VANANCHAL DENTAL COLLEGE

&

HOSPITAL

Farathiaya, Garhwa

Jharkhand

BASIC LIFE SUPPORT

COURSE MANUAL

VANANCHAL DENTAL COLLEGE & HOSPITAL

GARHWA, JHARKHAND

BASIC LIFE SUPPORTCOURSE

Definition: Life support refers to a spectrum of techniques used to maintain life after the failure of one or more vital organs.

Purpose A patient requires life support when one or more vital organs fail, due to causes such as trauma, infection, **cancer, heart attack,** or chronic disease. Among the purposes of life support are to:

- Establish and maintain the ABC's of resuscitation—airway, breathing, and circulation.
- Restore the patient's homeostasis—the internal chemical and physical balance of the body.
- Protect the patient from complications of the underlying disease and its treatment.

Precautions:

Patients and families need to recognize that life support is an extremely painful, expensive, and emotionally wrenching experience. Life support exposes a patient to vast risks of further medical complications, and offers no guarantee of a positive outcome. Even in successful cases, recovery may be slow and frustrating.

Description

Successful life support begins with establishing the ABC's of resuscitation—airway, breathing, and circulation.

The **airway** refers to a clear passageway for air to enter the lungs from outside the body. The patient's airway may become blocked by:

- Foreign body obstruction, as by food or dentures
- Injury-related damage and swelling, as from a wound or surgery
- Loss of protective reflexes due to **coma** of any origin
-

Airway maintenance techniques

1) Chin lift
2) Jaw thrust
3) Oropharyngeal airway

4) Nasopharyngeal airway
5) Laryngeal mask
6) Comi tube airway

Definitive airway techniques

1. Orotracheal intubation
2. Nasotracheal intubation
3. Surgical airway – tracheostomy, cricothyroid puncture,cricothyroidotomy

Life support may begin with basic **cardiopulmonary resuscitation (CPR),** as in cases of cardiac arrest. Thereafter, the most common technique used to create a secure airway is insertion of an endotracheal (ET) tube through the mouth or nose into the windpipe (trachea). An alternative method of securing an airway is by **tracheotomy,** a surgical procedure in which a tube is inserted into the trachea through an incision made in the base of the throat. Of the two options, placement of an ET tube is usually quicker and more convenient, and thus occurs much more commonly. Doctors perform a tracheotomy when they cannot establish an ET airway, or when the patient will require an artificial airway for more than a week or two.

Breathing refers to the movement of air in and out of the lungs. Inadequate breathing may result from:

- Heart disease, as in congestive heart failure
- Primary disease of the lungs, such as **pneumonia, asthma,** or emphysema
- Coma of any cause, such as narcotic overdose or stroke
- Muscle **fatigue** or neuromuscular disease (**spinal cord injury** or polio)
- Pain, from rib **fractures** or surgery on the chest

Assessment: Look for respiratory rate, tracheal position, Chest movement.

Insufflation, also known as 'rescue breaths' or 'ventilations', is the act of mechanically forcing air into a patient's respiratory system. This can be achieved via a number of methods, which will depend on the situation and equipment available. All methods require good airway management to perform, which ensures that the method is effective. These methods include:

- Mouth to mouth - This involves the rescuer making a seal between their mouth and the patient's mouth and 'blowing', to pass air into the patient's body

- Mouth to nose - In some instances, the rescuer may need or wish to form a seal with the patient's nose. Typical reasons for this include maxillofacial injuries, performing the procedure in water or the remains of vomit in the mouth
- Mouth to mouth and nose - Used on infants (usually up to around 1 year old), as this forms the most effective seal
- Mouth to mask – Most organisations recommend the use of some sort of barrier between rescuer and patient to reduce cross infection risk. One popular type is the 'pocket mask'. This may be able to provide higher tidal volumes than a Bag Valve Mask.[6]
- **Bag valve mask (BVM)** - This is a simple device manually operated by the rescuer, which involves squeezing a bag to expel air into the patient.
- **Laryngeal mask** - Laryngeal masks consist of a tube with an inflatable cuff that is inserted into the pharynx. They cause less pain and coughing than an endotracheal tube, and are much easier to insert. Laryngeal mask airways come in a variety of sizes ranging from large adult (size 5) to infant (size 1). The laryngeal mask functions as a "peripharyngeal sealer," in contrast to another category of supraglottic airways which are "base on tongue sealers," such as the Esophageal-Tracheal Combitube and the King Laryngeal tube (LT). A newer generation of the laryngeal mask actually utilizes both airway sealing mechanisms (peripharyngeal sealing and base of tongue sealing), and they result in higher average seal pressures during controlled and assisted ventilation of the patient. The apex of the mask, with its open end pointing downwards toward the tongue, is pushed backwards towards the uvula. The cuff follows the natural bend of the oropharynx, and is seated over the pyriform fossae. Once placed, the cuff around the mask is inflated with air to create a tight seal. Air entry is confirmed by listening for air entry into the lungs with a stethoscope, by presence of end tidal carbon dioxide and by monitoring the degree and pressure at which the air leaks around the mask in the oropharynx
- Mechanical resuscitator - An electric unit designed to breathe for the patientWhen the patient cannot breathe sufficiently, the physician will use a ventilator, a machine that pumps air in and out of the patient's lungs. For many doctors and members of the public, the term "life support" calls up the image of an ET tube and ventilator.

C — Circulation

Once oxygen can be delivered to the lungs by a clear airway and efficient breathing, there needs to be a circulation to deliver it to the rest of the body.

Non-breathing patients

Circulation is the original meaning of the 'C' as laid down by Jude, Knickerbocker & Safar, and was intended to suggest assessing the presence or absence of circulation, usually by taking a carotid pulse, before taking any further treatment steps.
In modern protocols for lay persons, this step is omitted as it has been proven that lay rescuers may have difficulty in accurately determining the presence or absence of a pulse, and that, in any case, there is less risk of harm by performing chest compressions on a beating heart than failing to perform them when the heart is not beating.For this reason, lay rescuers proceed directly to cardiopulmonary resuscitation, starting with chest compressions, which is effectively artificial circulation. In order to simplify the teaching of this to some groups, especially at a basic first aid level, the C for '**Circulation'** is changed for meaning '**CPR'** or '**Compressions'**
It should be remembered, however, that health care professionals will often still include a pulse check in their ABC check, and may involve additional steps such as an immediate ECG when cardiac arrest is suspected, in order to assess heart rhythm.

