MANAGEMENT OF COLLAPSED ADULT PATIENT

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Background

A patient collapsing while in the dental chair is not only an embarrassing situation but also a real medical emergency. Such situation can happen at anytime. Dental doctors should be able to manage collapsed patient. All collapsed patients should be considered as cardiac arrests, unless otherwise proven. This is a medical emergency where the time and the presence of mind are so crucial.

Basic life support (BLS) is the most effective management strategy to save the life of a collapsed patient in any setting. BLS is evidence based structured approach to save lives. Unfortunately BLS is not emphasized adequately even in medical curriculum.

International organization like ILCOR (International Liaison Committee Of Resuscitation), AHA (American Heart Association), RCUK (Resuscitation Council United Kingdom) and other professional bodies have formulated a structured approach in Basic and Advanced Life Support. They revised these guidelines in every five years. Latest guidelines were proposed in 2005. BLS, ACLS (Advanced Cardiac Life Support) guidelines are the most scientific and evidence based approach so far available. This article is based on American Heart Association 2005 guidelines.

Basic Life Support Approach

If somebody has collapsed, the following steps are to be followed.

A : Assessment and airway
B : Breathing
C : Circulation
D : Defibrillation

Each step should be followed in two levels, first assess and then manage appropriately. Eg. Assess airway, if airway is obstructed, relieve the obstruction so that all together there will be 8 steps in BLS sequence. Each step should be followed in a YES or NO pattern.

STEP 1

Assess and manage airway

In any scenario, managing a collapsed patient, should start with assessment of responsiveness. Just do "shake and shout."

"Are you OK."

If patient is responsive, just reassure. If he is not responding, do the following steps.

1. Call for help, Activate emergency medical services, get an AED.(Automated External Defibrillator)
2. If patient is dental chair, adjust the dental chair to neutral position.
3. If the patient is in prone position shift to supine position.
4. Loose tight dresses
5. Open up the airway using HEAD TILT AND CHIN LIFT. If victim is involved in trauma-do JAW THRUST. NO head tilt should be done in trauma victims.
6. If there is any visible foreign body, secretion or vomittus or blood in the airway, clear it

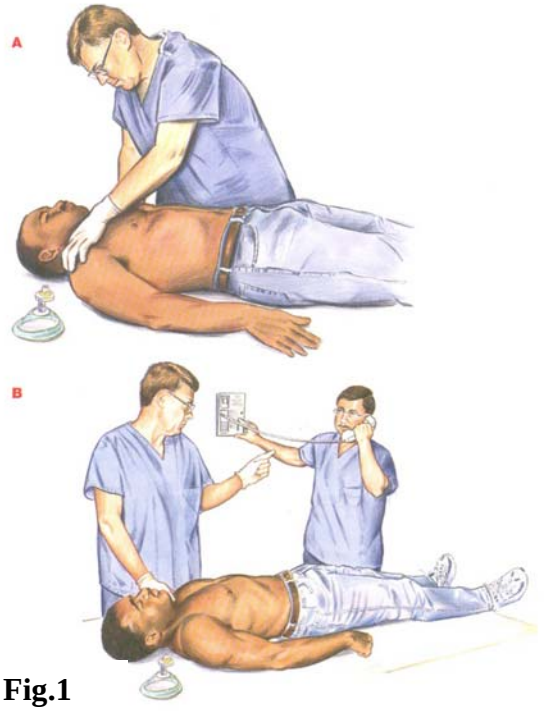

Fig.1

or unresponsiveness and activate the emergency response system. **A**, Tap the victim's shoulder and shout "Are you all right?" **B**, If the adult victim does not respond, shout for help. another rescuer responds, send him or her to activate the emergency response system.

