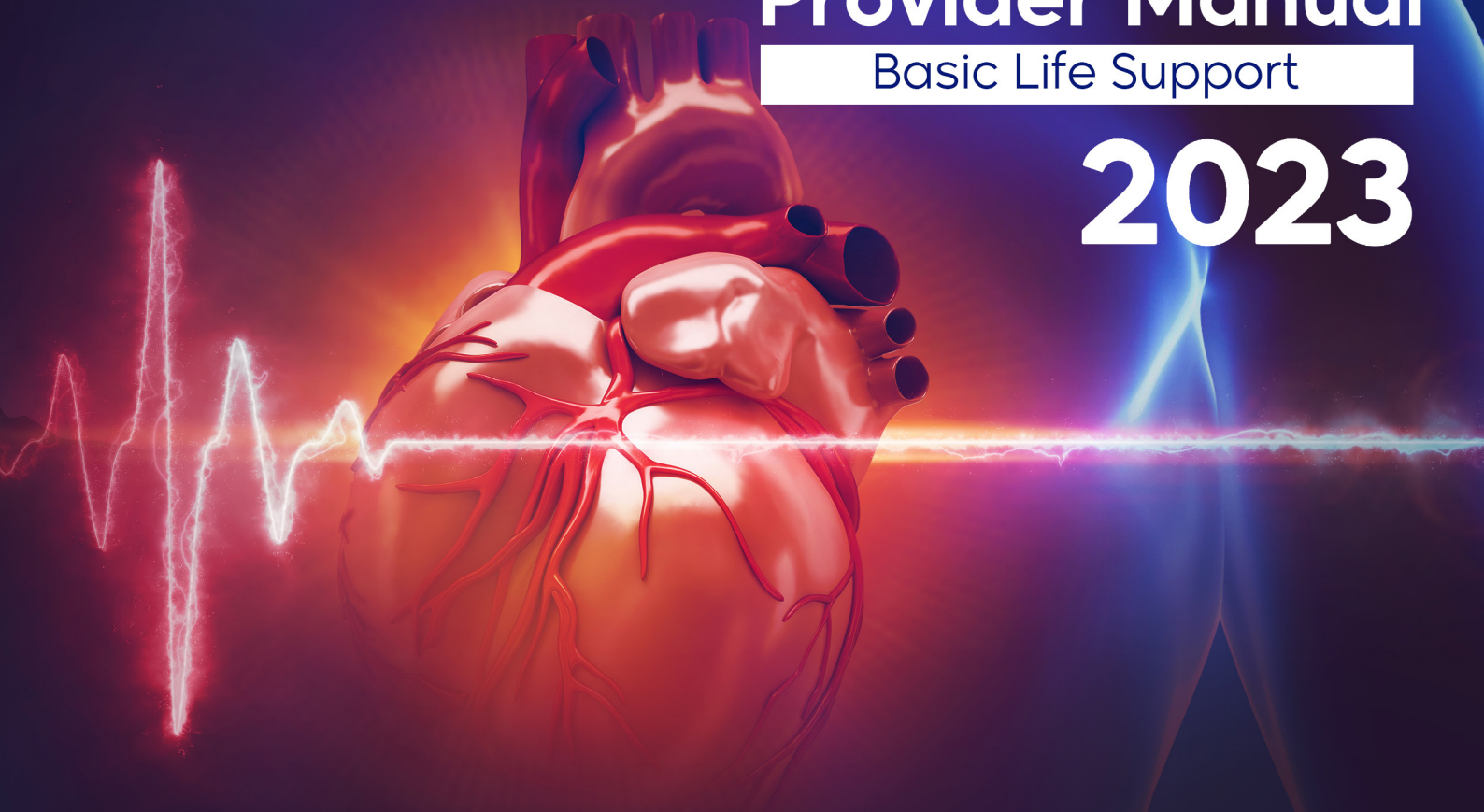
جمعية القلب السعودية
Saudi Heart Association
National Life Support Committee

BLS

SHA BLS Provider Manual

Basic Life Support

2023



SHA Basic life Support Provider Course
"SHA BLS Provider Course"

Preface

This course is intended to all healthcare professionals and community members who are involved in the care of cardiac and respiratory arrest either out of hospital or in hospital cardiac or respiratory arrest victims. The attendee of this course will learn how to perform CPR and other basic cardiovascular life support skills in a wide variety of in-hospital facility and prehospital settings.

This course is composed of nine chapters, for each chapter, the learning objectives are specified and the most important elements are reviewed. The content of this material is dedicated for the SHA BLS course, it is a summary of the latest evidences in the literature. For further details you can refer to the references indicated in the last chapter.

Acknowledgements

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Saudi Heart Association Basic Life Support (SHA BLS Provider Manual 2023

LIST OF CONTENTS

Course Overview

Course overview

Course Goal

The Goal of the Saudi Heart Association Basic Life Support for Healthcare Providers course (SHA BLS) is to ensure that all public safety professionals and healthcare providers have the essential and adequate knowledge and skills to respond to victims who are experiencing respiratory, cardiac arrest and choking.

This includes providing high-quality care integrating cognitive and psychomotor skills with the skills of critical thinking, problem solving and team dynamics to improve the chance of survival.

Course Objectives

This manual aims to provide the target participants the knowledge and skills as following:

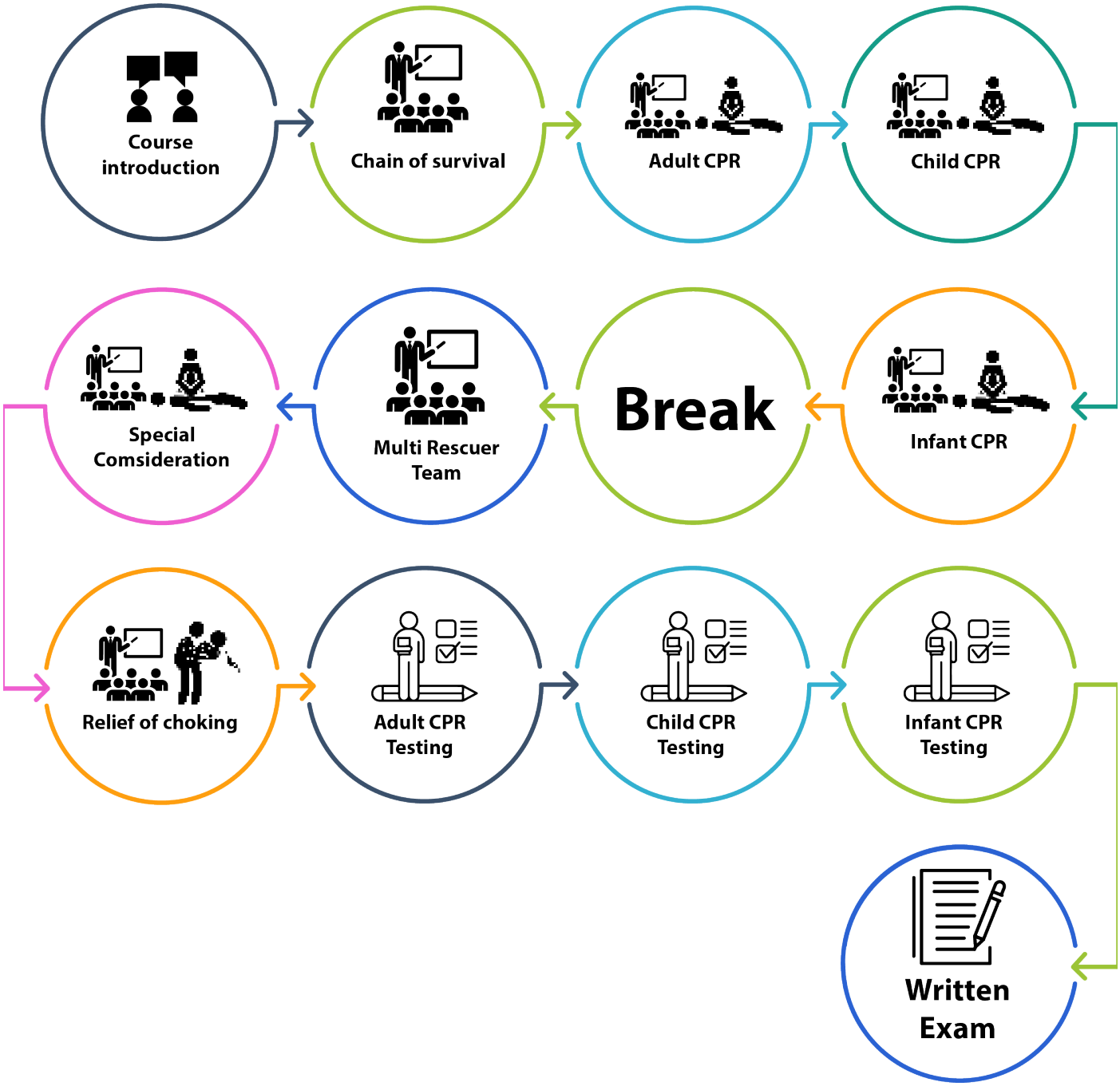
- Recognize the importance of Basic life support training.
- Describe the importance of high-quality CPR and its impact on chain of survival either in hospital or out of hospital cardiac arrest.
- Overview of anatomy and physiology of cardiopulmonary system.
- Recognize the signs of cardiac arrest, respiratory arrest and choking.
- How to Perform high-quality CPR for adults, children and infants.
- Recognize the differences of CPR skills between single or multiple rescuers for adults, children and infants.
- Describe the importance of early use of an AED and how to operate it.
- Describe the components of resuscitation team (members, roles and responsibilities and team dynamics).
- Describe the technique for relief of foreign-body airway obstruction (choking) for adults and infants.

Course Description

To help you achieve these objectives, the Saudi BLS Provider Course includes

- Pre-course Textbook.
- Didactic lectures.
- Skills station.

BLS Provider Course Agenda



Chapter 1

In Hospital and Out of Hospital Cardiac Arrest

Course Introduction

Basic Life Support (BLS) refers to a basic knowledge and skills that can be learnt to improve the chance of survival in life-threatening situations either in hospital or out of hospital situations for all age groups.

People can be certified in basic life support protocols regardless of their profession and backgrounds. BLS guidelines are frequently updated every 5 years, and certified BLS participants need to refresh their knowledge every two years.

This manual is designed for both healthcare and non-healthcare individuals. The content in this handbook is in compliance with the 2020 guidelines released by the ILCOR – therefore, all the protocols illustrated here are based on up-to-date evidence."

Cardiac arrest (CA) is considered a worldwide health issue despite all prevention and treatment efforts. Around 436,852 deaths occurred in 2020 from out of hospital cardiac arrest OHCA (90% mortality) in the USA.

Based on 2021 US data, around (73.4%) of adult Out of Hospital Cardiac Arrests (OHCA) occur at a home or residence . Public settings (16.3%) and nursing homes (10.3%) were the second and third most common locations of adult OHCA.

Cardiac Arrest (CA) is the third leading cause of death in Europe. Many efforts have been made to understand the underlying causes, prevalence and incidence of In Hospital Cardiac Arrest (IHCA) and Out of Hospital Cardiac Arrest (OHCA), the survival rate in IHCA and OHCA and the factors that affected the survival rates.

CA is defined as a failure of the mechanical and electrical system of the heart characterized by absence of pulse and breathing or gasping breath all combined with loss of consciousness.

The causes of CA can be originated from a cardiac or noncardiac insult. The main risk factors for CA of cardiac etiology are diabetes mellitus, history of cardiovascular disorders and dyslipidemia. For CA of noncardiac etiology, the main risk factors are hypertension and obesity, while smoking is a risk factor of SCA in general.

Heart and lungs are the two key organs of the body that are essential to survival. Right side of the heart receives blood from the rest of the body, and pumps it into the lungs. Lungs purify the blood by removing carbon dioxide and adding oxygen into the blood. The pure blood returns from the lungs to the left side of the heart, which then pumps it to the rest of the body. The oxygen that blood delivers is essential for functioning of various parts of the body (Figure 1.1).