Breathing patients

In patients who are breathing, there is the opportunity to undertake further diagnosis and, depending on the skill level of the attending rescuer, a number of assessment options are available, including:

- **Observation of colour and temperature of hands and fingers** where cold, blue, pink, pale, or mottled extremities can be indicative of poor circulation
- **Capillary refill** is an assessment of the effective working of the capillaries, and involves applying cutaneous pressure to an area of skin to force blood from the area, and counting the time until return of blood. This can be performed peripherally, usually on a fingernail bed, or centrally, usually on the sternum or forehead

- **Pulse checks**, both centrally and peripherally, assessing rate (normally 60-80 beats per minute in a resting adult), regularity, strength, and equality between different pulses
- **Blood pressure measurements** can be taken to assess for signs of shock
- **Auscultation of the heart** can be undertaken by medical professionals
- **Observation for secondary signs of circulatory failure** such as oedema or frothing from the mouth (indicative of congestive heart failure)
- **ECG monitoring** will allow the healthcare professional to help diagnose underlying heart conditions, including myocardial infarction.

D stands for -

- **Defibrillation** — The definitive treatment step for cardiac arrest
- **Disability** or Dysfunction — Disabilities caused by the injury, not pre-existing conditions
- **Deadly Bleeding**
- **(Differential) Diagnosis**
- **Decompression**

Disability – check for neurological status

A - ALERT

V - RESPONSE TO VOCAL STIMULI

P - RESPONSE TO PAIN STIMULI

U - UNRESPONSIVENESS

Record Pupil Size and Reflexes

E - Additionally, some protocols call for an 'E' step to patient assessment. *All* protocols that use 'E' steps diverge from looking after basic life support at that point, and begin looking for underlying causes.In some protocols, there can be up to 3 E's used. E can stand for:

- **Expose and Examine:** Predominantly for ambulance-level practitioners, where it is important to remove clothing and other obstructions in order to assess wounds. Tight clothing should be loosened to prevent hypothermia.
- **Environment** only after assessing ABCD does the responder deal with environmentally related symptoms or conditions, such as cold and lightning.

- **Escaping Air**: Checking for air escaping, such as through a sucking chest wound, which could lead to a collapsed lung.
- **Elimination**
- **Evaluate** : Is the patient "time-critical" and/or does the rescuer need further assistance

F in the protocol can stand for:

- **Fundus**: Relating to pregnancy, it is a reminder for crews to check if a female is pregnant, and if she is, how far progressed she is (the position of the fundus in relation to the bellybutton gives a ready reckoning guide)
- **Family** : Indicates that rescuers must also deal with the witnesses and the family, who may be able to give precious information about the accident or the health of the patient, or may present a problem for the rescuer.
- **Fluids**: A check for obvious fluids (blood, cerebro-spinal fluid (CSF) etc.)
- **Fluid resuscitation**
- **Final Steps** : Consulting the nearest definitive care facility

Fluid resuscitation refers to the flow of blood around the body from the heart to vital organs. Circulation can fail due to:

- Primary disease of the heart (heart attack)
- Blood loss (trauma or internal bleeding of any cause)
- Severe infection (sepsis)
- Drug reactions or overdoses
- Extreme allergic reaction
- Severe **dehydration (gastroenteritis** or heat-related illness)

In order to ensure adequate circulation, the patient will require one or more intravenous (IV) tubes (catheters). The IVs may include both the short needle and tube commonly used in the hand or forearm, and longer catheters inserted into the larger and more central veins of the body. Catheters inserted into these larger veins are known as central lines. Through the IVs the patient receives fluids, drugs, and blood transfusions as needed to support the circulation.

'G' in the protocol can stand for

- **Go Quickly!** — A reminder to ensure all assessments and on-scene treatments are completed with speed, in order to get the patient to hospital within the Golden Hour
- **Glucose** — The professional rescuer may choose to perform a blood glucose test, and this can form the 'G' or alternately, the 'DEFG' can stand for "**Don't Ever Forget Glucose**

Once the ABC's are secure, life support is directed at maintaining homeostasis, the body's delicate chemical and physical balance. In a healthy person, the body keeps precise control over many components of its makeup, such as its fluids, nutrients, and pressures. When vital organs fail, the body can no longer regulate these components, and the doctor must take steps to restore the normal state.

Preserving the body's internal equilibrium requires careful monitoring of innumerable indicators of the patient's well-being. These indicators include:

- Vital signs (heartbeats per minute, breaths per minute, blood pressure, body temperature, and weight)
- Fluids (input and output of the body)
- Blood cell counts
- Chemical substances of the body (sodium, potassium, sugar, and many others)
- Pressures in the circulation, lungs, and perhaps even the brain
- Presence of germs (bacteria, fungi) causing infection in body systems (lungs, blood, urine)

This intensive monitoring usually takes place in an intensive care unit (ICU) or critical care unit (CCU) and requires:

- Specialized physicians, such as cardiologists, intensivists, and surgeons
- Highly-skilled nursing care, often one nurse per patient around-the-clock
- Extensive support staff, such as respiratory therapists, laboratory technicians, radiology technicians, dieticians, and pharmacists
- Constant measurement of basics such as pulse, heart rhythm, and oxygen level in the blood
- Frequent inspection of the patient's alertness, color, and level of pain

- Use of catheters in the veins and arteries to withdraw blood samples and measure pressures in the circulation
- Use of tubes in the bladder (Foley catheter), stomach (nasogastric tube), and other body cavities
- Frequent laboratory tests on blood, urine, drainage from **wounds,** and other body specimens
- X-ray, ultrasound, computerized tomography (CT), and other imaging procedures
- Electrocardiograms

The treatments of life support include:

- Oxygen
- Intravenous fluids with sugar and basic salts
- Drugs to improve circulation and other body functions
- Antibiotics
- Transfusions
- Surgery
- Nutritional supplements by vein or stomach tube
- Tubes in body cavities (chest or abdomen) to relieve fluid buildup
- Dialysis
- Pacemaker
- Electrical defibrillation
- Various machines to assist heart or lung function
- Transplantation of organs or mechanical substitutes (artificial heart)
- Sedation or even temporary **paralysis** to enable the patient to tolerate these procedures

Preparation

The need for life support may arise suddenly and with little warning. All people should discuss in advance with family and doctor their wishes for the use of life support should a medical crisis develop. The doctor will note the preferences in the patient's record. Patients should sign documents such as an Advance Directive and Durable Power of Attorney for Health Care to express their wishes and designate a surrogate decision-maker in case of incapacitation.

