Pediatric Basic Life support

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This session will be recorded

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- The information in this presentation and the video record is up to date as the date it was recorded 12/11/2020
- It has not been updated to include any subsequent advances in practice, and the information presented in this video dose not replace hospital, health center, or governmental guidelines

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Basic life Support in Infant and Children

- At the end of this lecture the students are expected to Know:

1. Historical background of CPR
2. Introduction of CPR
3. The unique feature pediatrics airway
4. How to asses and open airway
5. When and how to initiate CPR

5. Use of AED

8. COVID an CPR

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Historical background of CPR

- In 1900's CPR used to be done with ratio of 1:5 (ABC)
- 2005 the ratio has changed to 2:15 in a single rescuer, 2:30 in two and more rescuer(ABC)
- 2010 CPR changed to instead of ABC changed to CAB
- 2015 there is no much change

- Manikin studies demonstrated that starting CPR with 30 chest compressions followed by 2 breaths
- Delays the first ventilation by 18 seconds for a single rescuer
- By about 9 seconds for 2 rescuers
- Beginning with chest compressions (C-A-B) increase bystander CPR rates

Introduction

- Pediatric cardiac arrest has inherent differences when compared with adult cardiac arrest
- In infants and children, asphyxial cardiac arrest is more common than cardiac arrest from a primary cardiac event
- Therefore ventilation may have greater importance during resuscitation of children
- Resuscitation outcomes for asphyxial arrest are better with a combination of ventilation and chest compressions

- Respiratory failure and shock are the most common causes of cardiopulmonary arrest in the pediatric population
- Consequently, the timely recognition and management of respiratory failure and shock are essential goals of pediatric resuscitation.

Unique feature of pediatrics airway

- The tongue is larger relative to the mouth and has a greater tendency to collapse and obstruct the airway
- This makes blind nasotracheal intubation much more difficult in children
- The epiglottis is larger, floppier, and more acutely angled, making it more likely to obstruct the view of the vocal cords during intubation
- The larynx is higher, relative to adults. It is at C1 in infants, C3 in toddlers, and C6 in

- It is also more anterior and more likely to collapse on inspiration
- Avoid hyperextension of the neck in infant
- The narrowest point of the airway in a child younger than 8 years is the cricoid cartilage
- An infant's occiput is larger than an adult
- For children younger than 2 years, a roll under the shoulders helps properly position the airway
- For children older than 2 years, place a roll under the head to improve the view.

Key Actions in Pediatric BLS

- Verify scene safety
- Determine unresponsiveness,
  - get help
  - activate emergency medical services (EMS)
- Assess breathing and brachial pulse
- Initiate cardiopulmonary resuscitation (CPR)

Pediatrics chain of survival

- Prevent arrest
- Perform high quality of CPR
- Activate EMS
- Advance life support
- Post cardiac arrest

Check for Response:-

- Gently tap the victim and ask loudly
- If the child is responsive, he or she will answer or move

- Assess if the victim is not breathing or gasping and pulse is >60/min start one breathing every 3-5 second

- If no breathing or gasping type of breath and pulse is < 60/min immediately start CPR

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Chest Compressions

- The 2015 international resuscitation guidelines performing chest compression, with full chest recoil and minimal interruptions
- Chest compressions should be performed over the lower half of the sternum
- Compression of the xiphoid process can cause trauma to the liver, spleen, or stomach, and must be avoided

Components of High-Quality CPR

- The 5 components of high-quality CPR are (100 to 120 per minute)
- Ensuring chest compressions of adequate rate
- Ensuring chest compressions of adequate depth (1/3 to ½ dimeter of the chest)
- Allowing full chest recoil between compressions(compress release)
- Minimizing interruptions in chest compressions

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Coordinate Chest Compressions and Breathing:-

- If no response to compression deliver shock initial 2J/kg after 2 minute 4J/kg

-The lone rescuer should continue this cycle of 30 compressions and 2 breaths for approximately 2 minutes

-If the victim of out-of-hospital cardiac arrest is ≥8 years old (approximately >25 kg body weight), use of automated external defibrillators (AEDs)2J/kg after 2 minute 4J/kg total not more than 10J/kg

Figure 1

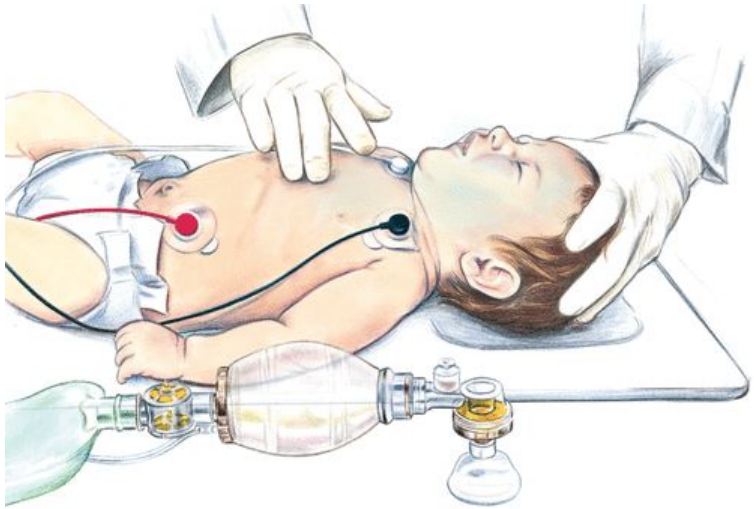


Figure 2

- **Two thumb encircling hands** — the two thumb-encircling hands technique provides optimum chest compressions when there are two rescuers