Remember

1. Loud nosy breathing is the sign of obstructed airway.
2. The tongue is the commonest cause for airway obstruction

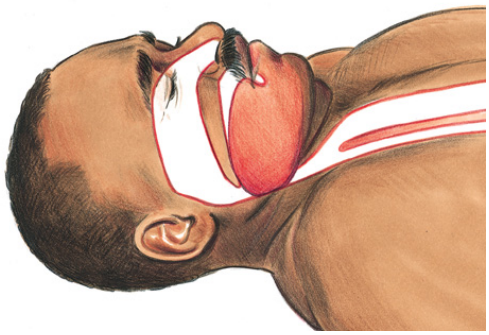

Fig.2 ***Tongue obstructs airway***

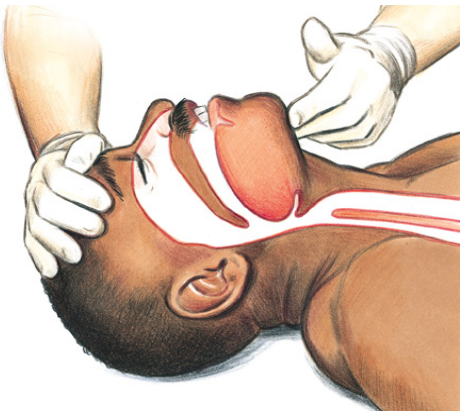

Fig.3 ***Head tilt chin lift***

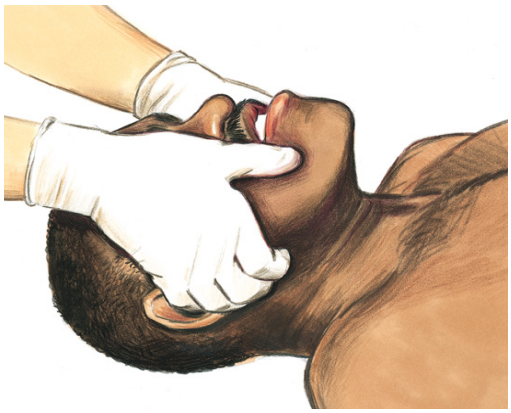

Fig.4 ***Jaw thrust***

<u>STEP 2</u>

Assess and manage Breaths

Assess Breathing by LOOK, LISTEN, AND FEEL

- Look for Chest movement
- Listen breath sound
- Feel for warmth of breath

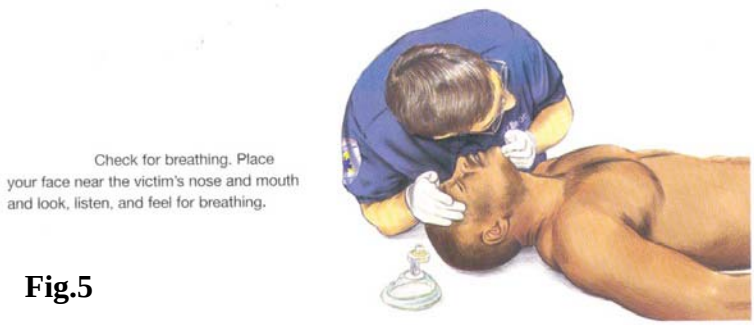

Fig.5

If victim is not breathing

Provide 2-rescue breath, each breath should last for one second with adequate chest rise.

Methods

1. Mouth to mouth ventilation
   - Standard technique to provide up to 16 % of O_2
   - Risk of direct contact

2. Mouth to mouth ventilation using a barrier device.
   - Face shield is barrier device
   - Prevent direct contact with victim
   - Towels or clothes are not recommended

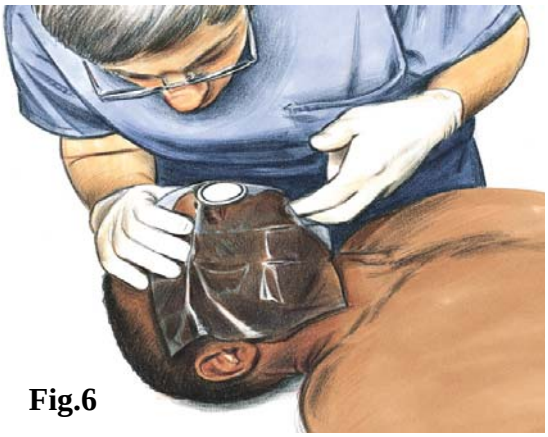

Fig.6

3. Pocket mask
   - Effective way to provide mouth to mask ventilation
   - No direct contact with victim

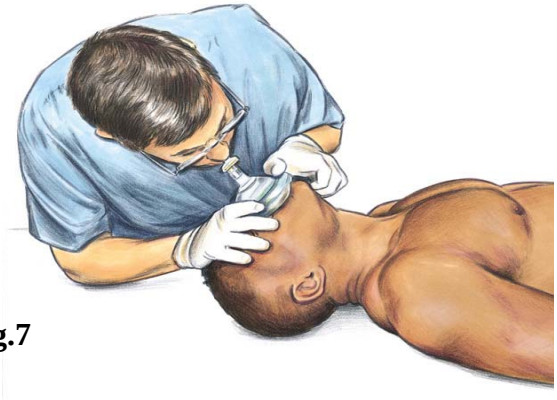

Fig.7

4. Bag-mask ventilation
    - Most effective way to provide rescue breathes
    - No direct contact
    - Can maintain life for a long time
    - You can provide high concentration of O_2 up to 80 % to 100 %
    - Apply cricoid pressure (To prevent gastric distention and regurgitation during bag mask ventilation