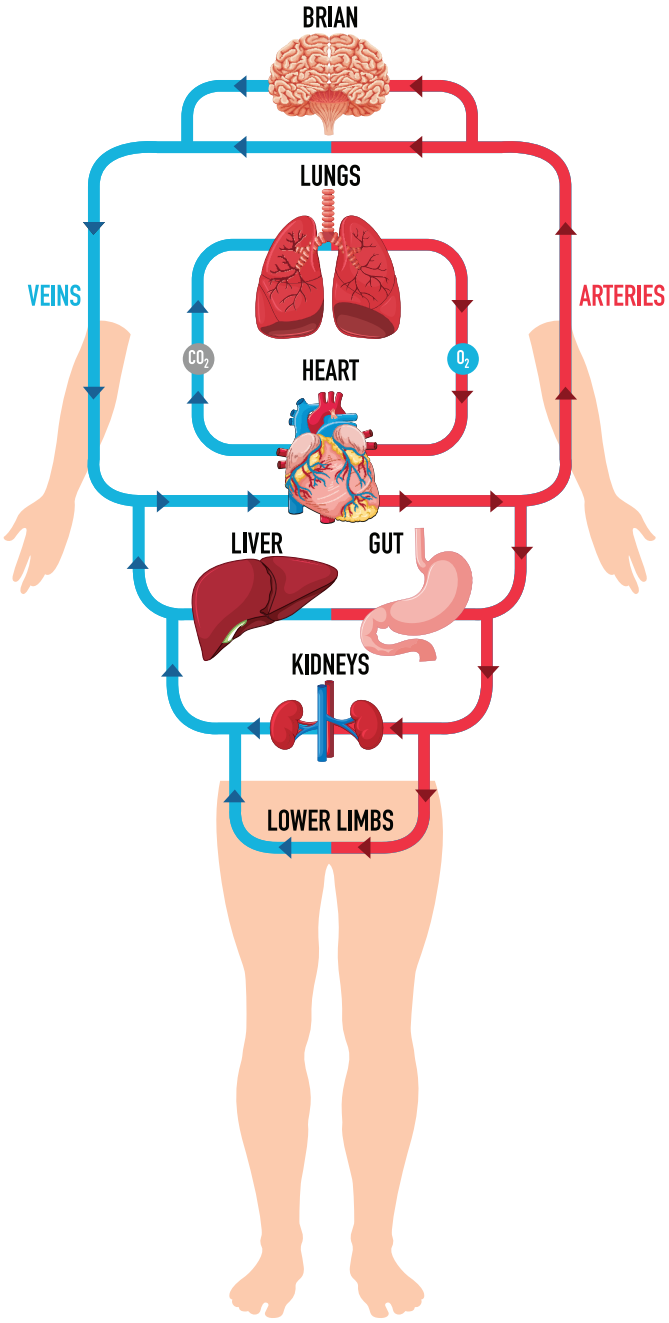


Figure 1.1 Cardiopulmonary System

When the heart stops, blood flow stops, and the person quickly becomes unconscious. Without blood flow, the heart and the brain quickly become damaged due to lack of oxygen. The actions that make up BLS try to prevent or slow the damage until the cause of the problem can be corrected. BLS improves a person's chance of surviving until advanced care becomes available.

However, sometimes, respiratory arrest can occur even when the heart is still functioning. This can occur due to nerve or neuromuscular disorders, and drugs that inhibit respiratory drive (e.g., Opioids). It can also occur secondary to trauma, which may produce a crush injury to the chest or cause upper or lower airway obstruction.
Airway obstruction closely related to respiratory arrest. While in respiratory arrest, the physiological act of breathing ceases, in airway obstruction, there is an anatomical (or physical) obstruction to the flow of air. This could be at any level from the nose, pharynx, larynx, or lower air passages."

Basic Life Support attempts to stimulate the body to continue the heart-lung cycle. This is achieved through two key mechanisms:
Cardiopulmonary resuscitation (CPR) aims at activating both the heart and the lungs. Heart is stimulated externally through chest compressions, while lungs are stimulated through rescue breathing. CPR involves a combination of both these procedures in a standard, regulated manner.

Choking blocks the upper airway, and could be relieved through CPR. Procedures that relieve choking basically attempt to dislodge the obstruction in the upper airway, and expel the obstruction through the mouth. Relief of choking is different from conventional CPR and is hence dealt with in a separate chapter. circulation (that is, the heart could start to beat again on its own), advanced methods of life support must take over as soon as possible. These can be provided by certified healthcare professionals. Therefore, before beginning BLS, or as soon as BLS is started, the rescuer must ensure that emergency medical services are being notified.

From 2003 to 2007, the estimated incidence of IHCA in the United States was approximately 6-7 cardiac arrests per 1,000 hospital admissions. Data also from the Get With The Guidelines-Resuscitation Registry from 2017 was used to estimate percentage survival to hospital discharge of 25%.

The annual incidence of IHCA in Europe is between 1.5 and 2.8 per 1,000 hospital admissions. Factors associated with survival are the initial rhythm, the place of arrest and the degree of monitoring at the time of collapse. Survival rates at 30 days / hospital discharge range from 15% to 34%.

Data from the UK National Cardiac Arrest Audit (NCAA) and from the Danish In-Hospital Cardiac Arrest Registry (DANARREST) both document lower incidences of IHCA (1.6 and 1.8 per 1,000 hospital admissions respectively) compared with the United States. Outside of Europe, multiple studies of OHCA incidence and outcome have been published reporting survival rates between 36% in Asia, 11% in USA and 12% in Australia and New Zealand. While some of the variation observed between these studies is because of

patient, area and country-level differences, there are calculation and categorization differences which add to the degree of variation.

Survival rate of IHCA or OHCA varies and these variations may arise from differences in:

- Collecting data (e.g. case definition, ascertainment methods and outcome verification).
- Demographic data (age, socioeconomic status, comorbidities).
- Structure (e.g. different types of emergency medical services (EMS) systems or differences in the organization of teams responding to IHCA.
- Use of community responder schemes and process of care (e.g. EMS response time, time to defibrillation, post resuscitation care).
- Differences in the quality of treatment provided by individual practitioners (e.g. quality of CPR, interventions provided, decisions about when to start and stop resuscitation).

According to 2021 US data for adult OHCA only, survival to hospital discharge was 9.1% for all EMS-treated non-traumatic OHCA cardiac arrests. Bystander witnessed adult arrests had a 13.3% survival to hospital discharge and 9-1-1 responder witnessed arrests had a 15.9% survival to hospital discharge.

Locally, 74% of cardiac arrest happens at home where the family members are almost in the scene before the arrival of emergency medical services and this leads to decrease the chance of survival.

Cardiopulmonary resuscitation (CPR) is a cornerstone of initial care. The quality of delivered CPR improves the survival rate from cardiac arrest, especially when the incident happens out of the hospital.
The survival rate depends entirely on the skills and knowledge of bystanders in terms of recognition, EMS activation and performing high quality CPR.

Building up an awareness programme for the public regarding performing CPR, using AED in addition to recognition arrest and EMS activation will be associated with improvement of OHCA cervical rate.
A different of studies conducted in different community setting to evaluate the public CPR related knowledge, skills and training to whom not involved in health care, one of these studies conducted in Jeddah and concluded that 28.7% of study sample received CPR training in comparison to 25.6 % in china, 29 % in Jordan, 40.7 % in Izmir and 55.7 % in Australia.

While the highest CPR training were reported in Canada 64% and Germany 83.2%, countries where there are various efforts to increase CPR training. Furthermore, numerous countries have linked driver license applications with mandatory Basic Life Support (BLS) training courses, as in Slovenia and Japan. However, there are a variety of barriers associated with performing CPR; knowledge deficit and decreased level of confidence, a fear of harming the victim, and legal issues make public respondents less likely to perform CPR on a stranger. With respect to a family member, 94.2% are willing to perform CPR .

In Riyadh City, there is little data regarding public CPR related knowledge and skills, with most of the published studies focusing on different groups of medical and non-medical populations.

ALjerian, N. study highlighted the deficiency of CPR related knowledge and skills among individuals in Riyadh City who were not involved in health care which may have an impact on individuals' ability to act in the case of SCA. Therefore, the Authorities efforts coordination should be considered to implement a solid well structured strategy aiming to increase public awareness, knowledge and skills of CPR which can be achieved by increasing public accessibility to CPR courses, incorporating BLS courses into educational materials, and regular hands on sessions for the public.

The Chain of Survival

The chain of survival is a series of events that must be followed by bystanders and first responders to increase the victim's chance of survival in case of cardiac arrest (figure 1.2). These events can help in improving victims heart artificially beating and increase the blood flood to vital organs especially the heart which can restore heart rhythmicity.

Each link in the chain of survival has been designed to make sure you have some guidance on what to do next. Learn the sequence and save lives.

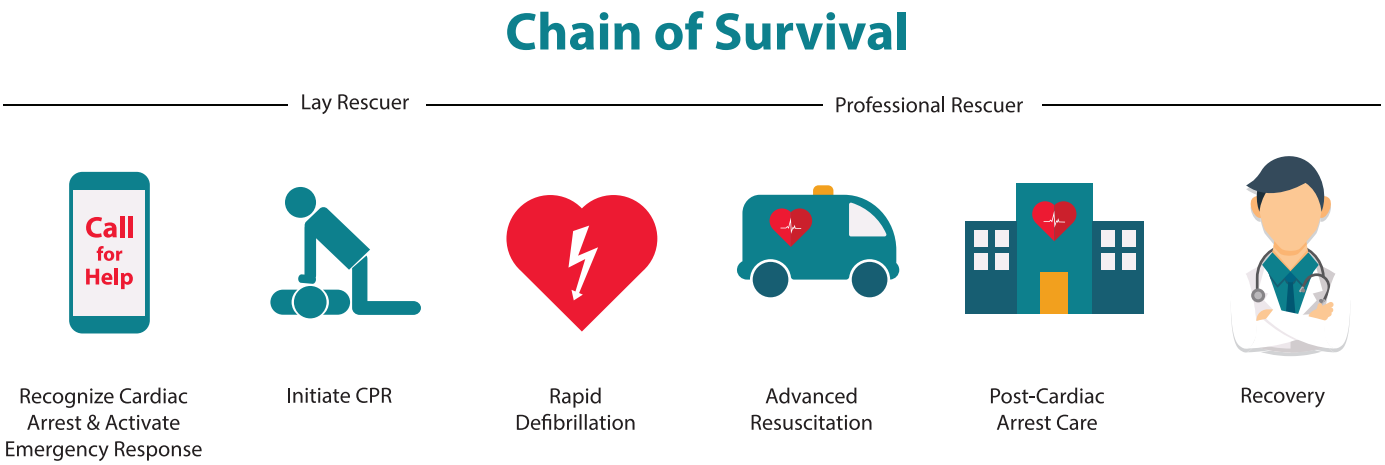


Figure 1.2 Chain of survival links

If one of these events are done incorrectly or missed; the chance of survival will be decreased which reinforces the statement that a chain is only as strong as its weakest link. Cardiac arrest recognition is a cornerstone of initiating CPR, administering defibrillation, and activating more advanced emergency response.

The Chain of Survival Events

The first people who offered help to victims who suddenly cardiac arrest, are called bystanders with no medical training. Even without training, bystanders can save victims' lives from cardiac arrest. In fact, bystanders who respond to a cardiac arrest can make the difference in whether a person survives or not.

in the recent study of CDC between 70-90% of cardiac arrest victims die before they reach the hospital, everyone should become familiar with the chain of survival, which lays out the steps that bystanders need to take to help a cardiac arrest victim survive. Anyone can take these simple steps and help save a life.

Every minute is passing after the onset of cardiac arrest matters. If there is no blood flow within three minutes; the brain tissue starts to damage and the chance of survival will be extremely decreased if ten minutes pass after the onset of cardiac arrest, so time is of the essence when a cardiac arrest occurs.
The chain of survival stresses that bystanders do not need any medical training to take these steps. Anyone can initiate the chain of survival and save a life.

Chain of survival – Out of hospital.

A cardiac arrest chain of survival inside the hospital is different from the survival chain if it occurs outside the hospital. You may not have all the resources with you. So, summoning additional help is important in Chain of survival.

Bystanders can help save lives by addressing the first three links in the Chain of Survival. Action steps for bystanders are described below.

1. Immediate recognition of cardiac arrest and activation of the emergency response system
If the victim is unresponsive, has no pulse and not breathing, or breathing abnormally, agonal breathing, or gasping, the victim could be in cardiac arrest. start CPR without waiting for the EMS team to arrive.