Physicians and medical care providers must anticipate the possibility that a patient will require life support, perhaps suddenly. In preparation, doctors and medical staff must:

- Receive training in resuscitation skills

- Monitor patients carefully
- Maintain proper supplies and equipment
- Discuss in advance with patients and patients' families whether or not to begin life support

Aftercare

If a patient survives life support treatments, doctors will cautiously try to wean the patient from the support systems. Being able to breathe adequately without the ventilator is one major hurdle. Patients commonly fail in their first attempts to breathe on their own, often tiring out after a few hours. Thus, the doctor will reconnect the ventilator, give the patient a rest, and try again in a day or two.

As the patient regains organ function, there is less need for monitors, tests, and treatments that require an intensive care setting. The doctor may transfer the patient to a lower level of hospital care, a skilled nursing facility (SNF), or perhaps directly to home. Physical and occupational therapists may help the patient improve strength and endurance. The patient will receive continuing care from the primary doctor and specialists as needed. The patient may require prescription drugs, assist devices, and psychological therapists.

Risks

The risks and consequences of life support are enormous. These risks include:

- Physical dangers
- Emotional suffering
- Financial costs
- Societal discord

The physical dangers of life support encompass all the hazards of the patient's underlying disease and treatments. Among these risks are:

- Permanent damage to the brain, kidneys, and other vital organs caused by poor circulation or low oxygen content of the blood
- Direct damage to organs from use of medical instruments and procedures
- Infections, often with organisms that are highly resistant to antibiotics
- Abnormal blood clots
- Skin ulcers from lying immobilized for long periods
- Extreme pain
- Exposure of medical personnel to communicable diseases

The emotional consequences of life support touch patients, families, and medical caregivers. These repercussions arise from:

- The frightening environment of an ICU
- The need to make life-and-death decisions
- The anger, guilt, and grief that relate to life-threatening illness
- The fact that many lengthy and difficult treatments will end in failure

The financial costs of life support are huge. A single day of life support costs many thousands of dollars. These expenses fall on individual payers, insurance companies, health plans, and governments. All such payers face difficult decisions regarding the allotment of money for such treatment, especially in cases that are likely to be futile.
Society as a whole faces difficult decisions surrounding life support. Some governments have enacted regulations that establish priorities for the spending of health care resources. Patients who do not receive treatment under such rules may feel victimized by society's choices.

CARDIOPULMONARY RESUSCITATION (CPR)

Definition: Cardiopulmonary resuscitation (CPR) is a procedure to support and maintain breathing and circulation for a person who has stopped breathing (respiratory arrest) and/or whose heart has stopped (cardiac arrest).

Purpose: CPR is performed to restore and maintain breathing and circulation and to provide oxygen and blood flow to the heart, brain, and other vital organs. CPR should be performed if a person is unconscious and not breathing. Respiratory and cardiac arrest can be caused by allergic reactions, an ineffective heartbeat, asphyxiation, breathing passages that are blocked, **choking,** drowning, drug reactions or overdoses, electric shock, exposure to cold, severe shock, or trauma. CPR can be performed by trained bystanders or healthcare professionals on infants, children, and adults. It should always be performed by the person on the scene who is most experienced in CPR.

Precautions: CPR should never be performed on a healthy person because it can cause serious injury to a beating heart by interfering with normal heartbeats.

Description: CPR is part of the emergency cardiac care system designed to save lives. Many deaths can be prevented by prompt recognition of the problem and notification of the emergency medical system (EMS), followed by early CPR, **defibrillation** (which delivers a

brief electric shock to the heart in attempt to get the heart to beat normally), and advanced cardiac **life support** measures.

CPR must be performed within four to six minutes after cessation of breathing so as to prevent brain damage or **death.** It is a two-part procedure that involves rescue breathing and external chest compressions. To provide oxygen to a person's lungs, the rescuer administers mouth-to-mouth breaths, then helps circulate blood through the heart to vital organs by external chest compressions. Mouth-to-mouth breathing and external chest compression should be performed together, but if the rescuer is not strong enough to do both, the external chest compressions should be done. This is more effective than no resuscitation attempt, as is CPR that is performed "poorly."

When performed by a bystander, CPR is designed to support and maintain breathing and circulation until emergency medical personnel arrive and take over. When performed by healthcare personnel, it is used in conjunction with other basic and advanced life support measures.

According to the American Heart Association, early CPR and defibrillation combined with early advanced emergency care can increase survival rates for people with a type of abnormal heart beat called **ventricular fibrillation** by as much as 40%. CPR by bystanders may prolong life during deadly ventricular fibrillation, giving emergency medical service personnel time to arrive.
However, many CPR attempts are not ultimately successful in restoring a person to a good quality of life. Often, there is brain damage even if the heart starts beating again. CPR is therefore not generally recommended for the chronically or terminally ill or frail elderly. For these people, it represents a traumatic and not a peaceful end of life.

Each year, CPR helps save thousands of lives in the United States. More than five million Americans annually receive training in CPR through American Heart Association and American Red Cross courses. In addition to courses taught by instructors, the American Heart Association also has an interactive video called Learning System, which is available at more than 500 healthcare institutions. Both organizations teach CPR the same way, but use different terms. These organizations recommend that family members or other people who live with people who are at risk for respiratory or cardiac arrest be trained in CPR. A hand-

held device called a CPR Prompt is available to walk people trained in CPR through the procedure, using American Heart Association guidelines. CPR has been practiced for more than 40 years.