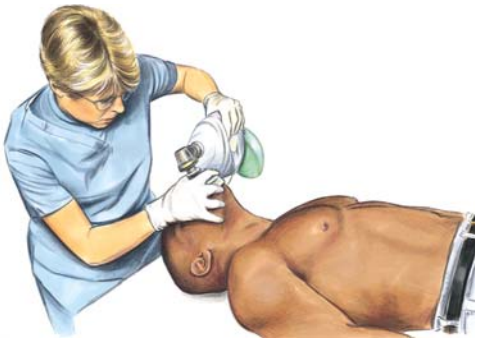

Fig.8

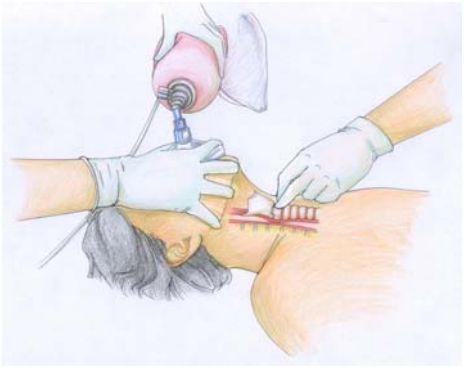

Fig.9 ***Cricoid pressure***

If the patient unresponsive but breathing normally

Shift the patient to recovery position for observation (Do not shift Trauma patients to recovery position.)

Recovery position **Fig.10**

Advantages

1. No risk of aspiration
2. No risk of airway obstruction

STEP III

Assess and manage circulation

Check carotid pulse in the anterior groove of the sternocledomastoid at the level of thyroid cartilage. Try to assess carotid pulse up to 10 seconds

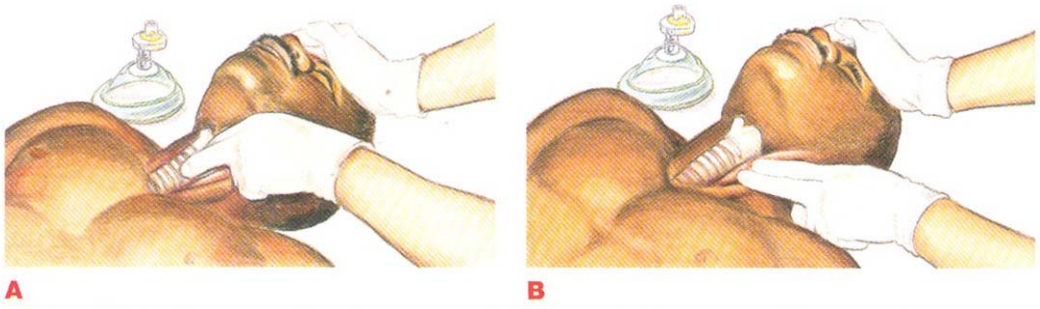

Fig.11 Finding the carotid pulse. **A**, Locate the trachea. **B**, Gently feel for the carotid pulse.

If no pulse

Start external cardiac compression. Shift the patient to hard surface or floor. Compression site on the sternum just below the inter mammary line

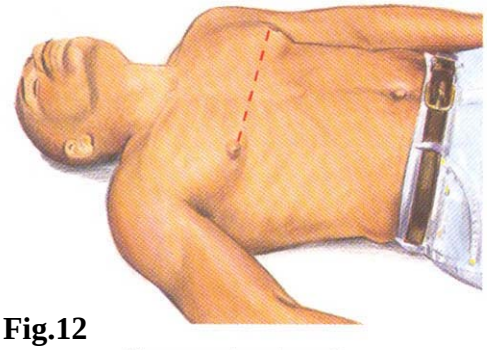

Fig.12 Place your hands on the breastbone at the nipple line.