Once you identify a victim that needs help, call 997 or 911, activate the on-site emergency response system (e.g., by phone or text), and send someone to retrieve the nearest automated external defibrillator (AED). If the rescuer is alone, should ask for the AED immediately or get it if it is nearby.

2. Early CPR with an emphasis on chest compressions
Minimizing the time between cardiac arrest onset and the first chest compression is the essence of victim's chance of survival (Graham, 2015), provide hands-only or compression-only CPR if the bystander is not trained by pushing hard and fast on the center of the chest at a rate of 100-120 compressions per minute, compress the adult chest at least 2 inches, about 2 inches for children and 1 and half inch in case of infant victims. CPR should continue until an AED is ready for use or EMS providers take over care of the victim.

In the event the bystander is trained and proficient in CPR, he or she should provide 30 compressions followed by two breaths and repeat this cycle until an AED is ready for use or EMS providers take over care of the victim.

In some emergency systems, dispatchers will guide and coach the bystanders through the phone on compressions only CPR, and in the event of an asphyxial arrest such as drowning, dispatchers will also provide guidance on rescue breathing.

3. Rapid defibrillation

Once the AED is available, the bystander should use it by turning it one and follow the visual and voice prompts. attach the electrode pads to the victim's chest as shown in the diagram on the pads. If a shock is advised, the rescuer may resume compressions until the shock is ready then make sure no one is touching the victim and then press the shock button. AEDs are designed for use by untrained laypersons. Resume chest compression immediately after shock delivery. If the shock was not advised the rescuer must prompt back on compressions immediately.

4. Advanced life support measure

Once the EMS arrives, let them take over and transfer the victim to a hospital for advanced care delivery.

5. Return of spontaneous circulation

A comprehensive, multidisciplinary system of care including mild therapeutic hypothermia and other treatments. Once you achieve a "Return of spontaneous circulation" – ROSC, it's important to provide adequate care to prevent a re-arrest. (Explained later in the ACLS course).

6. The recovery:

could take a long time and it should not be neglected. (Physiotherapy, psychological support, etc.).

Pediatric Chain of Survival

The pediatric chain of survival steps are slightly different from the adult cardiac chain of survival related to the body surface area, weight and physiological distinctions.

Prevention is the first step since cardiac arrest in children and infants occurs due to preventable problems. In addition to heart problems, Children and infants most often have breathing problems that trigger cardiac arrest.

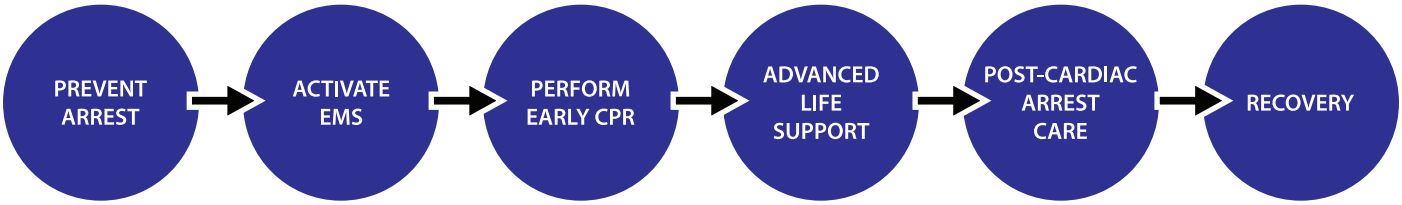


Figure 1.3 Pediatric chain of survival links

Chain of Survival – In Hospital

Inside the hospital, a trained health care provider and plenty of resources are available and If the chain of survival is followed the chances of survival for the cardiac arrest victim will increase.

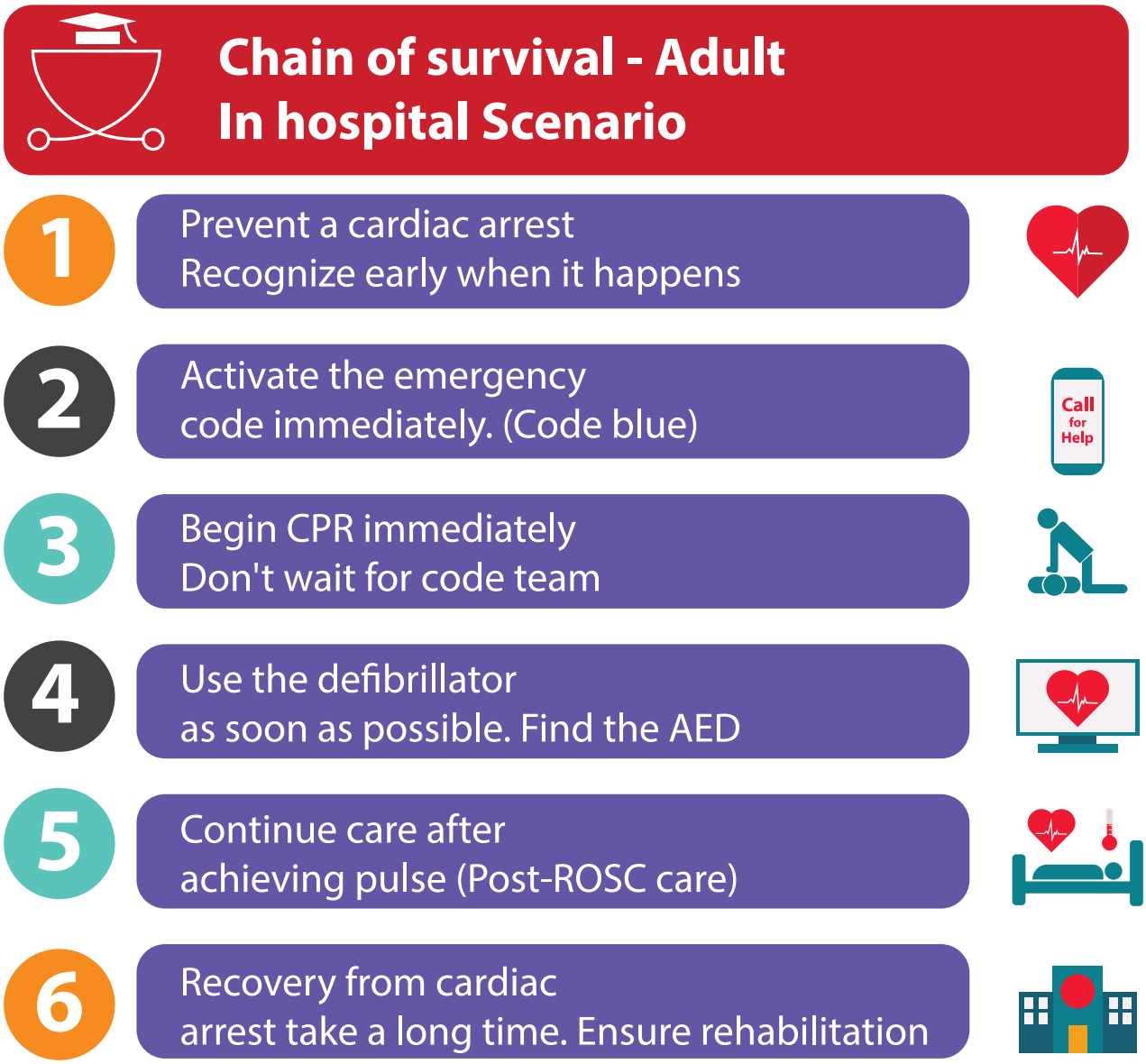


Figure 1.4 Adult in hospital chain of survival

A certain protocol and specialized team (MRT, RRT) in the hospital are important in identifying patients who are at risk of cardiac arrest and moving them to critical care areas. If there is a cardiac arrest or not sure if pulse is present, have a code blue activated immediately and start CPR till they arrive.

Early use of an AED or defibrillator in case of shockable rhythms Ventricular fibrillation (VF) or pulseless Ventricular Tachycardia (PVT) improves the outcomes. Check the initial rhythm and act on it as soon as possible (You may interrupt CPR to check the first rhythm if the rhythm was not checked).

Care of the patient after the return of spontaneous circulation (ROSC) requires close attention to oxygenation, blood pressure control, evaluation for percutaneous coronary intervention, targeted temperature management, and multimodal neuroprognostication. ROSC, it's important to provide adequate care to prevent a re-arrest. (Explained later in the ACLS course).

Because recovery from cardiac arrest continues long after the initial hospitalization, patients should have formal assessment and support for their physical, cognitive, and psychosocial needs. The recovery could take a long time and it should not be neglected. (Physiotherapy, psychological support, etc..).

Chapter 2

One Rescuer Adult BLS

Learning objectives

At the end of this chapter you will be able to learn:

- Recognize the signs of cardiac arrest in adults (anyone showing signs of puberty and above).
- How to Perform effective chest compression for adults as single rescuer.
- Explain how to open the airway for adults in different technique.
- How to provide breaths by using pocket mask for adult.
- Describe the importance of early use of an AED and how to operate it.

Single Rescuer Adult CPR

In this part you will learn how to perform high quality CPR when there is a single or multiple rescuer, we will start to discuss CPR skills for a single rescuer.

Once the rescuer notices that there is someone collapse immediately should do assessment.

1- Assessment:

Assess the surrounding environment

by looking if there is any dangerous situation around the victim, quickly move the victim to a safe place without any harm for the rescuer, for example, if the victim is beside fire, try to move the victim to a safer place. If the place is safe, do not try to move the victim as he/she may have other injuries that you cannot see.

Simply put him onto his back over a firm surface and start to assess the victim

Assess the Victim by taping at the shoulders and talk loudly, if not responding

Figure 2.1 check responsivness

- **Call for help or EMS system by calling 997 or 911 and ask for AED**
- **Assess pulse and Breathing for at least 5 seconds but not more than 10 seconds**

To save the time assess pulse and breathing at the same time

Assess the carotid pulse for adults by sliding 2 or 3 fingers into the groove between the trachea and the neck muscles at the side of the neck and look for the chest movement (rise and fall).

Figure 2.2 check carotid pulse

If there is pulse and breathing, put the victim in a recovery position with continuous monitoring for signs of airway occlusion, inadequate or agonal breathing and unresponsiveness.

but if the recovery position is a factor impairing the rescuer provider's ability to determine the presence or absence of signs of life, the person should be immediately positioned supine and re-assessed.

For the recovery position, put the victim in lateral recumbent positioning with the arm that is nearest to the BLS provider at right angle to the body and elbow bent with palm up and far knee flexed.

Figure 2.3 Recovery position

- If there iis no pulse, nor breathing (or agonal gasp) **Activate Emergency response system** by activate the hospital code or call 911/997 if the victim out hospital and start high quality CPR

- If there is pulse without normal breathing activate the rapid response team for in-side the hospital or call 911/ 997 if out-the-hospital, then start rescue breathing (chapter 10) and assess the pulse every 2 minutes

2- High quality CPR (cardiopulmonary resuscitation)

Components of CPR:

- **C:** compressions
- **A:** airway
- **B:** breathing

Chest Compressions for Adults

Chest compressions are the most important component of the high-quality CPR, during cardiac arrest, the heart stops pumping oxygenated blood to the brain and vital organs , and can cause irreversible damage in minutes.

Chest compression helps in blood flow out of the heart to reach brain and vital organs through arteries, and when pressure on the chest is released, blood is allowed to return to the heart, which may help in minimizing the damage and to stimulate the normal activity of the heart.

Agonal gasps

Agonal gasps are a sign of cardiac arrest which are uncontrollable, inadequate breathing patterns brought on by hypoxia, or low blood oxygen levels. It is probable that someone is dying since this breathing is abnormal. Due to the fight for oxygen, agonal breaths may be accompanied by some trembling or other muscular action. It sounds like heavy breathing and snoring, or inaudible

.

Figure 2.4 Checking pulse and breathing simultaneously

To perform the compression in effective and correct way follow these steps for performing CPR compressions:

1. Put the victim on his or her back on a firm surface like floor or backboard
2. Kneel at the victim's side.
3. Place the lower palm (heel) of one hand over the center of the victim chest, on the lower half of the chest bone (sternum)
4. Place your other hand on top of the first hand and interlace your fingers.
5. Keep your elbows straight and position your shoulders directly above your hands in a straight line.