Performing CPR

The basic procedure for CPR is the same for all people, with a few modifications for infants and children to account for their smaller size.

PERFORMING CPR ON AN ADULT. The first step is to call the emergency medical system for help by telephoning 108; then to begin CPR, following these steps:

The rescuer opens a person's airway by placing the head face up, with the forehead tilted back and the chin lifted. The rescuer checks again for breathing (three to five seconds), then begins rescue breathing (mouth-to-mouth artificial respiration), pinching the nostrils shut while holding the chin in the other hand. The rescuer's mouth is placed against the unconscious person's mouth with the lips making a tight seal, then gently exhales for about one to one and a half seconds. The rescuer breaks away for a moment and then repeats. The person's head is repositioned after each mouth-to-mouth breath.If person is not breathing than **Heimlich Maneuver is performed.**

- After two breaths, the rescuer checks the unconscious person's pulse by moving the hand that was under the person's chin to the artery in the neck (carotid artery). If the unconscious person has a heartbeat, the rescuer continues rescue breathing until help arrives or the person begins breathing without assistance. If the unconscious person is breathing, the rescuer turns the person onto his or her side.
- If there is no heartbeat, the rescuer performs chest compressions. The rescuer kneels next to the unconscious person, placing the heel of one hand in the spot on the lower chest where the two halves of the rib cage come together. The rescuer puts one hand on top of the other on the person's chest and interlocks the fingers. The arms are straightened; the rescuer's shoulders are positioned directly above the hands on the unconscious person's chest. The hands are pressed down, using only the palms, so that the person's breastbone sinks in about 1 1/2-2 inches. The rescuer releases pressure without removing the hands, then repeats about 15 times per 10-15 second intervals.

- The rescuer tilts the unconscious person's head and returns to rescue breathing for one or two quick breaths. Then breathing and chest compressions are alternated for one minute before checking for a pulse. If the rescuer finds signs of a heartbeat and breathing, CPR is stopped. If the unconscious person is breathing but has no pulse, the chest compressions are continued. If the unconscious person has a pulse but is not breathing, rescue breathing is continued.
- For children over the age of eight, the rescuer performs CPR exactly as for an adult.

PERFORMING CPR ON AN INFANT OR CHILD UNDER THE AGE OF EIGHT.

The procedures outlined above are followed with these differences:

- The rescuer administers CPR for one minute, then calls for help.
- The rescuer makes a seal around the child's mouth or infant's nose and mouth to give gentle breaths. The rescuer delivers 20 rescue breaths per minute, taking 1 1/2-2 seconds for each breath.
- Chest compressions are given with only one hand for a child and with two or three fingers for an infant. The breastbone is depressed only 1-1 1/2 inch for a child and 1/2-1 inch for an infant, the rescuer gives at least 100 chest compressions per minute.

ONE RESCUER TECHNIQUE

If you are alone, continue chest compression and artificial breathing all by yourself as follows

1. First breathe two consecutive breaths into patient’s mouth followed by Thirty chest compressions.
2. The chest compressions should be at the rate of about 100 per minute.
3. Feel for carotid pulse every 2 minutes
4. Continue CPR till carotid pulsations are felt or help arrives.
5. Simultaneously call for help/ ambulance/ AED

TWO RESCUER TECHNIQUES

If two rescuers are available, one person should provide artificial breathing and the other person cardiac compression.

1. Provide One Artificial breath for every five chest compressions.
2. Chet compression should be at the rate of 100 per minute and should be provided without interruption for artificial breathing.
3. Check for carotid pulse every 2- 3 minutes.
4. Interchange the roles between the two people avery 5- 10 minutes.
5. Check for carotid pulse every 2- 3 minutes.
6. Interchange the roles between the two people every 5-10 mins.
7. Continue CPR till carotid pulsations are felt or help arrives.

New developments in CPR

Methods

CPR training: CPR is being administered while a second rescuer prepares for defibrillation.

In 2010, the American Heart Association and International Liaison Committee on Resuscitation updated their CPR guidelines. The importance of high quality CPR (sufficient rate and depth without excessively ventilating) was emphasized. The order of interventions was changed for all age groups except newborns from airway, breathing, chest compressions (ABC) to chest compressions, airway, breathing (CAB). An exception to this recommendation is for those who are believed to be in a respiratory arrest (drowning, etc.).

Standard

A universal compression to ventilation ratio of 30:2 is recommended (2005 protocol, Press faster and harder) for adult and in children and infant if only a single rescuer is present.at least 2 rescuers are present a ratio of 15:2 is preferred in children and infants. In newborns a rate of 3:1 is recommended unless a cardiac cause is known in which case a 15:2 ratio is reasonable. If an advanced airway such as an endotracheal tube or laryngeal mask airway is in place delivery of respirations should occur without pauses in compressions at a rate of 8-10 per minute.. The recommended order of interventions is chest compressions, airway, breathing or CAB in most situations. With a compression rate of at least 100 per minute in all groups. recommended compression depth in adults and children is about 5 cm (2 inches) and in infants it is 4 cm (1.5 inches.) As of 2010 the Resuscitation Council (UK) still recommends ABC for children.] As it can be difficult to determine the presence or absence of a pulse the pulse check has been removed for lay providers and should not be performed for more than 10 seconds by health care providers. In adults rescuers should use two hands for the chest compressions, while in children they should use one, and with infants two fingers (index and middle fingers).

Compression only

Compression only (hands-only or cardiocerebral resuscitation) CPR is a technique that involves chest compressions without artificial respiration. It is recommended as the method of choice for the untrained rescuer or those who are not proficient as it is easier to perform and instructions are easier to give over the phone. In adults with out-of-hospital cardiac arrest, compression-only CPR by the lay public has a higher success rate than standard CPR.[8] The exceptions are cases of drownings, drug overdose, and arrest in children. Children who receive compression only CPR have the same outcomes as those who received no CPR. The method of delivering chest compressions remains the same, as does the rate (at least 100 per minute). It is hoped that the use of compression only delivery will increase the chances of the lay public delivering CPR.[9] For those with non cardiac arrest and people less than 20 years of age standard CPR is superior to compression only CPR

Aftercare

Emergency medical care is always necessary after successful CPR. Once a person's breathing and heartbeat have been restored, the rescuer should make the person comfortable and stay there until emergency medical personnel arrive. The rescuer can continue to reassure the person that help is coming and talk positively until professionals arrive and take over.

