Chapter 7: Review of Cardiopulmonary Resuscitation

Learning objectives

- Identify the indicators for the use of cardio pulmonary resuscitation (CPR)/ automatic electronic defibrillator (AED).
- List and describe the 2016 guideline changes by the American Heart Association (AHA).
- Explain the hands-only CPR procedures and why it was developed.
- Describe how the AED affects the heart and how to apply the procedure.
- Compare and contrast the difference in performing CPR on an adult, a child and an infant.
- Explain how to identify a patient who is choking. Explain the steps to complete a Heimlich maneuver on a choking adult or child.

Purpose

This course is for review and updating information only. It is neither intended for CPR/AED Certification, nor is it for recertification. It is written for the certified nursing assistant that may be closest to the patient when a cardiac event occurs. The CNA must know how to activate the Emergency Response System (ERS) and begin life-saving procedures – until licensed providers are able to take over.

Overview

The American Heart Association (AHA) continually conducts research on data gathered from hospitals and EMS calls. This data is used when improving patients’ services toward the goal of improving survival rates after cardiac events. The AHA updated CPR guidelines for instructors in 2016.

An American Heart Association CPR certification is valid for two years; current cards are in force through the validity date. All refresher training is now under the new 2016 guidelines – these guidelines will be outlined in this course. It is important to stay current on cardio pulmonary resuscitation (CPR) and using an alternative external defibrillator (AED) for emergency cardiovascular care (ECC). Having the most current information ensures the safety of patients and enables your maintenance of certification as a certified nursing assistant.

New AHA guidelines: The focus is on completing these tasks simultaneously[1]

- Call for help while checking for a pulse and for adequate breathing.
- Use an AED as soon as it is available.
- Immediately activate the Emergency Response System (chances are that someone in your office will have a phone readily available, as opposed to someone having to ‘run’ to call 911).
- Chest compressions are administered – which is 100-120 per minute.
- Another AHA change in 2016 is the “ceiling” on the rate of chest compressions that are administered which is 100-120 per minute.

Under the old guidelines, chest compressions were given at a rate of at least 100 per minute (the rule of thumb was to sing the song ‘Stayin’ Alive’ as a tool to help keep tempo). One drawback to requiring only a minimum number of compressions per minute is that rescuers often tended to sacrifice quality for quantity. A compression rate of over 120 per minute often results in incomplete chest recoil and may compromise the venous return.

Compression depth for adults is modified to at least 2 inches (5 cm) – but should not exceed 2.4 inches (6 cm)[1].

Nursing consideration #1: Think about the new changes discussed above. Is your facility set up to accommodate these changes? If not, what would you suggest to change in the environment to enhance your own practice, as well as enhance the safety of the residents?

For witnessed adult cardiac arrest when an AED is immediately available, it is reasonable that the defibrillator be used as soon as possible[1]. For adults with unwitnessed cardiac arrest, or for whom an AED is not immediately available, it is reasonable that CPR be initiated while the defibrillator equipment is being retrieved and applied. The defibrillation, if indicated, should be attempted as soon as the device is ready for use[1].

Introduction

The Centers for Disease Control and Prevention (CDC) estimates that in 2015, about 800,000 Americans experienced their first heart attack; 470,000 Americans experienced their second heart attack; and more than 615,000 Americans died from heart-related events[2]. Most people who experience a cardiac arrest at home, at work or in a public location die because they did not receive immediate CPR from someone on the scene. According to the American Heart Association, someone in the United States has a myocardial infarction, or a heart attack, every forty-three seconds[2].

About 90 percent of people who suffer out-of-hospital cardiac arrests die; however, immediate CPR can double – or even triple – a cardiac arrest victim’s chance of survival[2].
ACUTE CORONARY SYNDROME (ACS)

Heart attacks and unstable angina are conditions called “acute coronary syndromes”: An umbrella term for situations where the blood supplied to the heart muscle is suddenly blocked[3].

The American Heart Association (AHA) provides the following information:

The heart muscle needs oxygen to survive and a heart attack occurs when the blood flow that brings oxygen to the heart muscle is severely reduced or cut off completely. This happens because coronary arteries that supply the heart muscle with blood flow can slowly become narrow from a buildup of fat, cholesterol and other substances that together are called plaque. This slow process is known as atherosclerosis. When a plaque in a heart artery breaks, a blood clot forms around the plaque. This blood clot can block the blood flow through the heart muscle. When the heart muscle is starved for oxygen and nutrients, it is called ischemia. When damage or death of part of the heart muscle occurs as a result of ischemia, it is called a heart attack or myocardial infarction (MI).