Figure 2.5 Hands placement for chest compression

6. Push straight down on (compress) the chest at least 2 inches (5 centimeters) but no more than 2.4 inches (6 centimeters), push by Using your body weight.

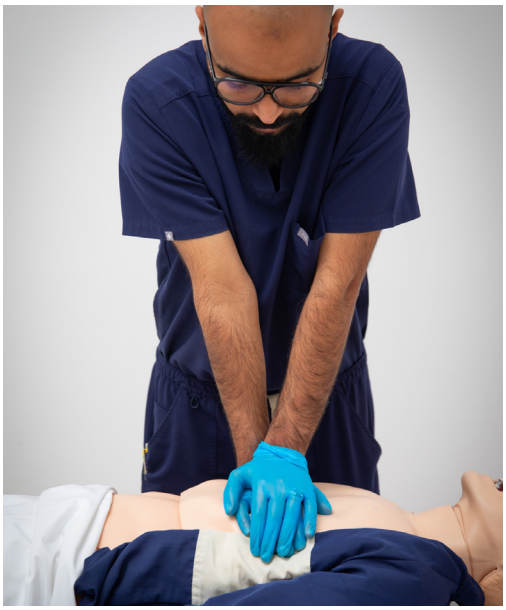


Figure 2.6 Chest compression at depths 2 inches at least (5 cm)

7. Push fast at a rate of 100 to 120 compressions per minute

Figure 2.7 Chest compression at rate 100- 120/ min.

8. Allow the chest to recoil (return the chest to normal position) in between compressions. If you do not allow the chest to recoil, the heart will not fill completely, because less blood will be pumped out of the heart to brain and vital organs with the next compression.

9. Rescuer should start CPR within 10 seconds from recognizing cardiac arrest and try to minimize chest compression interruption when finish 30 compressions (in 15-18 second) to give 2 breaths to less than 10 second to improve survival rate.

Airway: Open the airway

After performing 30 chest compressions, open the person's airway by using the head-tilt chin-lift maneuver by putting your palm on the person's forehead and gently tilt the head back. Then with the other hand, lift the chin forward to open the airway.

Figure 2.8 Head tilt chin lift maneuver

Jaw thrust is performed if there are suspected cervical spine injuries (neck region). It is performed by putting the index and middle fingers to push the posterior part of lower jaw upwards while thumbs push down on the chin to open the mouth.

Figure 2.9 Jaw thrust maneuver

Breathing

In one-rescuer CPR, breaths should be provided by using a pocket mask, if available.
pocket masks provide a barrier between the rescuer and the victim. Some masks are equipped with a one-way valve that allows the rescuer's breaths to enter the victim's airway, but prevents the victim's expired air from entering the rescuer's airway.

To provide breaths by using Pocket mask

1. Positioning yourself at the victim's side will allow you to provide ventilations and compressions without moving from the victim's side.

2. Put the mask on the victim's face. Masks are usually triangular in shape, and you will notice that the mask's narrow end should be over the bridge of the victim's nose.

Figure 2.10 Correct placement of pocket mask against victim face

3. Seal the mask against the victim's face. To do this, take the hand that is closest to the top of the victim's head and place it along the edge of the mask with the thumb of your other hand, apply pressure along the bottom edge of the mask. Then place the remaining fingers of your second hand along the bony edge of the jaw and lift the jaw upwards. Open the airway by performing a head-tilt chin-lift procedure. While you lift the jaw, ensure that you are sealing the mask all the way around the outside edge of the mask to obtain a good seal against the victim's face.

Figure 2.11 Pocket mask sealing

4. Deliver air over 1 second, ensuring that the victim's chest rises but avoiding excessive ventilation.

- If the victim's chest does not rise, reposition the mask and try to get a better seal, open the airway and give the second breath, observe chest rises, then resume 30 compression in less than 10 seconds.

- If the chest does not rise after a second breath, resume 30 chest compressions. Repeat the cycles of 30 compression and 2 breaths for 5 times which is equal to 2 minutes then check airway.

Figure 2.12 Breath delivery over one second and observe chest rise

3- Automated external defibrillator (AED)

AED is a device that recognizes ventricular fibrillation and other dysrhythmias and delivers an electric shock, even there are different brands of AEDs, but the steps to use are the same, and safe for anyone to use, as soon as an AED is available, turn it on and follow the voice prompts.

AED steps

1. Open the case and turn on the AED

Figure 2.13 Turn on AED

2. Remove all clothing covering the chest. If necessary, wipe the chest if wet

3. Open the AED adult pads which is used for age 8 years and above

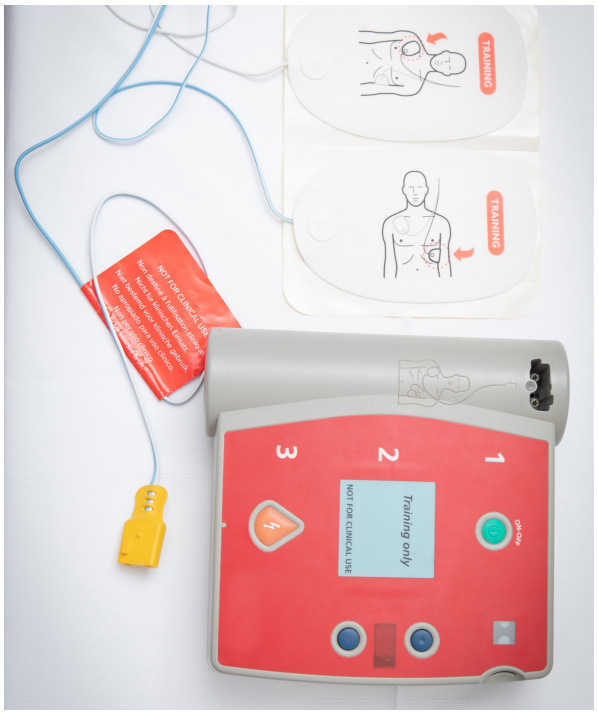


Figure 2.14 AED adult pads

4. Place one pad on the upper right side of the chest and Place the other pad on the lower left side of the chest, a few inches below the left armpit

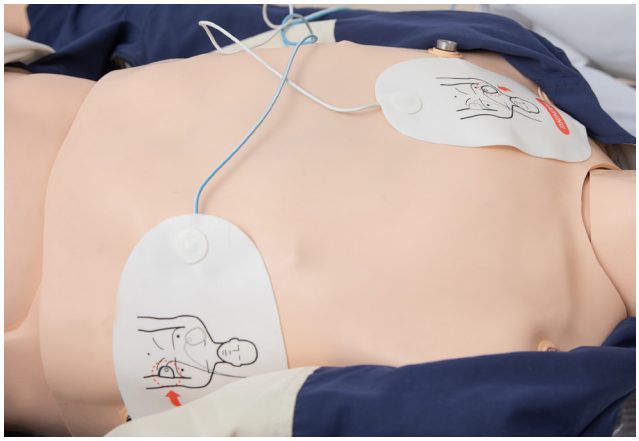


Figure 2.15 AED pads placement

5. Plug the pad connector cable into the AED

Figure 2.16 Plug in AED cable

6. Make sure no one is touching the person to let AED analyze the heart rhythm
7. Say, "CLEAR!" in a loud voice

Figure 2.17 Clear the victim verbally and visually

8. If shocked advised
   - Make sure no one is touching the person
   - Say, "CLEAR!" in a loud voice
   - Push the "shock" button to deliver the shock

Figure 2.18 Push the shock button

9. After the AED delivers the shock, or if no shock is advised, immediately start CPR, beginning with compressions.

Special Situation for AED

- **The victim has a hairy chest:** use a razor to shave the areas that would be covered by the AED pads. If a razor is not available, place the pads then quickly pull them off to remove enough hair to allow a new set of pads to adhere to the victim's skin and press it to ensure good contact with skin.
- **The victim is submerged in water:** first pull the victim to a dry area, quickly dry the chest and use the AED.
- **The victim has an implanted pacemaker:** You will recognize it as a small lump under the skin on the chest, usually the upper chest.
  avoid placing the AED pad directly over it; pacemaker stimuli may degrade the accuracy of ECG rhythm analysis or the pacemaker may be damaged by defibrillator discharges; doing so may block delivery of the shock.
- **The victim has a medication patch:** Do not place an AED pad over the medication patch. Remove and wipe the skin before applying the AED pad.
- **AED can be used on children and infants** and should be used as early as possible for the best chance of improving the chance of survival.
- Pediatric pads should be used if the person is less than eight years old, Standard (adult) pads may be used if pediatric pads are not available. If using standard (adult) pads, do not let the pads touch each other or put one in front and one at the back of the child.

- For infants less than a year old, a manual defibrillator should be used if available. If a manual defibrillator is not available, an AED may be used.

Some AEDs have a switch that can be set to deliver a pediatric shock. If available, turn the switch on when using on children younger than eight years old. If the AED cannot deliver a pediatric shock, an adult shock should be given. It is important to remember an electric shock may be the treatment for a fatal heart rhythm.

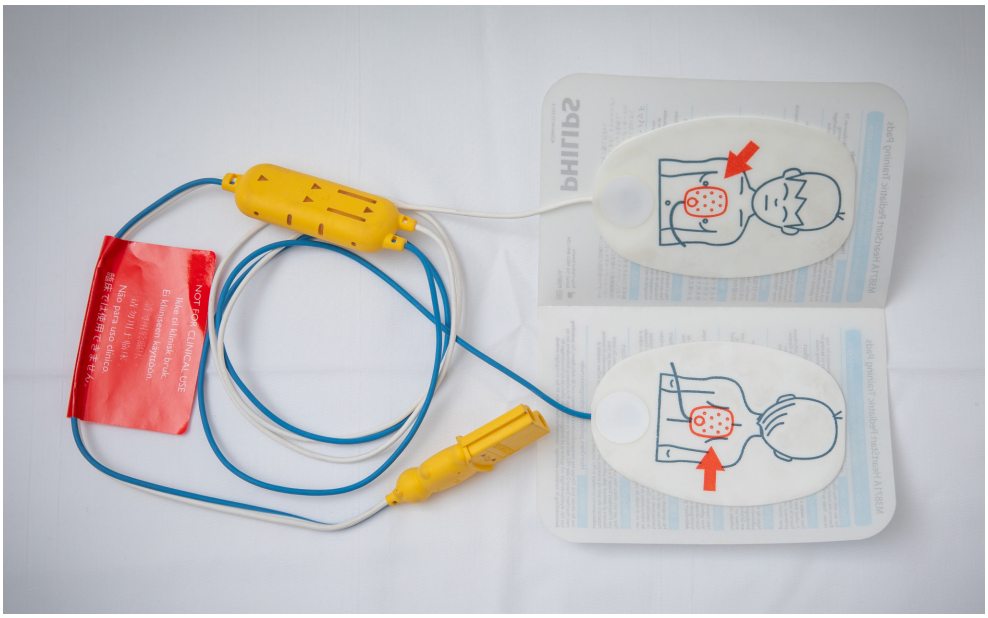
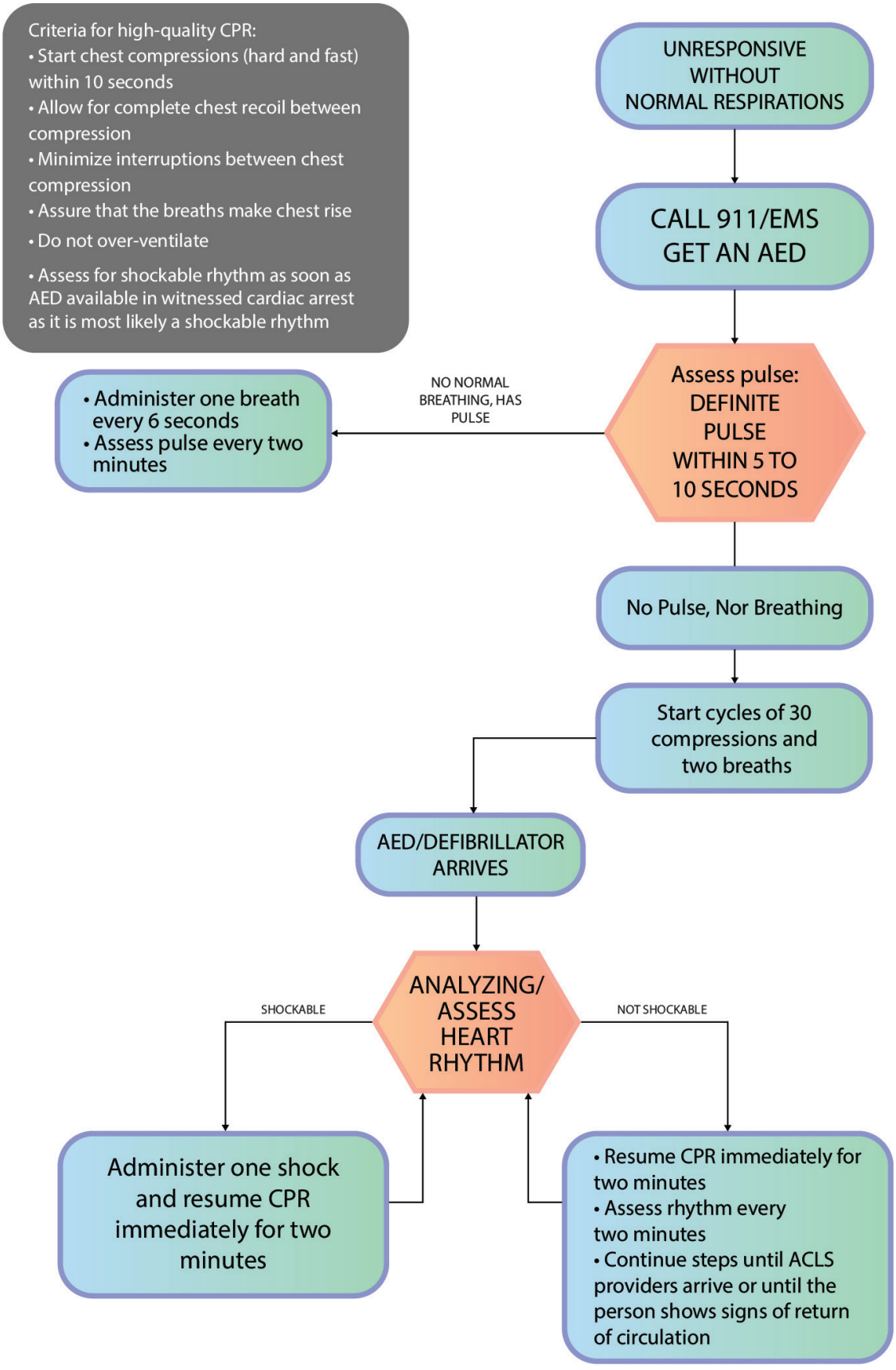


