation. The first Czechoslovakian universal Prema defibrillator was manufactured in 1957 by Prema, developed by Dr. Bohumil Peleszka. In 1958, his device was awarded the Grand Prix at Expo 58. In 1958, U.S. Senator Hubert Humphrey visited Nikita Khrushchev and, among other things, visited the Moscow Institute of Resuscitation, where, among other things, he met with Gurvich. Humphrey immediately recognized the importance of resuscitation research, after which a number of American doctors visited Gurvich. At the same time, Humphrey worked on a federal program at the National Institutes of Health in Physiology and Medicine, speaking to Congress: Let's compete with the USSR in studies on the reversibility of death. In 1959, Bernard Lown began research in his animal lab in collaboration with engineer Baruch Berkowitz in a technique that included charging the capacitors bank to about 1,000 volts with an energy content of 100-200 joules then delivering the charge through induction, such as producing a severely faded sinus wave of finite duration (5 milliseconds) to the heart using the arc of the arc. This team also developed an understanding of the optimal time of delivering shock in the heart cycle, allowing the device to be applied to arrhythmias such as atrial fibrillation, atrial flutter, and supraventricular tachycardia in a technique known as cardioversion. The wave form of Lone Berkowitz was known to be the standard of defibrillation until the late 1980s. Previously, in the 1980s, LABAL MU at the University of Missouri pioneered numerous studies, introducing a new wave form called the two-phase truncated wave form (BTE). In this wave form, the exponentially decomposing DC voltage changes in the polarity about halfway through the time of impact, and then continues to disintegrate for some time, after which the voltage is disconnected or truncated. Studies have shown that a two-phase truncated wave shape can be more effective, requiring lower levels to be delivered energy to produce defibrillation. An additional advantage was the significant weight reduction of the machine. The wave form of BTE, combined with the automatic measurement of transthoracic impleence, is the basis for modern defibrillators. Portable devices are becoming available wall installed emergency defibrillator A major breakthrough has been the introduction of portable defibrillators used from the hospital. The Prema Peleska defibrillator was designed to be more portable than The original Gurvich model. In the Soviet Union, a portable version of Gurvich's defibrillator, Model 3 (DPA-3), was reported in 1959. In the west it was first in the early 1960s by Professor Frank Pantridge in Belfast. Today, portable defibrillators are among the many very important tools used by ambulances. They are the only proven way to resuscitate a person who has had a cardiac arrest unwited by emergency medical care (EMS), who is still in persistent ventricular fibrillation or ventricular tachycardia upon arrival before hospital providers. Gradual improvement in the design of defibrillators, based in part on the development of implanted versions (see below), has led to the presence of automated external defibrillators. These devices can analyze heart rate by themselves, diagnose shock rhythms, and charge for treatment. This means that no clinical skills are required to use them, allowing lay people to respond effectively to emergencies. Changing the biphase shape of the wave Until the mid-1990s, external defibrillators delivered a Lown-type wave form (see Bernard Lawn), which was a highly moist sinusoidal pulse, with a largely single-phase characteristic. Biphase defibrillation alternates the direction of pulses, completing one cycle in about 12 milliseconds. Biphase defibrillation was originally developed and used for implantable cardioverter defibrillators. When applied to external defibrillators, biphase defibrillation significantly reduces the energy level needed for successful defibrillation, reducing the risk of burns and myocardial damage. Ventricular fibrillation (VF) can be returned to normal sinus rhythm in 60% of patients with cardiac arrest who were treated with a single shock from a monophasic defibrillator. Most biphase defibrillators have a first strike success rate of more than 90%. Implanted devices Further development of defibrillation occurred with the invention of an implantable device known as an implantable cardioverter defibrillator (or ICD). It was the first time a Team at Sinai Hospital in Baltimore that included Stephen Heilman, Alois Langer, Jack Lattuca, Morton Mower, Michelle Mirowski, and Mir Imran, with the help