In summary, ACS can be described as a circulation problem. Most ACS incidents do not lead to sudden cardiac arrest when the heart stops. When the heart has stopped, however, a common cause is ACS[3].

Sudden cardiac arrest occurs when the heart’s electrical system malfunctions and the heart stops beating. The most common cause of sudden cardiac arrest is a disturbance in the heart rhythm called “ventricular fibrillation” (VF). VF or V-fib is a serious cardiac rhythm disturbance of the lower chambers in the heart. VF causes the heart to quiver or flutter and so it cannot pump blood effectively to circulate through the system. The heart may continue to falter until it stops beating: This is known as cardiac arrest[3].

The AED may also detect “ventricular tachycardia” (VT), or a pulse rate of more than 100 beats per minute, including at least three irregular heartbeats in a row. During cardiac arrest, blood does not circulate oxygen to the brain; cells will begin to die in four to six minutes. This explains the need to begin CPR/AED immediately.

To prevent imminent death, the patient requires prompt medical intervention. If the patient is unconscious, not breathing, and does not have a pulse, he or she needs cardiopulmonary resuscitation (CPR) or an automatic electronic defibrillator (AED) to restore oxygen and circulation to the heart muscle. A heart attack is the most common reason that CPR/AED is applied. Other reasons include near drowning, or other conditions that cause a person to stop breathing or cause his or her heart to stop beating[3].

The majority of patients who are affected by sudden cardiac arrest typically die. It is important that certified nursing assistants (CNAs) who are responsible for providing daily care for patients in a hospital, in assisted living facilities, in nursing homes or are in the home on a daily basis are trained in CPR. It is important for CNAs to recognize the signs of a patient experiencing a heart attack, or experiencing distress, so that they may be able to react appropriately and potentially save a patient’s life.

CNAs must renew their CPR training according to the standards established in their states and by the organizations for which they work.

Symptoms of a heart attack

It is important to recognize symptoms that a patient may exhibit before or during a heart attack to ensure that CPR is delivered promptly. Many times, the CNA may be the first health care professional who recognizes the patient’s distress. Here are some signs and symptoms that a heart attack is happening[3]:

- Chest pain or discomfort in the center of the chest that lasts more than a few minutes. It can go away and come back. Some people describe the pain as uncomfortable pressure, squeezing, fullness, or indigestion. It can be mild or severe.
- Upper body discomfort. Pain or discomfort may be felt in one or both arms, the back, shoulders, neck, jaw, or upper part of the stomach, above the belly button.
- Discomfort or pain in other parts of the body, such as pain in one or both arms, the back, neck, jaw or stomach.
- Shortness of breath that may occur with or without chest pain or discomfort.
- Nausea.
- Dizziness or light-headedness.
- Sweating.

Women and elderly patients may not present the “typical” symptoms of a heart attack described above. They may not even have chest pain. This can make it harder to recognize if these patients are having a heart attack. They may exhibit symptoms such as the following[6]:

- Pain between the shoulder blades.
- Pain in the arm (especially the left arm), back, neck and abdomen.
- Jaw or throat pain.
- Nausea and vomiting.
- Unusual, overwhelming fatigue for no reason, sometimes for days.
- Any sudden or new symptoms – or changes in the pattern of symptoms – that become stronger or that last longer than usual.

If the CNA suspects that a patient is having a heart attack, he or she must get help immediately. If a CNA is working in the hospital – or in an area where nurses and doctors are present and help is available – press the call light to signal help immediately. In a patient’s home, call 911.

If the patient is conscious, encourage him or her to rest quietly and take his or her vital signs. During ACS, physical activity should be avoided and the patient should rest: The heart is lacking adequate blood flow and oxygenation. If a patient stays active during a potential ACS, the heart rate and blood pressure increases and will result in increasing the workload of the heart[3].

Nursing consideration #2: What are the differences in symptoms of heart attack between men and women? What is the first thing you would do if you suspect or observe the symptoms of a heart attack?