Figure 2.19 Pediatric AED pads


Criteria for high-quality CPR:
• Start chest compressions (hard and fast) within 10 seconds
• Allow for complete chest recoil between compression
• Minimize interruptions between chest compression
• Assure that the breaths make chest rise
• Do not over-ventilate
• Assess for shockable rhythm as soon as AED available in witnessed cardiac arrest as it is most likely a shockable rhythm
UNRESPONSIVE WITHOUT NORMAL RESPIRATIONS
CALL 911/EMS GET AN AED
Assess pulse: DEFINITE PULSE WITHIN 5 TO 10 SECONDS
NO NORMAL BREATHING, HAS PULSE
• Administer one breath every 6 seconds
• Assess pulse every two minutes
No Pulse, Nor Breathing
Start cycles of 30 compressions and two breaths
AED/DEFIBRILLATOR ARRIVES
ANALYZING/ ASSESS HEART RHYTHM
SHOCKABLE
NOT SHOCKABLE
Administer one shock and resume CPR immediately for two minutes
• Resume CPR immediately for two minutes
• Assess rhythm every two minutes
• Continue steps until ACLS providers arrive or until the person shows signs of return of circulation

Chapter 3

Two Rescuers Adult BLS

Objective:

At the end of this chapter you will be able to learn:

- Recognize the differences of CPR skills between single or two rescuers for adults.
- How to Perform effective chest compression for adults as two rescuers.
- How provide breaths for adults by using bag mask ventilation.
- Describe the use of an AED for adults as two rescuers.

Two Rescuer Adult CPR

There are differences between a single rescuer and two rescuers' skills on how perform CPR for an adult that we will be discussing them in the next part which includes differences in assessment, high quality CPR, and using of AED.

1- Assessment :

- Rescuers should assess the surrounding environment by looking if there is any dangerous situation around the victim, and quickly move the victim to a safe place without any harm to the rescuer. Make sure the victim is on a firm surface, and start to assess the victim.

- First rescuer will assess the victim by taping at the shoulders and talk loudly, if not responding while Second rescuer Activate Emergency response system and get AED. If not responding,

- First rescuer continues to assess pulse and breathing within 5-10 second.

- Assess the carotid pulse for adults by sliding 2 or 3 fingers into the groove between the trachea and the neck muscles at the side of the neck and look for the chest rise.

2- High quality CPR (cardiopulmonary resuscitation).

If the first rescuer did not feel pulse, should immediately start chest compression.

Chest Compressions

- **First rescuer** will kneel at the victim side, remove any clothes on the chest Place his hand on the chest as we explain before and begin CPR, start with chest compression and continue cycles of chest compressions and ventilation with a face mask until second rescuer returns with an AED and a Bag-Valve-Mask device

- **Second rescuer** give the AED to the first rescuer and kneel in the opposite side of first rescuer to take over chest compression to maintain the quality of CPR.

First rescuer begins to use the AED like what was explained before in the AED part. After shock delivered or no shock advised, immediately continue high quality CPR starting with chest compression by the second rescuer and the first rescuer will move to be at the victim's head to deliver breaths by using a bag mask device.

Breathing

- In two rescuers' CPR, breaths should be provided by using a Bag-Valve-Mask.
- Bag mask device is a self-inflating bag attached with a face mask and oxygen reservoir;some devices include a nonrebreathing valve. It provides 21% oxygen from room air and 100% oxygen if connecting the opposite end of the bag to an oxygen source.
- There are different sizes: small for infants, medium for children and large for adults.
- It provides positive pressure ventilation by handling it manually against the face and nose and squeezing the bag ventilates the patient through the nose and mouth.

Figure 3.1 Bag mask

To provide breaths by using bag mask device

1. The rescuer will be positioning at the victim's head.
2. Cover victims' mouth and nose with the appropriate mask size.
3. Seal the face mask by placing fingers of one hand like CE-shape across the top and bottom edge of the mask and open the airway using the head-tilt/chin-lift maneuver.
4. Deliver the first breath by squeezing the bag over one second, just enough to see the chest rise to avoid excessive ventilation.

Figure 3.2 squeezing the bag just enough to see chest rise

5. Observe the chest rise, if there is chest rise give another breath over one second.
6. If the victim's chest does not rise, reposition the mask and try to get a better seal, open the airway and give the second breath, after 2 attempts including first and second breaths, the first rescuer will continue 30 compression.

Figure 3.3 chest compression and ventilation ratio (30:2)

- Rescuers should switch positions if fatigued or every 2 minutes (5 cycles), when AED starts analyzing the victim heart rhythm which happens automatically after 2 minutes that is why it is important to keep AED pads on the victim chest not to remove it.
- Rescuers' positions sswitching is very important to maintain high quality CPR until hospital code arrive for in-hospital or EMS for out-of-hospital victim.

Chapter 4

Multi-Rescuers Team

Learning Objectives:

At the end of this chapter you will be able to learn:

- How to apply the skills as a BLS provider in a Multi-Rescuers resuscitation effort.
- Understand the components of Multi-Rescuers team Dynamics.
- Explain the importance of multi-rescuers team's components.

Component of Effective Multi-Rescuers team Dynamics

During a resuscitation effort, the multi-rescuers team depends highly not only on a high-quality CPR. Team members' understanding of each role involved in the resuscitation effort and working in a sequence with each other are bound to a successful resuscitation.

Multi-Rescuers team Dynamics components:

1. Roles and obligations
2. Communication
3. Debriefing
4. Switching Roles and Obligations

1- Roles and Obligations:

Determining precise role and obligations as soon as feasible is crucial since every second counts during a resuscitation effort. The multi-rescuers team roles should be developed and assigned at the beginning of each shift, according to local protocols as per SHA recommendations.

Knowing the role and obligations prior resuscitation begins will help the team avoid losing valuable time that could have improved the success of the resuscitation effort.

There are two components of Roles and Obligations;

- The 6 Roles and Obligations.
- Roles Delegation.

Figure 4.1 The 6 Roles

The 6 Roles and Obligation:

1- Team Leader;

- Responsible for delegating the roles to each team member in accordance with their scope of practice.
- Gets to determine the course of treatment.
- Overseas and maintain a close watch on the team›s performance to make sure that all procedures and technical skills have been carried out admirably.

2- Compressor;

- Applying chest compression triangle (CCT).
- Alternating role every two minutes, or sooner if you are fatigued.
- Concentrate on listening to the CPR coach›s instructions and feedback for further guidance.

3- Airway;

- Probably ensure an open airway being maintained.
- Insert appropriate airway adjuncts.
- Provide ventilation.

4- AED/Monitor/CPR Coach;

- Ensure a high- quality CPR is being performed.
- Minimize chest compression interruptions to a minimum and limit them to no more than 10 seconds.
- Monitor the compressor for signs of fatigue.
- Coordinate the switch for the compressor role every 5 cycles/2 minutes or sooner if signs of fatigue are seen/ compressor fatigue.
- Operates the AED/Manual Defibrillator if trained.

5- Medication/IV;

- Establishes IV/IO access if trained.
- Medication administration.

6- Recorder;

- Records when interventions are being performed including, but not limited to when medications are being administered, when defibrating, and the durations of the CPR cycles.
- Informs the team leader of any important timelines, such as the ending of the CPR cycle.

Roles Delegation;

Effective roles and obligations are mostly determined by the team members that are assigned by the team leader. To achieve the highest performance for the skills being completed, roles should be delegated in accordance with each team member's scope of practice and profession.
When a team member is assigned a role, they should be trained for the primary responsibilities of that role.

Recognizing your boundaries would guide the team leader to assign the most appropriate role that fits you.

For instance, if the team leader assigned you for the compressor role and you are experiencing back pain or shoulder injury, you must inform the team leader immediately of your limitations so the team leader would replace you and assign you to another role.

2- Communication:

- ***Respect for one another;***

It is essential for effective communication, which will result in a successful performance by the multi-rescuers team. In the case that a mistake was to occur, prompt action should be made to stop it from happening, but it should be handled in such a manner that respect is still a basis for the immediate corrective instructions.

Calling the team member should be done by one of the following ways;

- Name
- Profession
- Role

- ***Effective communication;***

The use of effective communication would remove the possibility of mishearing the proper instructions and orders. For instance, once the team leader has given an order, the receiving team member should confirm that the order was understood as intended by the team leader by repeating the order identically back to the team leader. It is necessary for the team member to verify that the team leader is confirming the instruction they are getting.

Whenever instructions or orders are given orally, the person giving them should make eye contact with the team member receiving them to ensure that they are comprehended.

Figure 4.2 Effective communication between CPR coach and compressor

- ***Confirmation of Interventions:***

Confirming the task that is being asked is done, is the key for recorder to record the intervention times which will help with the reevaluating process and documentation. The recorder will not record the time spent preparing tasks, but rather the time the task completed.

- ***Clear instructions and orders;***

To help with improving the communication components which includes respect for one another, closed-loop communication, and confirmation of interventions, the use of clear messaging is the main key.

Clear instructions and orders has three main point;

- Clear and understandable communication
- The tone should be calm and assured.
- Speaking with a loud enough voice to be heard and understood.

3- Debriefing:

Debriefing is necessary when the resuscitation effort is completed and should be immediately done right after the resuscitation. The purpose of the debriefing is not to provide feedback on the performance of each team member, but rather to assess the performance of the multi-rescuers as a whole team in order to pinpoint their strengths and weaknesses in areas such as but not limited to communication, role and responsibilities, medical skills and interventions for further practices and improvements to improve patient survival and multi-rescuers' team performance.
(If a deficiency has occurred follow the local protocols).