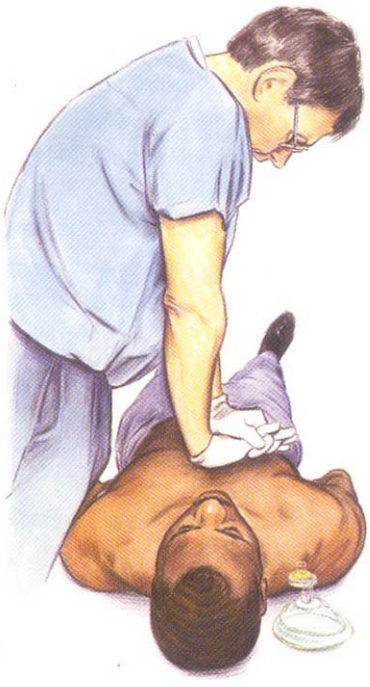

Fig.13 Position of the rescuer during chest compressions.

Apply the following rules strictly

- Push hard
- Push fast 100/mt
- Adequate chest recoil in between
- Minimum interruption in between
- Change the rescuer in every 2 mts
- Provide 30 compression

2005 Guideline emphasis so much on compression. Advocated compression ventilation ratio is 30:2; and reassess the patients pulse and rhythm every two minutes or after 5 CPR cycles.

STEP 4

Assess and manage arrest rhythm

Defibrillation

Principles of early defibrillation

Early defibrillation is crucial for victims of sudden cardiac arrest for the following reasons.

- The most common initial rhythm in witnessed sudden cardiac arrest is ventricular fibrillation (VF) when VF is present, the heart quivers and does not pump blood.
- The most effective treatment for VF is electrical defibrillation(delivery of shock to stop the VF)
- The probability of successful defibrillation decreases quickly over time
- VF deteriorate to asystole if not treated.

The earlier defibrillation occurs, the higher the survival rate When VF is present, CPR can provide a small amount of blood flow to the heart and brain but cannot directly restore an organized rhythm. Restoration of a perfusing rhythm require immediate CPR and defibrillation within a few minutes of the initial arrest. Figure 14 displays the sequence of events that must occur the successful resuscitation from cardiac arrest.

Without bystander CPR, the chance of survival from VF Cardiac arrest declines by 7% to 10 % without defibrillation (see figure 15) Bystander CPR improves survival from VF cardiac arrest at most defibrillation intervals

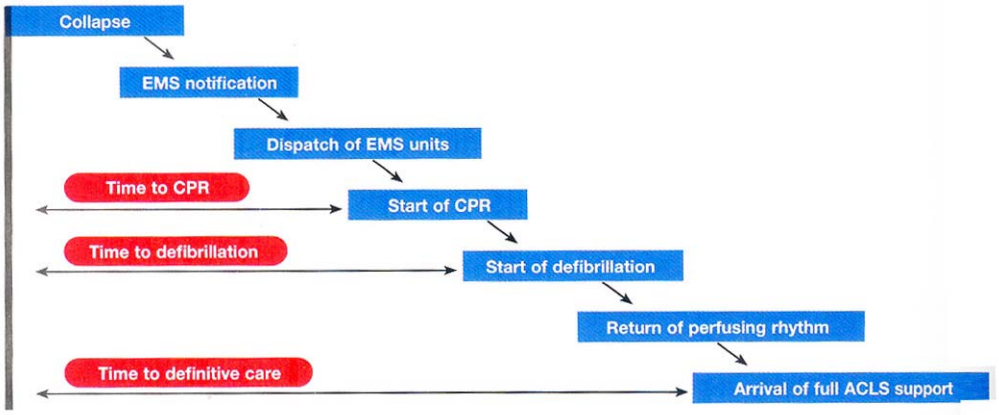

Fig.14 Sequence of events and key intervals that occur with cardiac arrest.