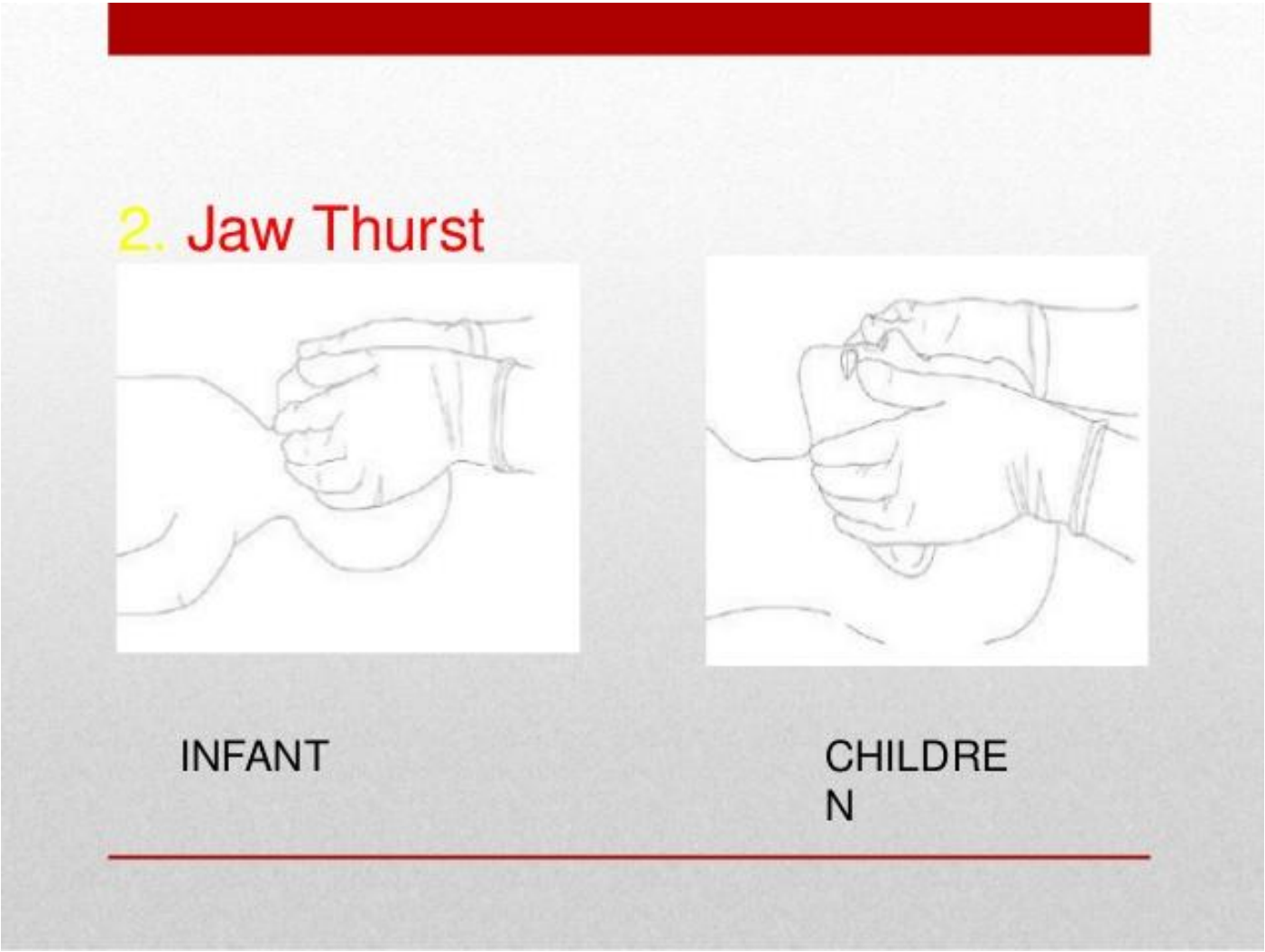
Figure 3

1. Head Tilt/Chin Lift

NEUTRAL POSITION

SNIFFING POSITION

Figure 4



Insertion of an oropharyngeal (Guedel) Airway

- Can be used in unconscious patient to improve airway opening
- Not tolerated in patients who are awake (gag reflex)
- Size–from centre of teeth to angle of jaw (convex side up)
- Infants– insert convex side (right way) up
- Children- insert concave side up (upside down) then turn 180
- Check airway opening before and after insertion
- Give Oxygen