RECENT AHA CHANGES IN 2016 CPR GUIDELINES

As previously indicated, the former compression rate of 100 per minute is now given a maximum rate of 120. This is due to the fact that too many compressions do not allow the chest to fully expand and recoil between compressions. This may interfere with the complete blood flow in the venous system. This change stresses the importance of performing chest compressions properly to keep the blood flowing through the heart and to the brain. Rescue breathing is still used, but only 2 breaths of 1 second each for every 30 compressions. Compressions should not be interrupted for more than 10 seconds.
The AHA 2015 updated guidelines note

“Conventional CPR (rescue breaths and chest compressions) should be provided for infants and children in cardiac arrest. The asphyxial nature of most pediatric cardiac arrests necessitates ventilation as part of effective CPR. However, because compression-only CPR can be effective in patients with a primary cardiac arrest, if rescuers are unwilling or unable to deliver breaths, we recommend rescuers perform compression-only CPR for infants and children in cardiac arrest.”

Recognition of cardiac arrest[6]

- First, determine whether the person is conscious or unconscious while summoning help. Tap or shake his or her shoulder or tap the collarbone and ask loudly, “Are you OK?” Check whether the person is breathing normally and whether she or he has a pulse.

Note: Gassing is not considered to be normal breathing. Do not take any more than five to 10 seconds to check for breathing. For example, is the patient’s chest moving up and down? Do you hear normal breath sounds? Is air coming out of the patient’s nose or mouth? Do not take any more than 10 seconds to check whether a patient has a pulse.

Activate the emergency response system (ERS)

- Follow the protocol to call for help in the facility, or call out loudly for help if you are at work in a place where other people are available to help you – such as a hospital or long-term care facility.
- For a witnessed collapse of an adult or adolescent: If alone with no mobile phone, activate the ERS, retrieve an AED before beginning CPR if it is nearby; otherwise begin CPR, send someone to get the AED and begin using it as soon as possible.
- For patients of all ages: 30 compressions to 2 breaths (30:2) at the rate of 100 to 120 compressions per minute and a 15:2 ratio with two rescuers. Breaths should not be longer than one second each.
- Compression/ventilation ratio:
  - For patients of all ages: 30 compressions to 2 breaths (30:2)
  - If no pulse is present, begin CPR.
  - If the patient is breathing and has a pulse but does not respond, call for help. If help is not available, call 911.
- Compressions review[7]: If a patient is not breathing but has a pulse, provide rescue breathing:
  - One (1) breath every 3-5 seconds, or about 12-20 breaths/minute.
  - Activate emergency response system (if not already done).
  - Continue rescue breathing; check pulse about every 2 minutes.
  - If no pulse is present, begin CPR.
  - If the patient is breathing and has a pulse but does not respond, call for help. If help is not available, call 911.
- If the person wakes up but is confused or unable to speak, call for help (if it is available) or call 911 (if help is not available).

PROCEDURES IF CPR IS INDICATED

For an unwitnessed collapse, do two minutes of CPR, activate ERS and get the AED, if nearby. Return to the patient of any age, resume CPR and use the AED as soon as possible.

If you are alone in a patient’s home or another location, call 911.

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  - At the rate of 100 to 120 compressions per minute and a 15:2 ratio with two rescuers. Breaths should not be longer than one second each.
  - If no pulse is present, begin CPR.
  - If the patient is breathing and has a pulse but does not respond, call for help. If help is not available, call 911.
- Compressions review[7]: If a patient is unresponsive, has no pulse and is not breathing, call for help or dial 911 if you are in a place where no help is available.
  - Call for help while checking for a pulse and assessing the patient.
  - Check the carotid pulse (on the side of the neck) in adults and children.
  - Put the patient on his or her back on a firm surface.
  - Kneel next to the patient’s neck and shoulders.
  - Put the heel of one hand over the center of the patient’s chest just below the patient’s nipples. Place your other hand on top of the first hand with your fingers interlaced. It is important that you keep your elbows straight and position your shoulders directly above your hands.
  - Use the weight of your body, not just your arms, to push straight down (compress) the patient’s chest. Push down on the adult’s chest to a depth of at least two inches, about five centimeters. Compress the patient’s chest at a rate of at least 100-120 compressions per minute.
  - Do not interrupt compressions for more than 10 seconds.
  - Give 30 chest compressions. This should take about 18 seconds.
  - Next, check the airway.
  - Note: 2015 updates include the following information for pregnant patients:
    - Priorities for the pregnant woman in cardiac arrest are provision of high-quality CPR and relief of aortocaval compression. If the fundus height is at (or above) the level of the umbilicus, manual left uterine displacement can be beneficial in relieving aortocaval compression during chest compressions.
  - Airway:
    - After 30 compressions, open the airway using what is called the head-tilt, chin-lift maneuver. Put your palm on the patient’s forehead and gently and carefully tilt the head back. With your

Nursing consideration #5: What are the differences in ratio, depth, and hand placement for adult, child and infant CPR?