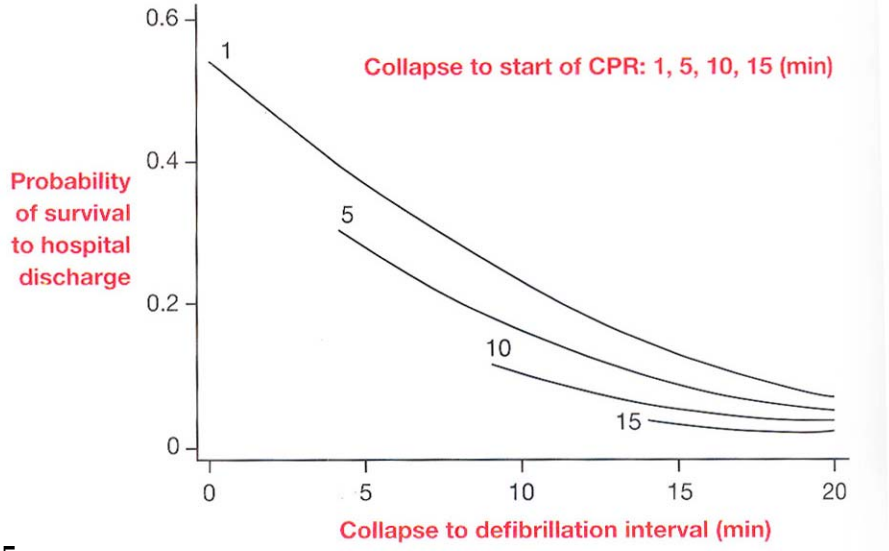

Fig.15 Effect of collapse-to-CPR interval and collapse-to-defibrillation interval on survival to hospital discharge. The graph displays the probability of survival to hospital discharge in relation to 4 intervals from collapse to start of CPR (1, 5, 10, and 15 minutes) and collapse to defibrillation (5, 10, 15, and 20 minutes). To determine the probability of survival for an individual patient, identify the curve indicating the interval between collapse and CPR, and then identify the point on that curve that corresponds to the interval from collapse to defibrillation (see horizontal axis). The probability of survival is then indicated on the vertical axis. Based on data from King County, Washington (N=1667 witnessed VT/VF arrests), with additional cases from Tucson, Arizona (N=205 witnessed VT/VF arrests).

Structure and Function of AEDs

AEDs are computerized device that are attached to a pulseles victim with adhesive pads. They will recommend shock delivery only if the victims heart rhythm is one that a shock can treat. ASEDs give rescuer visual and voice prompts to guide rescuer actions.

The word automated actually means semiautomatic, because most commercially available AEDS will advice the operator that a shock is needed but will not delivery a shock without an action by the rescuer (i.e., the rescuer must push the SHOCK button)

A small number of fully automated AEDs are now in use. If a fully automated defibrillator detect a rhythm that a shock can treat, it will deliver a shock without operator intervention.

Adhesive electrodes attach the AED to the patient. Most AEDs operate in the same way and have similar components. The following sections present common aspects of AED function and operation, including troubleshooting information.

Inappropriate Shocks or Failure to shock

Several factors can affect AED analysis
Patient movement (eg, agnoal gasps)
Repositioning the patient
AEDs are extremely safe, especially when used properly

AED operation

Use AEDs only when victims have the following 3 clinical findings:
No response
No breathing
No pulse

The patient in cardiac arrest may demonstrate agonal gasps. Agonal gasps are not effective breathing. A victim who has agonal gasps and does not respond and has no pulse is in cardiac arrest. Remember that agonal gasps are not effective breaths.

The universal AED: Common steps to operate all AEDS

Once the AED arrives, put it at the victim’s side, next to the rescuer who will operate it. This position provides ready access to the AED controls and easy placement of electrode pads. It also allows a second rescuer to perform CPR from the opposite side of the victim without interfering with AED operation.

AEDs are available in different models. There are small differences from model to model, but all AEDs operate in basically the same way. The following tables lists the 4 universal steps for operating an AED.

Step	Action
1	Power on the AED
2	Attach electrode pads to the victim's bare chest
3.	Analyze the rhythm
4.	If the AED advices a shock, it will tell you to be sure to clear the victim
5.	Begin CPR with chest compressions as soon as the AED gives shock