4-Switching Roles and Obligations:

It is not always the case that the airway should take over the compressor role when the Compressor, CPR Coach, or Team Leader request a changeover. It is crucial to recognize the value of a consistent chest compression, which should always occur preceding any other role as in C-A-B sequence.
Any team member that is available might act as a compressor unless a limitation is discovered.

- In a team of 2-Rescuers Airway would switch with the compressor.
- In a team of 3-Rescuers AED/CPR coach would switch with the compressor.
- In a team of 4-Rescuers two would alternate the Compressor role every time the AED indicates analyzing or every 5 cycles if the AED is not attached. The Airway and AED/CPR Coach should be ready to switch if deemed necessary.

The essential roles should be delegated and the extra personnel would serve as the switch for the compressor role.

When the first rescuer starts the compressions, the second rescuer should take compressions upon arrival to allow the first rescuer to operate the AED. After the AED defibrillator the patient or indicates no shock advised, the second rescuer should immediately resume chest compressions.

Chapter 5

Single Rescuer Child BLS

Learning Objectives:

At the end of this chapter you will be able to learn:

- How to perform high-quality CPR for children.
- How to provide ventilations using BVM/Pocket mask.

Pediatric BLS Algorithm

This section outlines BLS for children from one year until puberty.

When witnessing a child collapse or arriving at a child who has collapsed with unknown time of when the child has lost of conscious, you should follow the steps below.

1- Assessment

A.**Check surrounding for hazard to ensure safety**

Checking the surroundings for hazards should be done to ensure your safety first and to avoid further injuries for the victim.

Figure 5.1 Assessment the scene for any hazards

B.**Check the victim responsiveness**

Gently shake or tap the victim's shoulders. Check to see whether the victim is moving or making sounds. shout, «Are you OK? ».Move to step 3 if the victim is not showing any indications of responsiveness.

Figure 5.2 Check responsiveness

C.**Check the victim pulse and breathing**

- When checking pulse and breathing, you will encounter three outcomes.
- Victim has palpated pulse, and is breathing.

D.**Activate EMS/Code and observe the child until advance providers arrive**

- Victim has palpated pulse, but not breathing.

Activate EMS/Code and begin rescue breathing (1 breath every two to three seconds). Refer to the rescue breathing chapter.

- Victim has palpated pulse at the rate of less than 60 bpm.

Activate EMS/Code and begin rescue breathing (1 breath every two to three seconds) and reassess pulse if not increased move to step 5.

- Victim has no palpated and is not breathing.

Move to step 4 if the EMS/Code team has not been activated.
Move to step 5 if the EMS/Code team has been activated.

Figure 5.3 check pulse and breathing simultaneously

Witness collapse: Activate EMS/Code team then begin high quality CPR (step 5)
Unwitnessed collapse: Begin high quality CPR for 5 cycles then Activate EMS/Code team

Only one rescuer is subject to the witness and unwitnessed collapse criteria.

Figure 5.4 Call for help and AED

2- High Quality CPR

Start immediate high-quality CPR by following the C-A-B sequence.

C- Compressions.

A- Airway opening.

B- Breath administration.

Figure 5.5 Chest Compression

Chest compression for a child has the same principals of the adult compressions with a few differences described in the figure below.

	Adult	child	Infant
Hand position	Heel of one hand in the center of the chest (on the lower half of the sternum) with the other hand on the top of the first For a child one hand technique maybe used 		Two fingers on the center of the chest (just below the nipple line) 
Compression depth	At least 2 inches (Try to avoid greater than 2.4 inches if using a feed-back device.)	At least one third of the chest depth Approximately 2 in/5cm	Approximately 1.5 in/4cm
Ventilations	Until chest begins to rise (about 1 second per ventilation)		
Cycles (one rescuer)	30 chest compressions and 2 ventilations		
Cycles (two rescuers)	30 chest compressions and 2 ventilations	15 chest compressions and 2 ventilations	
Rate	Between 100 and 120 compressions per minute		

Figure 5.6 Differences between adult & child Chest Compression

Check for pulse in Children:

Pulse and Breathing Evaluation;

When evaluating a victim who is unresponsive, check for the carotid pulse for at least 5 seconds, but no more than 10 seconds, to see whether there is a pulse or the pulse rate is less than 60 bpm. Observe the chest for movement simultaneously to check for breathing while checking for pulse.

Pulse Check in Children:

Place your index and middle fingers on the child's neck, to the side of the larynx (voicebox), to check the pulse on the carotid artery. After placing your fingers on the larynx, withdraw to your side, do not try to check for a pulse on the other side from where you are positioned.

Figure 5.7 Carotid pulse palpation

On the child's anterior body, where the thigh meets the trunk, you may feel the femoral pulse (on the inner thigh in the crease between the leg and groin). Do not check for a pulse for longer than 10 seconds.

Figure 5.8 Femoral pulse palpation

Breathing Check;

Chest rise and fall is the sign of breathing. Observe the chest for up and down movements which will indicate that the child is breathing.

Agonal gasps;

Agonal gasps are a sign of cardiac arrest which are uncontrollable, inadequate breathing patterns brought on by hypoxia, or low blood oxygen levels.

It is probable that someone is dying since this breathing is abnormal. Due to the fight for oxygen, agonal breaths may be accompanied by some trembling or other muscular action. It sounds like heavy breathing and snoring, or inaudible. The individual may even appear to be groaning.

Chest compressions;

Hand placement:

Place the heel of one hand on the lower half of the chest-bone (sternum) then place the other hand over the first hand if you choose to use the two hands technique. One hand technique could be used if the rescuer feels confident that achieving the required depth will be met.

Shoulders should always be vertically on the same line over the rescuer's hands. Lock elbows and make sure to use the shoulders and back to compress the child chest.

Figure 5.9 One hand chest compression technique

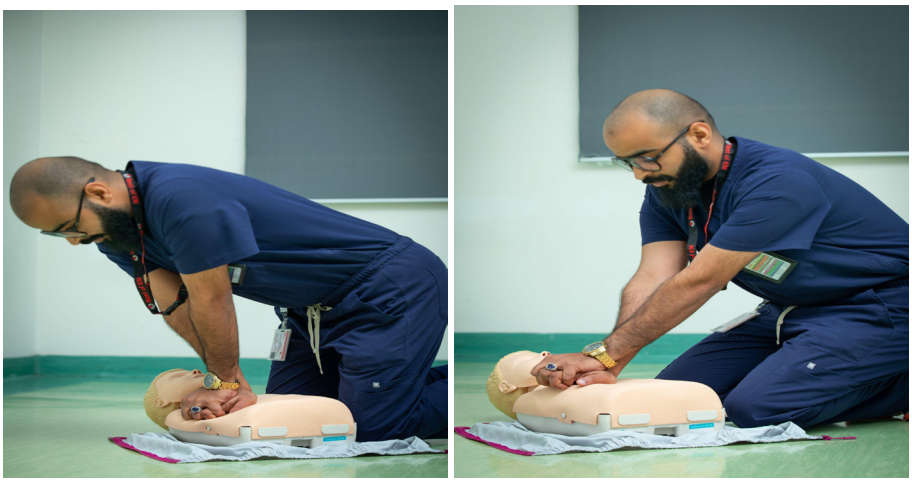


Figure 5.10 Inappropriate hands placement

Depth:

Press down on the chest-bone (sternum) at least one-third of the chest's diameter approximately 2in/5cm.

Chest Recoil:

Full chest wall recoil is strongly encouraged during cardiopulmonary resuscitation since insufficient chest wall recoil from leaning on the chest might further restrict venous blood return back to the heart and decrease cardiac output, which will lead to poor perfusion to the organs.

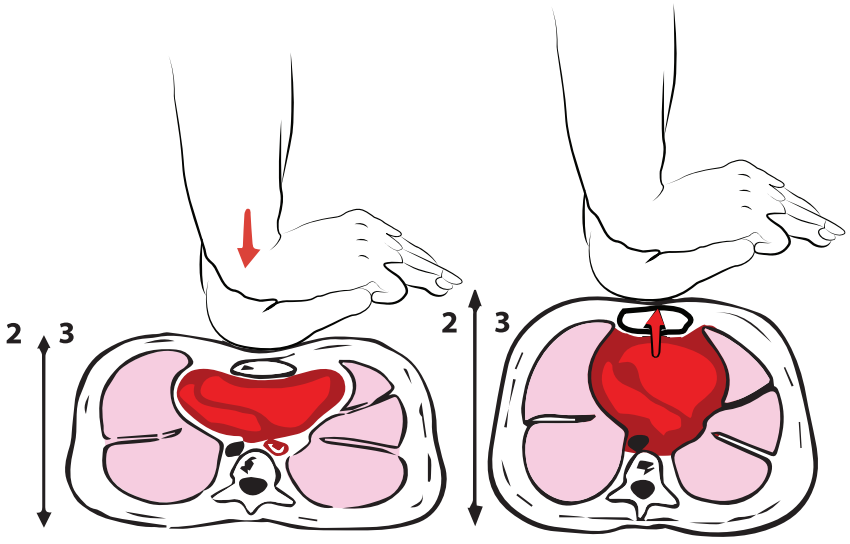


Figure 5.11 Chest Recoil

Compressions Rate:

100 to 120 chest compressions per minute. The rate should be done at a steady speed. Rescuers can maximize cardiac output and ensure adequate coronary perfusion pressure while still allowing for full chest recoil and the recommended depth compressions by controlling the rate to between 100 and 120 compressions per minute.

- Going more than 120 chest compression per minute, will not allow the heart to fill again with blood at the same time the rescuer will not be able to allow for a full chest recoil.
- Going Less than 100 chest compressions per minute, the brain, heart, and other essential organs are less likely to receive enough blood flow.
- Chest compressions must not be paused for more than 10 seconds.

Breathing:

Assessing ventilation with a pocket mask.

1. Place the pocket mask with a one-way valve on the victim's face. Put the mask's widest end over the victim's chin and just below the bottom lip. The nose-shaped end should be placed over the victim's nose.

   Apply the mask on the victim's face and make sure the seal is tight using both hands, including the thumbs.

Figure 5.12 Delivering breaths via pocket mask

2. Then deliver each breath over one second. Make sure to pause between breaths to allow the victim to exhale and for the rescuer to take another breath.

3. The chest rising is a sign that the breath was efficient. If a chest rise was seen, the rescuer should not continue squeezing the BVM and should allow the BVM device to refill for the second breath which will reduce the chance of excessive ventilations.

A Single Rescuer BLS

A single rescuer should continue to provide 30 chest compressions to 2 rescue breaths until a second rescuer, EMS, or the Code team arrive.

Between the chest compressions and rescue breaths the rescuer must not pause the chest compressions for more than 10 seconds. If the rescuer after 30 chest compressions tries to give two rescue breaths and the first breath was not effective, then tries to reopen the airway/ re-adjust the mask and the second breath is effective the rescuer should prompt back to resume chest compressions instead of giving a third rescue breath.

Chapter 6
Two Rescuers Child BLS

Learning Objective:

At the end of this chapter you will be able to learn:

- Recognize the differences of CPR skills between single or two rescuers for child victims.
- How to Perform effective chest compression for a child as two rescuers.
- How provide breaths for child by using bag mask ventilation.
- Describe the use of an AED for a child as two rescuers.

Whenever more than one rescuer arrives, start assigning roles as discussed in **chapter 4.**

As a single rescuer, the ratio of chest compressions to ventilations must be 30 chest compressions to 2 rescue breaths. If the second rescuer arrived, the ratio would change to 15 chest compressions to 2 rescue breaths.

However, the change of the ratio is not about the presence of the second rescuer, it does rely on whether the second rescuer is participating in the resuscitation effort or not by taking the role as Compressor/Airway.

If the second rescuer took the role of the airway and was ready to deliver the rescue breath, then the change of the ratio to 15 chest compressions to 2 rescue breaths should be done.

If the second rescuer arrived with the AED and handed it to the first rescuer, the ratio should stay as 30 chest compressions to 2 breaths until the AED signals that chest compressions should resume either after administering the shock or if no shock was advised.

Chapter 7

Infant CPR

Learning Objectives

At the end of this chapter, you will be able to learn

- How to assess an infant who has an impending cardiac or respiratory arrest.
- How to perform High quality CPR in infants.
- How to deliver breaths to an infant properly and effectively.