What are the age guidelines for each group?

If patient is not breathing but has a pulse, provide rescue breathing:

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- Activate emergency response system (if not already done).
- Continue rescue breathing; check pulse about every 2 minutes.
- If no pulse is present, begin CPR.
- If the patient is breathing and has a pulse but does not respond, call for help. If help is not available, call 911.
- If the person wakes up but is confused or unable to speak, call for help (if it is available) or call 911 (if help is not available).

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  - Call for help while checking for a pulse and assessing the patient.
  - Check the carotid pulse (on the side of the neck) in adults and children.
  - Put the patient on his or her back on a firm surface.
  - Kneel next to the patient’s neck and shoulders.
  - Put the heel of one hand over the center of the patient’s chest just below the patient’s nipples. Place your other hand on top of the first hand with your fingers interlaced. It is important that you keep your elbows straight and position your shoulders directly above your hands.
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  - Airway:
    - After 30 compressions, open the airway using what is called the head-tilt, chin-lift maneuver. Put your palm on the patient’s forehead and gently and carefully tilt the head back. With your
other hand, gently and carefully lift the chin forward to open the airway.

- Check if the patient is breathing. Do not take any more than five to 10 seconds to do so. For example, is the patient’s chest moving up and down? Do you hear normal breathing sounds? Is air coming out of the patient’s nose or mouth? If the patient is not breathing, you need to begin rescue breathing for the patient (see previous section).

- Breathing:[7]
  - If the patient is not breathing, maintain the open airway with the head-tilt, chin-lift maneuver.
  - Pinch the nostrils shut and cover the patient’s mouth with yours, making a seal over the patient’s mouth.
  - Give two rescue breaths using a CPR mask/face shield. This will allow you to perform rescue breathing, but will protect you from possible contamination from bacteria in the patient’s mouth.
  - Give the first breath big enough to make the chest rise. If the chest rises, give a second breath.
  - If it does not rise, repeat the head-tilt, chin-lift maneuver and then give the second breath. There may be a foreign object lodged in the mouth, such as dentures that have come loose, making rescue breathing ineffective. If you see an object in the mouth, try to remove it, being careful not to push the object further down the throat. Note: Do not do what is called a “blind sweep” of the mouth. In other words, do not just sweep your fingers through the patient’s mouth to try to feel a foreign object. You must see the object before trying to remove it.
  - Next, give 30 chest compressions. The chest compressions may serve to dislodge or shift the object so the individual can begin breathing again.

- Repeat the process: 30 compressions, and then two rescue breaths each for one second.
- Each time you perform 30 chest compressions and two rescue breaths, you have completed what is called a “cycle.” It takes about two minutes to perform four to five cycles.
- After completing four to five cycles, or about two minutes of CPR, check for breathing and pulse. If breathing and pulse are not present, continue to perform CPR until help arrives.
- If a pulse is found, but the patient is not breathing, continue rescue breathing; however, stop chest compressions. Provide rescue breathing at a rate of one breath every six seconds or 10-12 a minute for adults and adolescents. For children, use one breath every 3-5 seconds of 12-20 per minute.

Key concepts with a second rescuer:[7]

Providing CPR may be very tiring if there is only one person performing it all. Therefore, if a second person is available, ask him or her to assist. In addition, if you ever arrive on a scene where somebody is performing CPR, inform them, “I can help, I know CPR.” Before the second rescuer begins, the first rescuer needs to complete the 30 compressions and two breaths currently in progress.

- The patient is checked for pulse and breathing. If there is no pulse and the patient is not breathing, CPR is resumed with the two rescuers.

- The rescuers should be on opposite sides of the patient so that each rescuer has enough room to work. One rescuer performs rescue breathing and the other performs the chest compressions. In the event that the first rescuer is exhausted by the time the second rescuer arrives, the second rescuer may have to perform both chest compressions and rescue breaths.
- The rescuer(s) continue CPR until other trained personnel arrive and assume responsibility for the patient such as nurses, physicians or EMS personnel.