Risks

CPR can cause injury to a person's ribs, liver, lungs, and heart. However, these risks must be accepted if CPR is necessary to save the person's life.

Normal results

In many cases, successful CPR results in restoration of consciousness and life. Barring other injuries, a revived person usually returns to normal functions within a few hours of being revived.

Precautions

There are certain important precautions for rescuers to remember in order to protect the victim and get the best result from CPR. These include:

- Do not leave the victim alone.
- Do not give chest compressions if the victim has a pulse. Chest compression when there is normal circulation could cause the heart to stop beating.
- Do not give the victim anything to eat or drink.
- Avoid moving the victim's head or neck if spinal injury is a possibility. The person should be left as found if breathing freely. To check for breathing when spinal injury is suspected, the rescuer should only listen for breath by the victim's mouth and watch the chest for movement.
- Do not slap the victim's face, or throw water on the face, to try and revive the person.
- Do not place a pillow under the victim's head.

The description above is not a substitute for CPR training and is not intended to be followed as a procedure.

Prevention

Loss of consciousness is an emergency that is potentially life threatening. To avoid loss of consciousness and protect themselves from emergency situations, people at risk can follow these general guidelines:

- People with known conditions or diseases, such as diabetes or epilepsy, should wear a medical alert tag or bracelet.
- People with diabetes should avoid situations that will lower their blood sugar level.
- People who feel weak, become dizzy or light-headed, or have ever fainted, should avoid standing in one place too long without moving.
- People, who feel faint, can lie down or sit with their head lowered between their knees.
- Risk factors that contribute to heart disease should be reduced or eliminated. People can reduce risks if they stop smoking, lower blood pressure and cholesterol, lose weight, and reduce stress.
- Illegal recreational drugs should be avoided.
- Seeing a doctor regularly and being aware of any disease conditions or risk factors can help prevent or complicate illness, as can seeking and following the doctor's advice about diet and exercise.
- Using seat belts and driving carefully can help avoid accidental injury.
- People with poor eyesight or those who have difficulty walking because of disability, injury, or recovery from illness, can use a cane or other assistance device to help them avoid falls and injury.

Defibrillation

Definition

Defibrillation is a process in which an electrical device called a defibrillator sends an electric shock to the heart to stop an arrhythmia resulting in the return of a productive heart rhythm.

Purpose

Defibrillation is performed to correct life-threatening arrhythmias of the heart including ventricular fibrillation and cardiac arrest. In cardiac emergencies it should be performed immediately after identifying that the patient is experiencing an arrhythmia, indicated by lack of pulse and unresponsiveness. If an electrocardiogram is available, the arrhythmia can be displayed visually for additional confirmation. For medical treatment by a physician, in non-life threatening situations, atrial defibrillation can be used to treat atrial fibrillation or flutter.

Precautions

Defibrillation should not be performed on a patient who has a pulse or is alert, as this could cause a lethal heart rhythm disturbance or cardiac arrest. The paddles used in the procedure should not be placed on a woman's breasts or over an internal pacemaker.

Cardiac arrhythmias that prevent the heart from pumping blood to the body can cause irreversible damage to the major organs including the brain and heart. These arrhythmias include ventricular tachycardia, fibrillation, and cardiac arrest. About 10% of the ability to restart the heart is lost with every minute that the heart fibrillates. Death can occur in minutes unless a productive heart rhythm, able to generate a pulse, is restored through defibrillation. Because immediate defibrillation is crucial to the patient's survival, the American Heart Association has called for the integration of defibrillation into an effective emergency cardiac care system. The system should include early access, early **cardiopulmonary resuscitation** , early defibrillation, and early advanced cardiac care.

Defibrillators deliver a brief electric shock to the heart, which enables the heart's natural pacemaker to regain control and establish a productive heart rhythm. The defibrillator is an electronic device that includes defibrillator paddles and electrocardiogram monitoring.

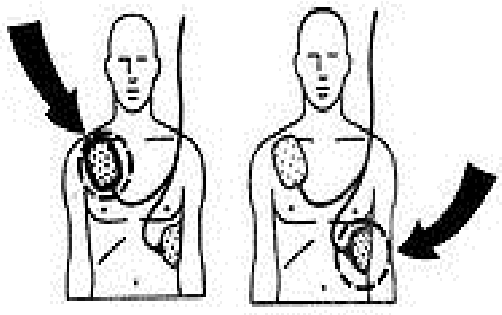
During external defibrillation, the paddles are placed on the patient's chest with a conducting gel ensuring good contact with the skin. When the heart can be visualized directly, during **thoracic surgery**, sterile internal paddles are applied directly to the heart. Direct contact with the patient is discontinued by all caregivers. If additional defibrillation is required the paddles should be repositioned exactly to increase the likelihood of further shocks being effective in stopping the arrhythmia. The patient's pulse and/or electrocardiogram are continually monitored when defibrillation is not in progress. Medications to treat possible causes of the abnormal heart rhythm may be administered. Defibrillation continues until the patient's condition stabilizes or the procedure is ordered to be discontinued.

Early defibrillators, about the size and weight of a car battery, were used primarily in ambulances and hospitals. The American Heart Association now advocates public access defibrillation; this calls for placing automated external defibrillators (AEDS) in police vehicles, airplanes, and at public events, etc. The AEDS are smaller, lighter, less expensive, and easier to use than the early defibrillators. They are computerized to provide simple, verbal instructions to the operator and to make it impossible to deliver a shock to a patient

whose heart is not fibrillating. The placement of AEDs is likely to expand to many public locations.