CPR in Infants

The term infant refers to the neonatal period and extends to the age of 1 year (0-1 year). Infant cardiac arrest is most likely a result of respiratory failure or airway obstruction. Majority of the babies require only breathing as their heart is not affected.

However, damage to the brain and other vital organs could occur after a few minutes of being short in O2 leading them to cardiac arrest.

Equipping yourself with the knowledge and skills of performing CPR could save an infant's life.

CPR Skills

1- Assessment

A.Safety of the scene

Look for any signs of danger from the surroundings. Make sure that the scene is safe.

Figure 7.1 assessment the scene safety

B.Response

Assess for response by tapping the sole of their feet, and talk to them loudly.

Figure 7.2 Check infant responsiveness

C.Check pulse & Breathing

Check for breathing by scanning the chest for the rise and fall. This is done simultaneously with checking the pulse for 5 seconds but no more than 10 seconds.

Figure 7.3 Check infant pulse and breathing

PULSE

- Put 2 or 3 fingers on the inner side of the arm between the shoulder and elbow.
- Feel the pulse for 5 -10 seconds.

Figure 7.4 Check infant brachial pulse

D.Activation

Witnessed – if you're alone and you witnessed the arrest you go and activate the EMS and get the AED.

Unwitnessed- complete 5 cycles of CPR approximately 2 minutes, then activate the EMS and get the AED.

2- High Quality CPR

Position- infant should be on a firm flat surface.

Location of chest compression should be at the center of the chest below the nipple line.

Figure 7.5 Two fingers chest compression technique

Technique- compression can be done either with 2 thumbs encircling or 2 finger chest compression

1.Two Thumbs Encircling- put the thumbs side by side at the center of the chest just below the nipple line, with the rest of the fingers encircling the chest and back for support.

Figure 7.6 Two thumbs encircling chest compression technique

2.Two fingers- put 2 fingers at the center of the chest. Fingers should remain in an upright position during compression to give proper depth.

- Ratio- for 1 rescuer you do it 30 compressions followed by 2 ventilations (30:2) for 2 rescuers 15 compressions followed by 2 ventilations (15:2).
- Rate- chest compression rate should be 100-120/min.
- Depth- firmly compress the chest to at least 1/3 of the AP diameter of the chest approximately one and a half inches or 4 cm.
- Chest recoil- complete chest recoil should be done during compression to allow blood to flow into the heart. Interruptions during compression should be minimized for a better outcome.

Giving breaths

The predominant cause of cardiac arrest in infants is respiratory failure due to different respiratory problems. Respiratory failure is when the lungs cannot get enough oxygen into the blood. Giving chest compressions alone may not be as effective as giving both compressions and breaths. So, it is important that right after chest compression, the infant should be given breaths.

Before giving breaths, you must open the airway first. there are two techniques in opening the airway, head tilt chin lift or jaw thrust technique if there is suspected spinal injury.

Open The Airway	Illustrated Image
Neutral Position – place your hand on the Fore-head and maintain a neutral position of the head. With your fingertips under the point of your infant's chin, lift the chin. Avoid pushing on the soft tissues under the chin because this may block the airway.	
Jaw thrust -kneel behind the infant's head, Sup-port the head in a neutral position, head neck spine is aligned. Place the hand at each side of the face with your fingertips on the angle of the mandible. Gently lift the jaw to open the airway.	
Breaths -if the airway is open and maintainable, give rescue breathing each breath should be over 1 second	

Table 7.1 opening airway technique

Use of barrier device

- Pocket mask- seal the mask with your C technique of your one hand and place the thumb of your other hand at the bottom edge of the mask using your 2 fingers of your hand at the bottom of the mask, open the airway. press firmly the edges of the mask and ventilate the infant, giving 2 breaths (1 sec each) enough to see a chest rise.

Figure 7.7 Pocket mask application

- For Bag-Valve-Mask select the proper size of the mask, use. the C-E clamp technique. C to seal the mask and E to open the airway (natural position). Connect to oxygen if available and squeeze the bag valve mask enough to see a chest rise.

Figure 7.8 the C-E clamp technique

2 Rescuers Infant CPR

If two rescuers are available:

Rescuer 1: Will be at the side of the infant and assess the responsiveness. Send rescuer 2 to activate emergency response system and get the AED.

Rescuer 1: Continue to assess the infant by checking the brachial pulse and breathing for 5 to 10 seconds

- If the infant has pulse more 60 beats per minute but not breathing, provide rescue breathing 1 breath every 2 to 3 seconds. Check pulse and breathing after 2 minutes, if there is pulse and still there is no breathing, continue rescue breathing.

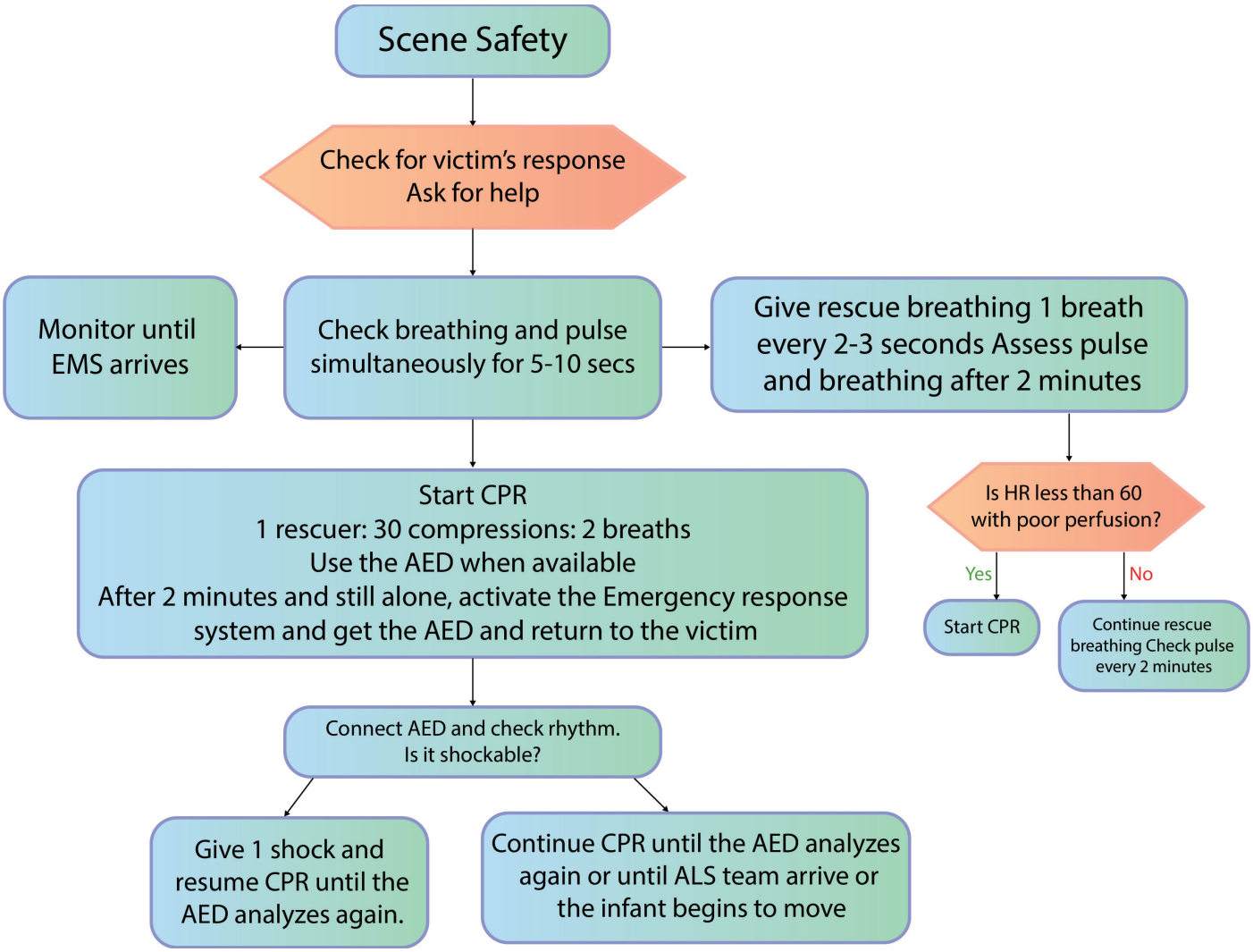
- If the infant has no pulse or has pulse, less than 60 beats per minute and with signs of poor perfusion, begin CPR, with 30 compressions and 2 breaths. When 2nd rescuer returns, use the AED.

Figure 7.9 Two rescuers infant BLS

Rescuer 2: Will hand the AED to rescuer 1, and continue 30 compressions and 2 breaths as rescuer 1 operates the AED. After giving the shock, the ratio will be switched to 15 compressions and two breaths.

Rescuer 1: Will use the AED and follow the prompt. If the AED detects shockable rhythm, then deliver shock, if not, continue CPR until advanced critical health care providers will arrive.

INFANT BLS ALGORITHM FOR SINGLE RESCUER



Chapter 8

Relief Foreign Body Airway Obstruction (FBAO)

Choking of Adult, Infant and Children's more than 1 year

Learning Objectives:

At the end of this chapter you will be able to learn:

- How to Recognize sign and symptom of FBAO (choking).
- How to perform abdominal thrust to relieve FBAO for adult.
- How to perform chest thrust to relieve FBAO for obese and pregnant woman.
- How perform correct steps to relieve FBAO for children more than 1 year.
- How to perform correct steps to relieve FBAO for infant less than 1 year.

FBAO happens when an object is stuck in the throat blocking the flow of air, the correct action for a choking person depends on the degree of airway obstruction, which person is responsive or not, and the age of the person.

Signs of FBAO (choking):

Degree of Obstruction	Persons Response	Rescuers Action
Partial Obstruction	Usually able to speak, cry, cough or breathe.	Stay with the person, encourage them to cough and call for help
Complete Obstruction	- (Clutching the neck) universal sign of choking, - Unable to cough or talk. - Difficulty breathing or no breathing may be cyanotic	- Use abdominal thrusts - Call for help - Begin CPR if the person becomes unresponsive with checking the object each time you open the airway to give breath, if the object can be visualized in the mouth, the manual removal of the object considered, if not visualized, do not do blind finger sweep

Table 8.1 Signs of FBAO (choking)

The initial response to foreign body airway obstruction in a conscious individual should be to encourage coughing as this is a normal physiological response that may be effective and is unlikely to cause harm.

The sequence of interventions in individuals without an effective cough suggested in treatment recommendations seeks to balance the benefits of early removal of the FBAO with the potential harms of interventions, such as abdominal thrusts.

Figure 8.1 Universal sign of choking

Abdominal Thrusts

To perform abdominal thrusts

1. Stand behind the responsive person. Wrap your arms around their waist under their ribcage.
2. Put the side of your fist above the person's navel in the middle of their belly and below the lower part of the sternum.

Figure 8.2 Locate the fist above the victim's navel

3. With your other hand, hold the first fist and press forcefully into the person's abdomen and up toward their chest.

Figure 8.3 Abdominal thrust technique

4. Continue performing these thrusts until the obstruction is relieved or until the victim becomes unresponsive put him on a flat surface and start CPR to increase the intrathoracic pressure which helps in expelling the object outside the mouth and checking the object each time you open the airway to give breath, if the object can be visualized in the mouth ,the manual removal of the object considered , if not visualized ,do not do blind finger sweep.

If the victim is pregnant, obese, or you cannot get your arms around the stomach, give chest thrusts:

- Put your hands at the base of the breastbone, just above the joining of the lowest ribs.
- Press hard into the chest with a quick thrust.
- Repeat until the blockage is removed from the airway or become unresponsive.
- If become unreceptive start CPR with checking the object each time you open the airway to give breath, if the object can be visualized in the mouth, the manual removal of the object considered, if not visualized, do not do blind finger sweep.

Figure 8.4 Chest thrust technique for pregnant lady

Infant choking

In a choking but responsive infant less than one-year-old, back slap and chest thrusts are used instead of abdominal thrusts.

1. Put the infant with their face down and their head lower than their chest; they should be resting on your forearm. Put your forearm on your thigh.
2. Support the infant's head and neck with your hand and be sure to avoid putting pressure on their throat.