AEDs

Fig.16

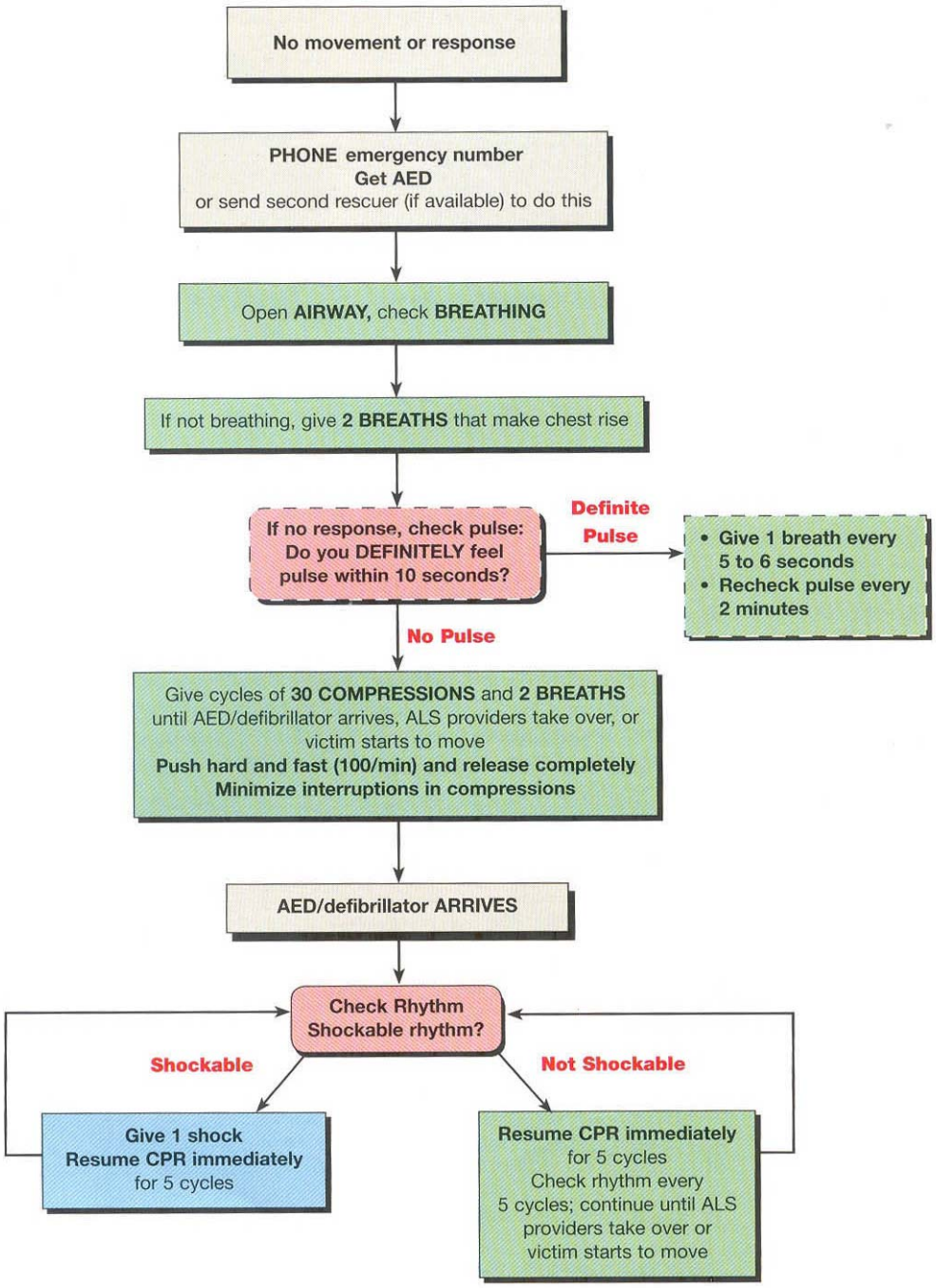

Fig.17 Adult BLS Algorithm.

Hands-Only CPR for adults who suddenly collapse

Hands-Only CPR has been widely publicized by the AHA as an appropriate bystander response to adult victims of out-of-hospital, witnessed, sudden cardiac arrest. So, don't be surprised if others at the scene of such an event are performing Hands-Only CPR, that is, CPR without breathing. They've probably learned the following two simple steps:

Call Emergency

Push hard and fast
in the center of the chest

Fig.18

Hands-Only CPR is NOT recommended for:

- Unresponsive infants and children
- Victims of
  - drowning
  - trauma
  - airway obstruction
  - acute respiratory diseases
  - apnea, such as associated with drug overdose

For Further Reading

BLS for Healthcare Providers – Student Manual, 2006 American Heart Association, www.americanheart.org/cpr

Circulation December 13, 2005; 112 (Suppl. 1): 1 - 211, http://circ.ahajounrals.org