Preparation

Once a patient is found in cardiac distress, without a pulse and non-responsive, and help is summoned, cardiopulmonary resuscitation (CPR) is begun and continued until the caregivers arrive and are able to provide defibrillation. Electrocardiogram leads are attached to the patient chest. Gel or paste is applied to the defibrillator paddles, or two gel pads are placed on the patient's chest. The caregivers verify lack of a pulse while visualizing the electrocardiogram, assure contact with the patient is discontinued, and deliver the electrical charge.



Anterio-apical placement of external defibrillator electrodes (When defibrillation is unsuccessful, anterior-posterior placement is also sometimes attempted)

Resuscitation electrodes are placed according to one of two schemes. The anterior-posterior scheme (conf. image) is the preferred scheme for long-term electrode placement. One electrode is placed over the left pericardium (the lower part of the chest, in front of the heart). The other electrode is placed on the back, behind the heart in the region between the scapula. This placement is preferred because it is best for non-invasive pacing.

The anterior-apex scheme can be used when the anterior-posterior scheme is inconvenient or unnecessary. In this scheme, the anterior electrode is placed on the right, below the clavicle. The apex electrode is applied to the left side of the patient, just below and to the left of the pectoral muscle. This scheme works well for defibrillation and cardioversion, as well as for monitoring an ECG.

The average AED or other defibrillator delivers it's shock at around 4kV within milliseconds . (120 – 200 joules) There are two types of outputs- Monphasic and Bi-phasic. Metal items that are close to the defib's contacts can cause burns (jewelery) as well as redirect the energy so that it's less effective .You should only really worry if the metal is within 2"-3" of the electrode. However don't waste time removing jewelery if it takes more than 5-10sec. The success rate of defibrillation drops ~10%/minute after arrest.

Atrial defibrillation is a treatment option that will be ordered for treatment of atrial fibrillation or flutter. The electrocardiogram will be monitored throughout the procedure. The paddles are placed on the patients' chest with conducting gel to ensure good contact between the paddles and skin. If the heart can be visualized directly during thoracic surgery, the paddles will be applied directly to the heart. The defibrillator is programmed to recognize distinct components of the electrocardiogram and will only fire the electrical shock at the correct time. Again, all direct contact with the patient is discontinued prior to defibrillation.

Aftercare

After defibrillation, the patient's cardiac status, breathing, and **vital signs** are monitored with a **cardiac monitor** . Additional tests to measure cardiac damage will be performed, which can include a 12 lead electrocardiogram, a chest x-ray, and **cardiac catheterization**. Treatment options will be determined from the outcome of these procedures. The patient's skin is cleansed to remove gel and, if necessary, electrical burns are treated.

Risks

Skin burns from the defibrillator paddles are the most common complication of defibrillation. Other risks include injury to the heart muscle, abnormal heart rhythms, and blood clots.

Jump to: navigation, search

The **precordial thump** is a medical procedure that used to be used by healthcare professionals in the initial response to a witnessed ventricular fibrillation or ventricular tachycardia when no defibrillator is immediately available. The procedure is outside the scope of first-aid treatment for unstable ventricular tachycardia, preventing ventricular fibrillation, and requires, at minimum, training in advanced cardiac life support (ACLS). The precordial thump may be considered for patients with witnessed, monitored, unstable

ventricular tachycardia including pulseless VT if a defibrillator is not immediately ready for use (Class IIb, LOE C), but it should not delay CPR and shock delivery.[1]

To perform a precordial thump, a highly trained provider strikes a single, very carefully aimed blow with the fist to the center of the patient's sternum. The intent is to interrupt a potentially-life threatening rhythm, should one be developing. The thump is thought to produce an electrical depolarization of 2 to 5 joules. However, it is effective only if used at the onset of ventricular fibrillation or pulseless ventricular tachycardia, and so should be used only when the arrest is witnessed or monitored. About 25% of patients in cardiac arrest who received a thump on the precordium regained cardiac function (Scherf and Bornemann, 1960); there is no evidence that the precordial thump improves recovery in unwitnessed cardiac arrest.

Do Not Resuscitate

When it was first introduced in the early 1960s, CPR was a heroic, life-sustaining act. It was a technique used on only a select group of acutely ill but otherwise relatively healthy patients. By the end of the following decade, however, CPR had become a routine intervention for all patients facing imminent death. With this widespread use of CPR came a growing recognition that it was neither effective nor desirable for some patients. For example, patients with aggressive cancer or serious infection had almost no chance of recovery after CPR. Other patients who did survive after CPR often ended up with brain damage or permanent disabilities. At the same time that poor outcomes from CPR were being recognized, patients were demanding to be more involved in medical decisions. The result was the institution of DNR orders.

Participation in the DNR Decision

An ongoing debate about DNR has involved the extent to which patients or their surrogate decision makers must agree to such orders. Through the late 1970s and early 1980s, some hospitals routinely created DNR orders without any discussion with the patient or the patient's family, and they did not clearly document the DNR order in the patient's chart. But these practices were abandoned as the bioethics movement and the courts emphasized the right of patients or their surrogate decision makers to refuse medical treatment, including life-sustaining therapies such as CPR. Most health care providers and well-recognized health

professional groups and accrediting bodies began to support DNR policies that require the patient to be informed of the risks and benefits of CPR and to give consent that CPR not be used. Some well-respected physician ethicists and medical groups, however, advocate that physicians should have the ability to write DNR orders without a patient's consent in situations in which it has been determined that CPR would have no medical benefit.

Communication and Knowledge about CPR and DNR Orders

Despite policies that require consent to a DNR order, informed discussions between patients and physicians about CPR and other life-sustaining treatments occur infrequently. Only about one patient in seven reports having discussed personal preferences for life-sustaining treatment with a physician. Even when patients have life-threatening illnesses such as AIDS, cancer, and congestive heart failure, such discussions occurred less than 40 percent of the time in some studies. In many cases, the decision about a DNR order is broached only after extensive procedures have been attempted and at a time when patients are no longer capable of making an informed decision.