of an industrial employee of Intec Systems Pittsburgh. Mirowski with Mower and Staven, and together they began their research in 1969, but it was 11 years before they his first patient. Similar development work was carried out by Shuder and his colleagues at the University of Missouri. Work was started despite doubts from leading experts in arrhythmia and sudden death. There were doubts that their ideas would one day become a clinical reality. In 1962, Bernard Lawn introduced an external DC defibrillator. This device applied a direct current from the discharged capacitor through the chest wall to the heart to stop the heart fibrillation. In 1972, Lown stated in the journal Circulation: A very rare patient with frequent bouts of ventricular fibrillation is best treated in the coronary care unit and better served with an effective antiarrhythmic program or surgical correction of inadequate coronary blood flow or ventricular malfunction. In fact, the implanted defibrillator system is an imperfect solution in search of a plausible and practical application. The problems that needed to be overcome were the design of a system that would detect ventricular fibrillation or ventricular tachycardia. Despite the lack of financial support and grants, they survived, and the first device was implanted in February 1980 at Johns Hopkins Hospital by Dr. Levi Watkins Jr. with the assistance of Vivienne Thomas. Modern ICDs do not require thoracotomy and have the ability to walk, cardioversion and defibrillation. The invention of implantable units is invaluable for some regular sufferers of heart problems, although they are usually only for those people who have already had a cardiac episode. People can live a long normal life with devices. Many patients have multiple implants. A patient in Houston, Texas had an implant at age 18 in 1994 by a recent Dr. Antonio Pacifico. In 1996, he was awarded the Youngest Patient with a Defibrillator Award. Although today these devices are implanted in small infants shortly after birth. Society and Culture As devices that can quickly produce significant improvements in patient health, defibrillators are often portrayed in movies, television, video games and other fictional media. Their function, however, is often exaggerated, with a defibrillator causing a sudden, violent jerk or cramp of the patient; In reality, although muscles may contract, such dramatic patient presentations are rare. Similarly, health care providers are often portrayed as defibrillating patients with a flat line of ECG rhythm (also known as istol). This is not a normal medical practice, since the heart cannot be restarted by the defibrillator itself. Only cardiac arrest rhythms of ventricular fibrillation and pulsed ventricular tachycardia are usually defibrillation. The purpose of defibrillation is to depolar heart at once so that it synchronizes, effectively causing a temporary asystole, in the hope that in the absence of the previous abnormal electric electric heart spontaneously resumes beating normally. Anyone who is already in aystola cannot be helped by electrical means, and usually needs urgent CPR and intravenous drugs. (A useful analogy to remember to think of defibrillators as the power of cycling rather than jump-start, heart.) There are also several heart rhythms that can be shocked when the patient is not in cardiac arrest, such as supraventricular tachycardia and ventricular tachycardia, which produces a pulse; this more complex procedure is known as cardioversion rather than defibrillation. In Australia, ambulances were relatively rare in defibrillators until the 1990s. That changed in 1990 after Australian media mogul Kerry Packer had a heart attack and, coincidentally, the ambulance that responded to the call was carrying a defibrillator. After Kerry's recovery, Kerry Packer donated a large sum to the NSW Ambulance Service to ensure all ambulances in NSW were fitted with a personal defibrillator, so defibrillators in Australia are sometimes referred to as Packer Whackers. After the widespread introduction of ambulances, various governments have distributed them to local sports fields. See also Advanced Cardiac Life Support (ACLS) Automated External Defibrillator Of the Emergency Room Cardiopulmonary Resuscitation (CPR) Cardioversion of Myocardial Infarction (Heart Attack) Wearable Cardioverter Defibrillator Links Lim, S; Venkataraman, A (2016). Defibrillation and cardioversion. in Tintinally JE; (Special Medicine Tintinally: Comprehensive Study Guide, 8e. McGraw-Hill (New York, NY). a b c d e f Kerber, RE (2011). Chapter 46. 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