Figure 8.5 Support the infant›s head

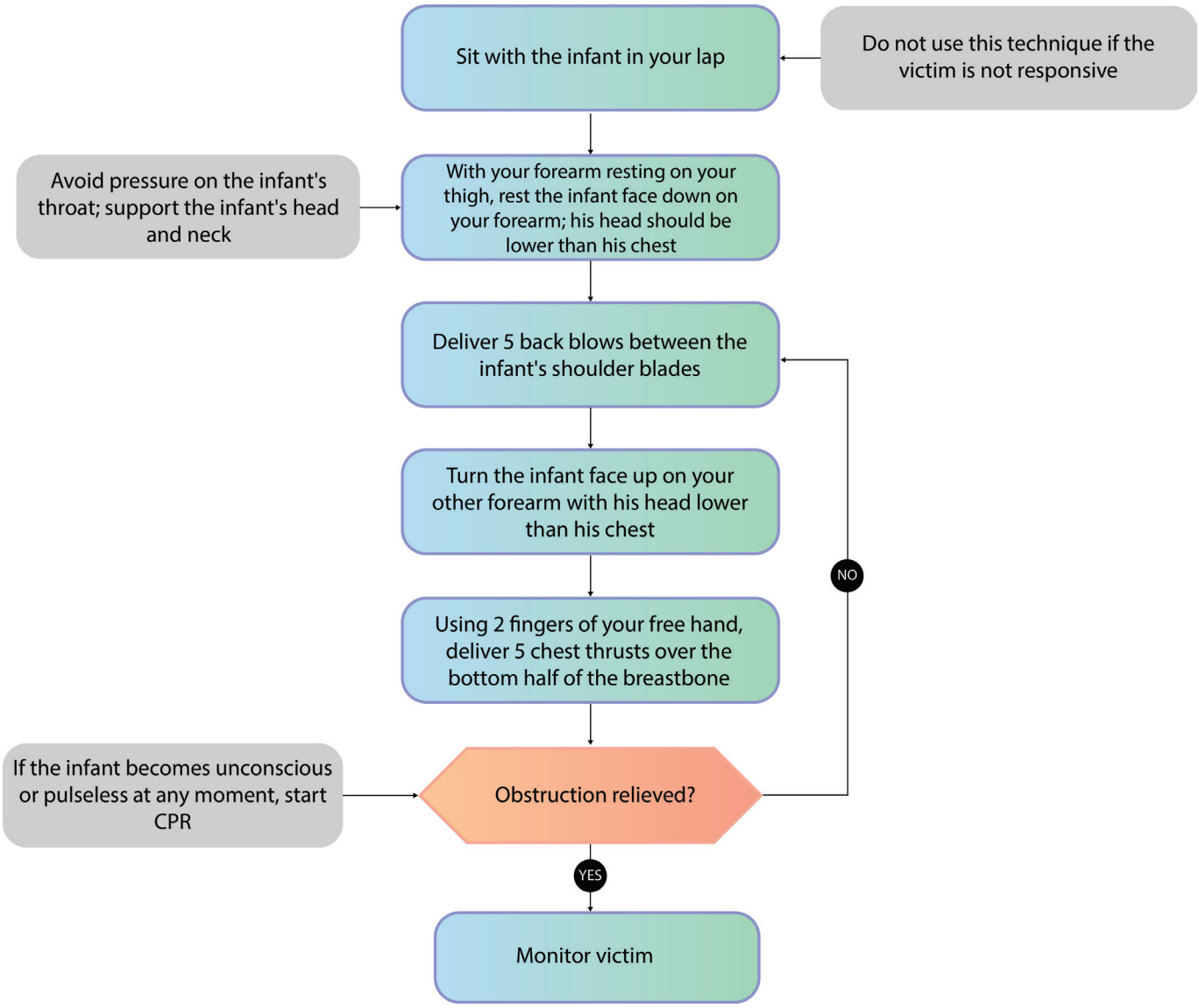
3. Using the heel of your free hand, deliver five back blows between the infant's shoulder blades.

Figure 8.6 Back blow technique

4. Using both hands and arms, turn the infant face up so they are now resting on your other arm; this arm should now be resting on your thigh.
5. Make sure the infant's head is lower than their chest.
6. Using the fingers of your free hand, provide up to five quick downward chest thrusts over the lower half of the breastbone.

Figure 8.7 Chest thrusts

7. If the obstruction is not relieved, turn the infant face down on your other forearm and repeat the process.
8. Continue doing these steps until the infant begins to breathe or becomes unresponsive.
9. If become unresponsive start CPR observe the object each time you open the airway to give breaths, if the object can be visualized in the mouth, the manual removal of the object considered, if not visualized, do not do blind finger sweep.


Sit with the infant in your lap
Do not use this technique if the victim is not responsive
Avoid pressure on the infant's throat; support the infant's head and neck
With your forearm resting on your thigh, rest the infant face down on your forearm; his head should be lower than his chest
Deliver 5 back blows between the infant's shoulder blades
Turn the infant face up on your other forearm with his head lower than his chest
Using 2 fingers of your free hand, deliver 5 chest thrusts over the bottom half of the breastbone
If the infant becomes unconscious or pulseless at any moment, start CPR
Obstruction relieved?
NO
YES
Monitor victim

Chapter 9
Other Considerations

Learning Objectives:

At the end of this chapter, you will be able to learn:

- How to perform rescue breathing in respiratory arrest victims.
- How to modify CPR in victims with advanced airway.
- How to modify and perform High Quality CPR to pregnant woman.
- How to recognize and manage an opioid overdose related life-threatening condition.

Rescue Breathing

A technique used to resuscitate a person who is unresponsive with pulse but has stopped breathing, the rescuer forces air into the victim's lungs at several seconds, using barrier devices such as pocket mask, bag valve mask or face shield. In some emergency cases in which these barriers are not available, a rescuer may give breath thru mouth to mouth or even mouth to mouth and nose technique.

Rescue Breathing in Adult

- Give 1 breath every 6 seconds.
- Make sure to give each breath over 1 second.
- Each breath shall produce chest rise.
- After 2 minutes of giving breath, check the pulse.

Rescue breathing in Children and infants

- Give 1 breath every 2 to 3 seconds.
- Make sure to give each breath over 1 second.
- Each breath shall produce chest rise.
- After 2 minutes of giving breath, check the pulse.

Mouth to Mouth Breathing in Adults & Children

- Open the airway by head tilt chin lift.
- Using your thumb and finger of your hand on the forehand, pinch the nose of the victim.
- Have a regular breath and tightly seal your lips around the victim's mouth so the air will not be leaking.
- Give 1 breath over 1 second and look for a chest rise, reopen the airway and give another breath.
- With 2 unsuccessful attempts, return to chest compression.

Figure 9.1 Mouth to Mouth Breathing in Adults & Children

Mouth to Mouth Breathing in Infants

- Open the airway by head tilt chin lift.
- Using your thumb and finger of your hand on the forehand, pinch the nose of the victim.
- Have a regular breath and tightly seal your lips around the victim's mouth so the air will not be leaking.
- Give 1 breath over 1 second and look for a chest rise, reopen the airway and give another breath.
- With 2 unsuccessful attempts, return to chest compression.

Mouth to Mouth and Nose Technique

- Open the airway by head tilt chin lift.
- Place your mouth over the infant's nose and mouth with an airtight seal.
- Give 1 breath over 1 second and look for a chest rise, reopen the airway and give another breath.
- With 2 unsuccessful attempts, return to chest compression.

Figure 9.2 Mouth to Mouth & Nose Technique

CPR with An Advanced Airway

An advanced airway (supraglottic airway, laryngeal mask airway, or endotracheal tube) provides a more stable way of providing breaths and should, therefore, be inserted as early as possible in a resuscitation effort.

During CPR with an advanced airway in place, the compression and ventilation is to be modified from 30:2 to continuous chest compression without pauses for ventilation for 2 minutes.

Adult: 1 breath every 6 second.
Children and infant: 1 breath every 2-3 seconds.

CPR in a pregnant women

Pregnancy is not an exemption when it comes to sudden Cardiac arrest. Just like in any other normal person, Sudden Cardiac arrest can happen anytime in any situation in pregnant woman.

Bystanders might be hesitant to render CPR to pregnant women because of the fear of harming the mother as well as the unborn baby. However, it is important to know that CPR is vital and is being recommended. When a pregnant woman receives CPR, the survival rate increases by 40% so act quickly and do not delay chest compression.

CPR for pregnant women is likely the same as for a normal adult, positioning of the mother is one of the key differences from resuscitating the non-pregnant patient.

Positioning

Once the uterus is palpable above the umbilicus (around 20 weeks), the uterus compresses the aorta and vena cava which decreases venous blood flow when the pregnant woman is in supine position. Thus, Health care providers are directed to modify the CPR by performing manual left uterine displacement (LUD) while the pregnant woman is lying flat on her back to relieve the pressure. This can be done with multiple rescuers.

Technique

- 1 Handed technique- the rescuer should be on the right side of the mother and pushing the uterus upward and leftward. (Figure 9.3)

- 2 Handed technique- rescuer on the left side of the bed with 2 hands pulling the uterus to the left side of the mother. (Figure 9.4)

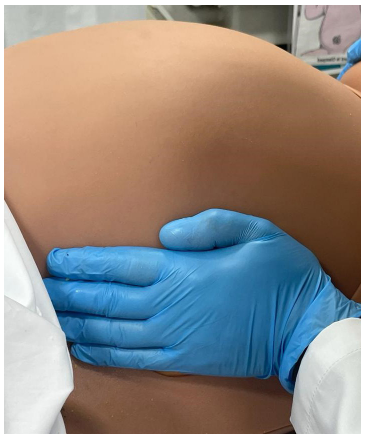


Figure 9.3 one handed technique

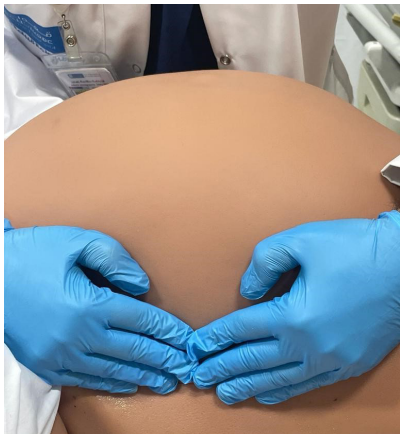


Figure 9.4 Two handed technique

Opioid Overdose Related Life-Threatening Conditions

OPIOIDS- sometimes called narcotics, are medications prescribed by doctors to treat persistent or severe pain. They are used by people with chronic headaches and backaches, by patients recovering from surgery or with severe pain associated with cancer.

Common Types of Opioids

Oxycodone, Oxymorphone, Hydrocodone, Hydromorphone, Fentanyl, Morphine, Codeine, Methadone, Tramadol, Buprenorphine

Taking opioids even with doctor's supervision can cause danger. Consistent use can increase tolerance and dependence, requiring higher and more frequent doses. Thus, making the person addictive.

Furthermore, when taken in a higher dose it can lead to fatal overdose which causes respiratory depression or respiratory arrest.

Recognizing an Opioid Emergency

- Assessment of the Scene.
- Ask bystanders about what happened.
- Check the surrounding and the victim and look for any signs of opioid use (injection, patch, empty medication bottles).
- Observe any signs of drug overdose:
- If the victim found to have pulse but not breathing normally, begin rescue breathing and give naloxone.
- If the victim does not have pulse and not breathing normally, start CPR and consider naloxone.

Signs of opioid overdose

- Unresponsiveness or unconsciousness.
- Slowed or stopped breathing.
- Snoring or gurgling sounds.
- Cold or clammy skin.
- Discolored lips or fingernails.

ACT QUICKLY:

- If the victim is found to have pulse but not breathing normally, begin rescue breathing and give naloxone.
- If the victim does not have pulse and not breathing normally, start CPR and consider naloxone.

How to Administer Naloxone

1. Intranasal (prepacked)- this method is safe and reliable. The nasal cavity has a large mucous membranes rich in capillaries for rapid absorption of drugs Insert the tip of the nozzle in either nostril then press the plunger firmly to give the dose.
   Remove the nasal spray from the patient's nostril after giving the dose.
2. Auto injector intramuscular- naloxone prefilled injection can be a single dose injected to the muscle.
3. Injection – intravenous, intramuscular and subcutaneous.

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NOTES

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جمعية القلب السعودية

Saudi Heart Association

National Life Support Committee

Basic Life Support