This lack of communication contributes to three concerns. First, many people have unrealistic expectations about the likely success of CPR. When CPR was first described in 1960, it referred to heart massage by the exertion of pressure on the chest. The success rate of 70 percent survival to hospital discharge was quite high, largely because it was applied to a small group of patients who experienced a cardiac arrest in the operating room or postoperative recovery rooms. By the early twenty-first century, CPR included not only heart compression and mouth-to-mouth resuscitation but also a host of advanced supports such as electrical defibrillation paddles, powerful drugs, and an assortment of mechanical breathing devices. This range of interventions is generally referred to as a "code" in which a special team responds to resuscitate a patient. But success rates are nowhere near those reported in original studies.

Research in the 1980s and 1990s showed that for all patients undergoing CPR in the hospital, just under one-half survived the code itself and one-third survived for twenty-four hours. Approximately 15 percent of patients undergoing CPR in the hospital survived to discharge. About 30 percent of those who survived suffered a significant increase in dependence and required extensive home care or institutionalization. Survival to discharge from the hospital

was much poorer when certain diseases or conditions were present. In some studies, for example, no patients with metastatic cancer and only 3 percent of patients with sepsis (a widespread infection) survived to discharge. Outcomes in some studies of frail, elderly patients in long-term care facilities showed survival rates of 5 percent or less, prompting some health care providers to suggest that CPR should not even be offered to residents of nursing homes and other long-term care facilities.

The general public, however, often has an overly positive impression about the success rates of CPR. As portrayed on popular television medical shows, CPR is much more effective than in real life. According to one study, two-thirds of CPR patients survive on television, a much higher percentage than any published medical study. The same study reported that on television only 17 percent of patients getting CPR were elderly. In reality cardiac arrest is much more common in older people than in any other age group. Furthermore, three-quarters of cases of cardiac arrest on television resulted from accidents, stabbings, lightning strikes, and other injuries, whereas in the real world 75 percent or more of cardiac arrests were triggered by underlying heart disease.

Knowledge about the outcomes of CPR is especially important because it has been shown to affect preferences for care. Surveys have shown that as many as 90 percent of elderly outpatients and a range of 44 to 88 percent of hospitalized elderly desire to have CPR in the event of a cardiac arrest. Even when elderly patients were asked whether they wanted CPR if they had a serious disability, 20 to 45 percent said they would. Clinicians at one geriatric practice asked patients about their preferences for CPR if they were acutely ill and if they were chronically ill. These patients were then educated about the probability of surviving to discharge under these conditions. Once they were given prognostic information, preferences for CPR dropped nearly 50 percent.

A second area of concern is that the lack of communication about CPR results in common misunderstandings about DNR orders. Many patients believe incorrectly that having a living will or other type of written advance directive automatically means that a patient will have a DNR order written. Instead, while an advance directive may express a patient's desire to have a DNR order written under certain circumstances, DNR orders—like all medical orders—must be authorized by a physician who is treating the patient. Also, some patients assume that a DNR order directs that all medical treatments be stopped and only comfort care provided.

In some circumstances, however, other aggressive therapies—including staying in an intensive care unit—are continued for patients with DNR orders.

Moreover, there are circumstances in which restricted or limited DNR orders are appropriate. For example, if it is determined that further attempts at CPR would not benefit a patient who is on a ventilator or a breathing machine, then an order might be written not to give cardio active medications should a cardiac or pulmonary arrest occur. On the other hand, it might also be determined that a patient would want cardio active medications and chest compressions but would not want to be intubated and put on a breathing machine. Because there are multiple options, it is essential that physicians thoroughly discuss DNR options with patients or their surrogate decision makers and that decision are carefully documented in the patient's medical record.

Third, the lack of genuine communication means that physicians are often unfamiliar with patients' preferences about CPR and must rely on family members to help decide whether a DNR order is appropriate. Family members, however, also are very poor predictors of what patients would actually want, answering wrongly up to 40 or 50 percent of the time in some scenarios. Uncertainty about patient wishes concerning CPR also mean that decisions about DNR orders are often delayed until the patient is near death.

A major, multihospital, longitudinal study of these issues focusing on more than 9,000 patients— the Study to Understand Prognosis and Preferences for Outcomes and Treatment (SUPPORT) —discovered that 79 percent of the patients who died in the hospital had a DNR order but that almost half of these orders had been written in the last two days before death. Almost 40 percent of these patients had spent at least ten days in the intensive care unit, and, of those able to communicate, more than half were in moderate or severe pain at least half of the time in their final days. About one-third of the patients expressed a desire not to be resuscitated, but less than half of their physicians understood this desire.

Other Issues

An issue of special concern involves the patient with a DNR order who needs to have surgery or some other medical intervention that requires the use of anaesthesia or other agents that affect resuscitation. At some hospitals, it is institutional policy to automatically suspend a DNR order while a patient is undergoing procedures that may require resuscitative measures. The rationale for such policies is that if the procedure requires a patient to be artificially

resuscitated through the use of a ventilator or chemical agents, then a DNR order would be illogical. Some hospitals, however, forbid the practice of automatically suspending a DNR order during surgery. Rather, they require the need for resuscitative measures during surgery or other procedures be discussed with the patient and that agreed-upon circumstances for using or not using resuscitative measures be put in writing.

Some states have authorized the use of "durable" DNR orders. Such orders can travel with the patient and can be recognized by a wide range of health care personnel at different facilities and at the patient's home. Durable DNR orders eliminate the problem of patients needing to have a DNR order written each time they enter a health care facility and mean that patients at home can have their DNR wishes honoured by emergency services personnel.

Heimlich Manoeuvre

Definition

The Heimlich manoeuvre is an emergency procedure for removing a foreign object lodged in the airway that is preventing a person from breathing.

The Heimlich manoeuvre is used mainly when solid material like food, coins, vomit, or small toys are blocking the airway. There has been some controversy about whether the Heimlich maneuver is appropriate to use routinely on **near-drowning** victims. After several studies of the effectiveness of the Heimlich manoeuvre on re-establishing breathing in near-drowning victims, the American Red Cross and the American Heart Association both recommend that the Heimlich maneuver be used only as a last resort after traditional airway clearance techniques and **cardiopulmonary resuscitation (CPR)** have been tried repeatedly and failed or if it is clear that a solid foreign object is blocking the airway.