ADULT CPR

- For adult victims of cardiac arrest, the CNA will perform chest compressions at a rate of 100 to 120 per minute.
- During manual CPR, the CNA should perform chest compressions to a depth of at least 2 inches (5 cm) for an average adult, while avoiding excessive chest compression depths (greater than 2.4 inches (6 cm)).
- The CNA should continue compression-only CPR until the arrival of an AED – or the arrival of rescuers with additional training.
- If a trained lay rescuer or a CNA is able to give rescue breaths, he or she should add rescue breaths in a ratio of 30 compressions to 2 breaths that are delivered over 1 second, making sure the chest rises.
- The CNA should continue CPR until an AED arrives and is ready for use. EMS providers will then take over the care of the victim, or the victim will begin to move and breathe.

- Hands-only compression methods are easier for untrained staff; however, for a trained CNA, the AHA's and Red Cross’ recommendation is to perform compressions and rescue breaths.
- The CNA must call for nearby help upon finding an unresponsive patient, while simultaneously assessing breathing and pulse. This change was made to minimize delay of the first compression and promote a fast response, rather than employing a slow, step-by-step method.
- The priority – if alone – is to activate the emergency response system and provide chest compressions.
- Be sure the chest is allowed to rise completely between compressions; do not lean on the chest.
- In the case of sudden cardiac arrest, AED should be used as soon as possible.
Hands-only CPR[2]

This type of CPR was developed for untrained bystanders because it is easier and involves no mouth contact, which might encourage people to get involved. This method is outlined below:

- Assess the patient.
- Tap the person’s shoulder and shout, “Are you OK?” It is alright to shake an adult to make sure they are not sleeping but never shake an infant or young child. When checking an infant for responsiveness, you may also include flicking the bottom of the foot, along with the standard technique of tapping on the shoulder and shouting.
- Look for normal breathing as listed above and call 911 if there is no response. Start hands-only CPR.

Note: Do not use hands-only CPR or adults when cardiac arrest is due to drug overdose. Normally the CNA would be familiar with the patient to some degree, even if the patient was not directly assigned to them, and would know if there is a history of opioid abuse. This is important because in an unwitnessed cardiac arrest, it is impossible to know the exact cause was not opiate overdose, requiring naloxone, or how long the person has been non responsive. For an unwitnessed event, including opiate overdose start traditional CPR as listed above with a combination of chest compressions and rescue breathing. As stated earlier, traditional CPR should be used with children and infants, unless the rescuer is unwilling or unable.

- Start with two compressions using the same hand position, depth, and rate as listed above.
- Continue and do not stop unless a trained responder takes over, or there is an automated external defibrillator (AED) to use.
- Use the AED as soon as it is available.
- Be sure to continue CPR until the AED begins to work on the patient.

Opiate overdose

The opiate overdose problem is occurring in all geographic areas, all ages and all socioeconomic groups. The 2015 AHA guidelines for CPR in this area are as follows:

- Patients with no definite pulse may be in cardiac arrest or may have an undetected weak or slow pulse. These patients should be managed as cardiac arrest patients. Standard resuscitative measures should take priority over naloxone administration, with a focus on high-quality CPR (compressions plus ventilation).

It may be reasonable to administer IM or IN naloxone based on the possibility that the patient is in respiratory arrest, not in cardiac arrest. Responders should not delay access to more-advanced medical services while awaiting the patient’s response to naloxone or other interventions.

CHILD CPR

Pediatric basic life support and CPR quality

According to the the Red Cross[7]:

“It is essential to obtain permission from a parent or guardian before providing care. If a parent or guardian is not present, consent is implied in a life-threatening situation. Do not let the absence of a parent be a barrier to helping a child who needs immediate help.”[7]

For children and infants only[7]

In an instance where a child is found unconscious – without someone seeing the child collapse – you should also immediately give 2 rescue breaths, once determined that there is no breathing. This will help you identify an airway obstruction (if present), such as when a child is choking-a common precursor to cardiac arrest in young children.

Performing CPR on a child

When performing CPR on a child ages 1 through 8, the procedure is about the same as that for an adult except for the following differences:

- If you are alone and no help is available, perform five cycles of compressions and breaths on the child (this takes about two minutes) before calling 911. If help is available, however, have them call 911 immediately.
- To open a child’s airway, use the head-tilt/chin-lift technique by placing one hand on the child’s forehead and tilting the head back, and two or three fingers of the other hand to lift the chin slightly past a neutral position. As you deliver the 2 rescue breaths required during each cycle, this will help ensure oxygen is able to make it through all those miles of airways to get to the child’s vital organs.
- Use one hand to perform chest compressions. Place your hand on the breastbone directly between the child’s nipples.
- Compress to a depth of about two inches, or about a third of the thickness of the child’s chest.
- Note that the ratio of compressions for children is the same as for adults: About 100-120 per minute followed by two rescue breaths of a second each.
- If the child does not respond after two minutes of CPR, use an AED if it is available. Apply pediatric pads if they are available.

Pediatric CPR[6]

- The compression, airway, and breathing (C-A-B) sequence has been reaffirmed in 2015, and has been included in the 2016 publications and training.
- Use the recommended adult chest compression rate of 100 to 120 per minute for infants and children.
- Compression depth should be at least 1/3 the anterior-posterior diameter of the chest.
- Infants: Approximately 1.5 inches (4 cm).
- Children: Approximately 2 inches (5 cm).
- Adolescents: At least 2 inches (5 cm), but no greater than 2.4 inches (6 cm).
- Deliver compression and breaths at the 30:2 ratio for children and 15:2 for infants. If that is not possible, perform compression-only CPR.

Nursing consideration #4: When performing CPR, what are the differences for adults, children and infants?

Before beginning CPR, ensure that the scene is safe for both the patient and the CNA. For example, the even may occur outside.
Performing CPR on an infant

Most cardiac arrests in infants—babies less than 1 year old—occur because of a lack of oxygen, such as from drowning or choking. If you know that the baby’s airway is obstructed, perform first aid for choking. But if you do not know why the baby is not breathing, you need to initiate rescue breathing. And if the baby also does not have a pulse, you need to perform CPR.

Here are the steps for infant CPR:

- Check whether the baby is responsive. Stroke the baby, especially the soles of his or her feet. Rubbing or tapping the soles of a small infant’s feet is a good way to check for responsiveness. If the baby is more than 2 months old, tap his or her shoulder or chest. Call out the baby’s name in a loud voice. However, do not shake the baby.
- Note that if you are alone, help is not available and the baby is not breathing or does not have a pulse, perform CPR for two minutes—then call 911. If help is available, have help call 911 immediately. An infant’s pulse is checked at the site of the brachial pulse in the inner bend of the elbow or the femoral pulse (in the groin).
- Place the baby on a firm surface, such as a table or on a floor.
- Imagine that you see a horizontal line drawn between the baby’s nipples. Place two fingers of one hand just below this line on the center of the baby’s chest.
- When performing two-rescuer CPR on an infant, the two-thumbs-encircling-hands technique should be used. The first rescuer should give chest compressions while the second rescuer gives ventilations.
- Push straight down about an inch and a half, about 4 cm. Compress at a rate of 100-120 compressions per minute.
- Perform chest compressions: 15 per cycle.
- To establish an open airway, do the head-tilt/chin-lift technique to gently place the head in a neutral position, the head and chin are neither flexed downward toward the chest nor extended backward.
- Check for breathing for no more than 10 seconds. Is the baby’s chest moving up and down? Do you hear breathing sounds? Is air coming out of the baby’s nose or mouth? If there are no signs of breathing, you need to breathe for the infant.
- Cover the baby’s mouth and nose with your mouth. If you have an infant-sized CPR mask or face shield, use it.
- Give two rescue breaths by delivering gentle puffs of air instead of deep breaths from your lungs, as you would do with an adult or child. Give one rescue breath and look to see whether the baby’s chest rises. If it does not, repeat the head-tilt, chin-lift maneuver and give the second rescue breath.
- If the baby’s chest still does not rise, check his or her mouth to make sure there is nothing inside the mouth that is blocking the airway. If you see a foreign object in the mouth, try to take it out of the mouth with your finger. If the airway is blocked, you will need to perform first aid for a choking baby. Do not do a “blind sweep” of the baby’s mouth.
- Give two breaths after every thirty compressions.
- Continue CPR until the baby responds or until trained medical help arrives. If an infant has a pulse but is not breathing, perform rescue breathing focus on a hands only method and the use of AED at a rate of one breath every three to five seconds.

Nursing consideration #6: When performing CPR on children and infants what are the differences in head tilt, hand placement, ratio and checking for responsiveness? What are the differences if there are two responders?