Precautions

Incorrect application of the Heimlich manoeuvre can damage the chest, ribs, and internal organs of the person on whom it is performed. People may also vomit after being treated with the Heimlich manoeuvre.

Description

The Heimlich manoeuvre can be performed on all people. Modifications are necessary if the **choking** victim is very obese, pregnant, a child, or an infant.

Indications that a person's airway is blocked include:

- The person cannot speak or cry out.
- The person's face turns blue from lack of oxygen.
- The person desperately grabs at his or her throat.
- The person has a weak **cough,** and labored breathing produces a high-pitched noise.
- The person does all of the above, then becomes unconscious.

Performing the Heimlich manoeuvre on adults

To perform the Heimlich manoeuvre on a conscious adult, the rescuer stands behind the victim. The victim may either be sitting or standing. The rescuer makes a fist with one hand, and places it, thumb toward the victim, below the rib cage and above the waist. The rescuer encircles the victim's waist, placing his other hand on top of the fist.

In a series of 6-10 sharp and distinct thrusts upward and inward, the rescue attempts to develop enough pressure to force the foreign object back up the trachea. If the manoeuvre fails, it is repeated. It is important not to give up if the first attempt fails. As the victim is deprived of oxygen, the muscles of the trachea relax slightly. Because of this loosening, it is possible that the foreign object may be expelled on a second or third attempt.

If the victim is unconscious, the rescuer should lay him or her on the floor, bend the chin forward, make sure the tongue is not blocking the airway, and feel in the mouth for **foreign objects,** being careful not to push any farther into the airway. The rescuer kneels astride the victim's thighs and places his fists between the bottom of the victim's breastbone and the navel. The rescuer then executes a series of 6-10 sharp compressions by pushing inward and upward.

After the abdominal thrusts, the rescuer repeats the process of lifting the chin, moving the tongue, feeling for and possibly removing the foreign material. If the airway is not clear, the rescuer repeats the abdominal thrusts as often as necessary. If the foreign object has been removed, but the victim is not breathing, the rescuer starts **CPR.**

Performing the Heimlich maneuver under special circumstances

OBVIOUSLY PREGNANT AND VERY OBESE PEOPLE: The main difference in performing the Heimlich maneuver on this group of people is in the placement of the fists. Instead of using abdominal thrusts, chest thrusts are used. The fists are placed against the middle of the breastbone, and the motion of the chest thrust is in and downward, rather than upward. If the victim is unconscious, the chest thrusts are similar to those used in CPR.

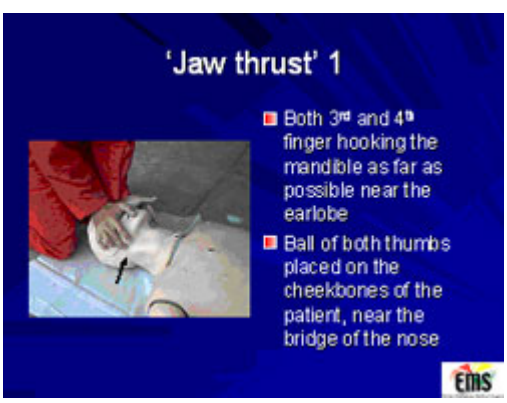
CHILDREN: The technique in children over one year of age is the same as in adults, except that the amount of force used is less than that used with adults in order to avoid damaging the child's ribs, breastbone, and internal organs.

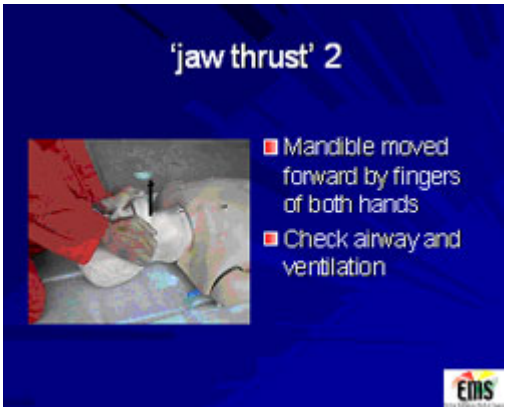
INFANTS UNDER ONE YEAR OLD: The rescuer sits down and lays the infant along his or her forearm with the infant's face pointed toward the floor. The rescuer's hand supports the infant's head, and his or her forearm rests on his or her own thigh for additional support. Using the heel of the other hand, the rescuer administers four or five rapid blows to the infant's back between the shoulder blades.

After administering the back blows, the rescuer sandwiches the infant between his or her arms, and turns the infant over so that the infant is lying face up supported by the opposite arm. Using the free hand, the rescuer places the index and middle finger on the centre of the breastbone and makes four sharp chest thrusts. This series of back blows and chest thrusts is alternated until the foreign object is expelled.

SELF-ADMINISTRATION OF THE HEIMLICH MANEUVER. To apply the Heimlich maneuver to oneself, one should make a fist with one hand and place it in the middle of the body at a spot above the navel and below the breastbone, then grasp the fist with the other hand and push sharply inward and upward. If this fails, the victim should press the upper abdomen over the back of a chair, edge of a table, porch railing or something similar, and thrust up and inward until the object is dislodged..

Esmarch's maneuver : opens the airway by tilting the head backward, retracting the patient's lower lip (with the rescuer's thumbs) and by forceful forward displacement of the mandible (triple airway maneuver). In a trauma situation where head tilt is not possible for reason of possible c-spine injury, only the jaw thrust maneuver and retraction of the lower lip is possible. With the Esmarch's maneuver it is possible to open the airway, even when the patient is posturing or has convulsions, if performed properly.





By this means, it is possible to maintain an open airway, even in difficult conditions, awaiting further, higher-level support.

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BASIC LIFE SUPPORT PROCEDURES




VANANCHAL DENTAL COLLEGE & HOSPITAL

BASIC LIFE SUPPORT COURSE (BLS)

HANDS ON COURSE

VENUE:
VANANCHAL DENTAL COLLEGE & HOSPITAL PREMISES

TIMING:
08:00 am to 01:00 pm

CERTIFICATE COURSE

RUN UNDER VANANCHAL EDUCATION AND WELFARE TRUST
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Principal
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