CHOKING

There are times when a patient may become unconscious from choking. Choking is a scary situation for the patient and anybody around him or her. Choking occurs when a foreign object becomes lodged in the throat or windpipe, blocking the flow of air. It is important to recognize the signs of choking, because it will affect the oxygen to the brain, then to the rest of the body. The universal sign of choking is clutching the throat. The patient may also have other symptoms, such as:

- Inability to cough forcefully.
- Skin, lips and nails turning blue or dusky.
- Loss of consciousness.

It is important to check whether the patient is conscious or unconscious. To do so, ask, “Are you choking?” If the patient responds by nodding or is obviously conscious, perform first aid for the choking conscious patient. Call for help or call 911. If you are alone, perform first aid for choking. If the patient does not improve after one minute of performing first aid for choking, call 911.

Adult/child

Give five back blows between the patient’s shoulder blades with the heel of your hand.

If the patient is still choking, give five abdominal thrusts, also known as the Heimlich maneuver. To perform the Heimlich maneuver, stand slightly behind the victim and place one arm diagonally across his chest, and then bend him over until the upper airway is at least parallel to the ground.

Bottom of form: The proper fist position to give abdominal thrusts is the thumb side of the fist positioned.

Top of form: Just above the navel. The fist should then be covered by the other hand, and 5 quick upward abdominal thrusts delivered. Cycles of 5 back blows and 5 abdominal thrusts should continue until the object is forced out or the victim can cough forcefully or breathe. If a victim becomes unconscious, he or she should be carefully lowered to the ground so the rescuer can continue to provide care.

- Make a fist with one hand and place it slightly above the person’s naval. Press hard into the abdomen with a quick upward thrust. Perform five abdominal thrusts. If the blockage still is dislodged, repeat the five back blows followed by five abdominal thrusts.
- Continue repeating five back blows and five abdominal thrusts until the blockage is dislodged or until licensed medical help arrives.
- If the blockage is dislodged, be sure to stay with the patient until help arrives.
- If the patient becomes unconsciousness, perform first aid for the unconscious adult or child.
- If the patient becomes unconscious, lower him or her onto the floor on his back.
- Clear the patient’s airway if you can see a foreign object blocking the airway. Carefully reach a finger into the mouth and sweep out the object, but be careful not to push the object deeper into the airway. Do not sweep the mouth unless you can see the foreign object.

- If you cannot remove the blockage and the patient remains unresponsive, perform five chest compressions followed by two rescue breaths.
- If the patient’s condition deteriorates (no pulse and no breathing), proceed to perform CPR.

**Infant**

- Sit down and hold the infant face down on the adult’s forearm resting on the thigh on his or her thigh.
- Thump the infant gently and firmly on the middle of the back with the heel of the hand.
- If that does not work, turn the infant face up on the forearm with the baby’s head lower than the truck of the body.
- Place two fingers at the center of the chest over the breastbone and give five quick chest compressions.
- If you see an object in the baby’s mouth, try to remove it, but be careful not to push it further down the baby’s throat. Do not do a “blind sweep” of the baby’s throat.

**AUTOMATIC EXTERNAL DEFIBRILLATORS (AED)**

AEDs are portable, computerized devices that are easy for untrained staff to use. They analyze heart rhythms using electrodes placed on a patient’s chest. The AED will not deliver a shock unless VF or VT, is detected. If indicated, the AED provides the shock (defibrillation) needed for restarting the heart called. The shock to the chest wall from the AED interrupts the disturbed rhythm so it regains normal activity.

For each minute that CPR and defibrillation are delayed, the person’s chance of survival is reduced by about 10%. This fact underscores the vital role of immediate action by the CNA[7].

To minimize the time to defibrillation for cardiac arrest victims, the deployment of an AED should not be limited to trained individuals, although training is still recommended[7].

**How to use the AED[8]**

Before using an AED, check for puddles or water near the person who is unconscious. Move him or her to a dry area, and stay away from wetness when delivering shocks (water conducts electricity).

- Continue performing CPR until the pads are in place and the AED is ready to start analyzing.
- Turn on the AED power for step-by-step instructions from the device. The CNA will hear voice prompts and see prompts on a screen.
- Remove clothing over chest.
- Wipe chest dry.
- Attach pads: Place one pad on the right center of the person’s chest above the nipple. Place the other pad slightly below the other nipple and to the left of the ribcage.
- Make sure the sticky pads have good connection with the skin. If the connection is not good, the machine may repeat the phrase “check electrodes.”
- If the person has a lot of chest hair, it may need to be trimmed (AEDs usually come with a kit that includes scissors and/or a razor).

Immediately after the AED delivers a shock

The AED will prompt you to resume compressions and follow additional AED prompts.

- If the person is wearing a medication patch that is in the way, remove it and clean the medicine from the skin before applying the sticky pads.
- Remove metal necklaces and underwire bras. The metal may conduct electricity and cause burns. Cut the center of the bra and pull it away from the skin.
- Check the person for implanted medical devices, such as a pacemaker or implantable cardioverter defibrillator (The outline of these devices is visible under the skin on the chest or abdomen, and the person may be wearing a medical alert bracelet). Also check for body piercings.
- Move the defibrillator pads at least 1 inch away from implanted devices or piercings so the electric current can flow freely between the pads.
- Make sure wires from the electrodes are plugged in to the AED.
- Make sure everyone steps back. Do not touch the person. Say “Clear.”
- Push the “Analyze” button if it does not analyze automatically.
- If the device indicates a shock is advised, push the “Shock” button.

**The AED for children and infants**

The adult AED can be used on children under eight years of age – but not under one year.

- If the AED does not have a pediatric pad/cable system, the CNA should proceed with the adult AED after one minute of CPR.
- On an infant, make sure that the pads do not touch each other. Place one pad in the middle of the infant’s chest and the other on the infant’s back to safely use the AED.

- If you see an object in the baby’s mouth, try to remove it, but be careful not to push the object deeper into the baby’s throat.
- If removing the object and/or performing back thumps and chest compressions do not work and breathing doesn’t resume, begin the CPR procedure for infants.

Special note: To perform the Heimlich maneuver on a pregnant woman or an obese person, position your hands a little bit higher than usual, at the base of the breastbone.

Nursing consideration #7: What are the differences when applying the AED to adults, children and infants? If you have no pediatric equipment what should you do?
The hands-only method and use of the AED

To emphasize the increased focus on compression, make CPR easier for bystanders and untrained staff, and to encourage immediate involvement, the American Heart Association developed the hands-only method:

Compression-only CPR is easy for an untrained rescuer to perform and can be more effectively guided by dispatchers over the telephone. Moreover, survival rates from adult cardiac arrests of cardiac etiology are similar with either compression-only CPR (or CPR with both compressions and rescue breaths) when provided before EMS arrival; however, for the trained lay rescuer or for the CNA who is able, the recommended best practice remains for the rescuer to perform both compressions and breaths.

The final addition is the portable AED as a vital tool in the life-saving process. The newer models may include visual and auditory directions, and are safe and easy for the untrained rescuer to use. Any 911 personnel will provide guidance in the proper application of the AED as well.

Conclusion

It is important to carefully review the changes to CPR/AED to stay informed on the frequent changes in the AHA and Red Cross guidelines. Current changes involve simultaneously assessing the patient while calling for assistance, emphasizing compression and ventilation as the best practices, including the hands-only option for lay persons, identifying a ceiling of 120 compressions per minute, implementing compression-only (rather than nothing), and emphasizing the use of AED as soon as one is available – even without prior training.

It is important that all health care professionals are adequately trained to handle cardiac and pulmonary emergencies. The prompt actions of a CNA may be the potential difference in life or death for the patient. Many training centers now offer online-learning courses which allow students to complete the classroom portion of their CPR certification and take a written test. An instructor is still needed for practical skill demonstration and testing using current guidelines. Many facilities provide training on site, but if not, the online tool is an alternative. According to 2015 AHA guidelines updates:

- CPR self-instruction through video and/or computer-based modules with hands-on practice may be a reasonable alternative to instructor-led courses. It may be reasonable to use alternative instructional modalities for basic and advanced life support teaching in resource-limited environments.
- Be sure to check the CPR/AED card for the expiration date and, if it is due to expire, schedule the next training to learn and practice current procedures. The AHA states in the 2015 updates: Two-year retraining cycles are not optimal. More-frequent training of basic and advanced life support skills may be helpful for providers who are likely to encounter a cardiac arrest. Given the potential educational benefits of short, frequent retraining sessions coupled with the potential for cost savings from reduced training time and removal of staff from clinical environment for standard refresher training, it is reasonable that individuals who are likely to encounter a cardiac arrest victim perform more frequent manakin-based retraining. There is insufficient evidence to recommend the optimal time interval.
- For this reason the requirements may CPR/AED training may change. Even before training is due, the CNA should review current training materials so that if an emergency occurs, the CNA can feel confident in their skills to save a life.

References