Figure 5
Insertion of an oropharyngeal (Guedel) Airway

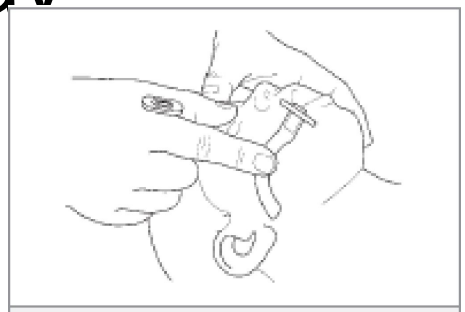


Figure 13
Selecting the right size of an oropharyngeal airway

Figure 14
Inserting an oropharyngeal airway in an infant: convex side up

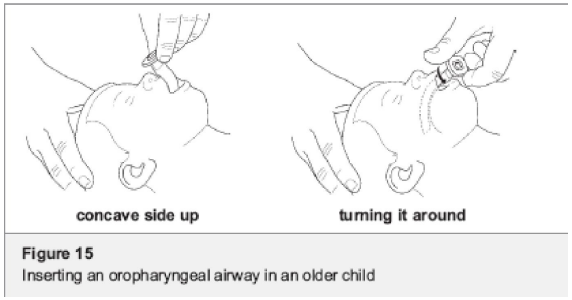


Figure 15
Inserting an oropharyngeal airway in an older child

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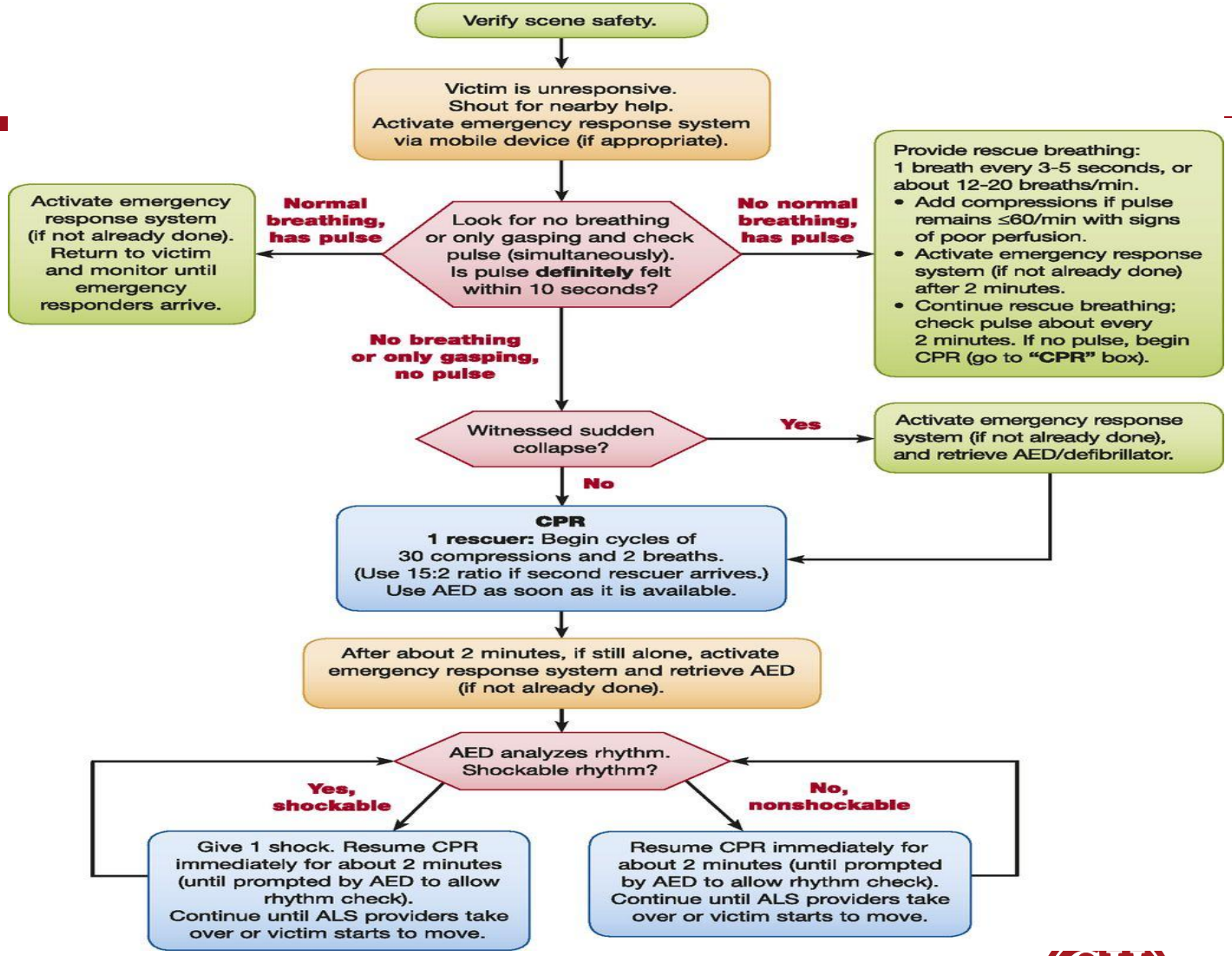

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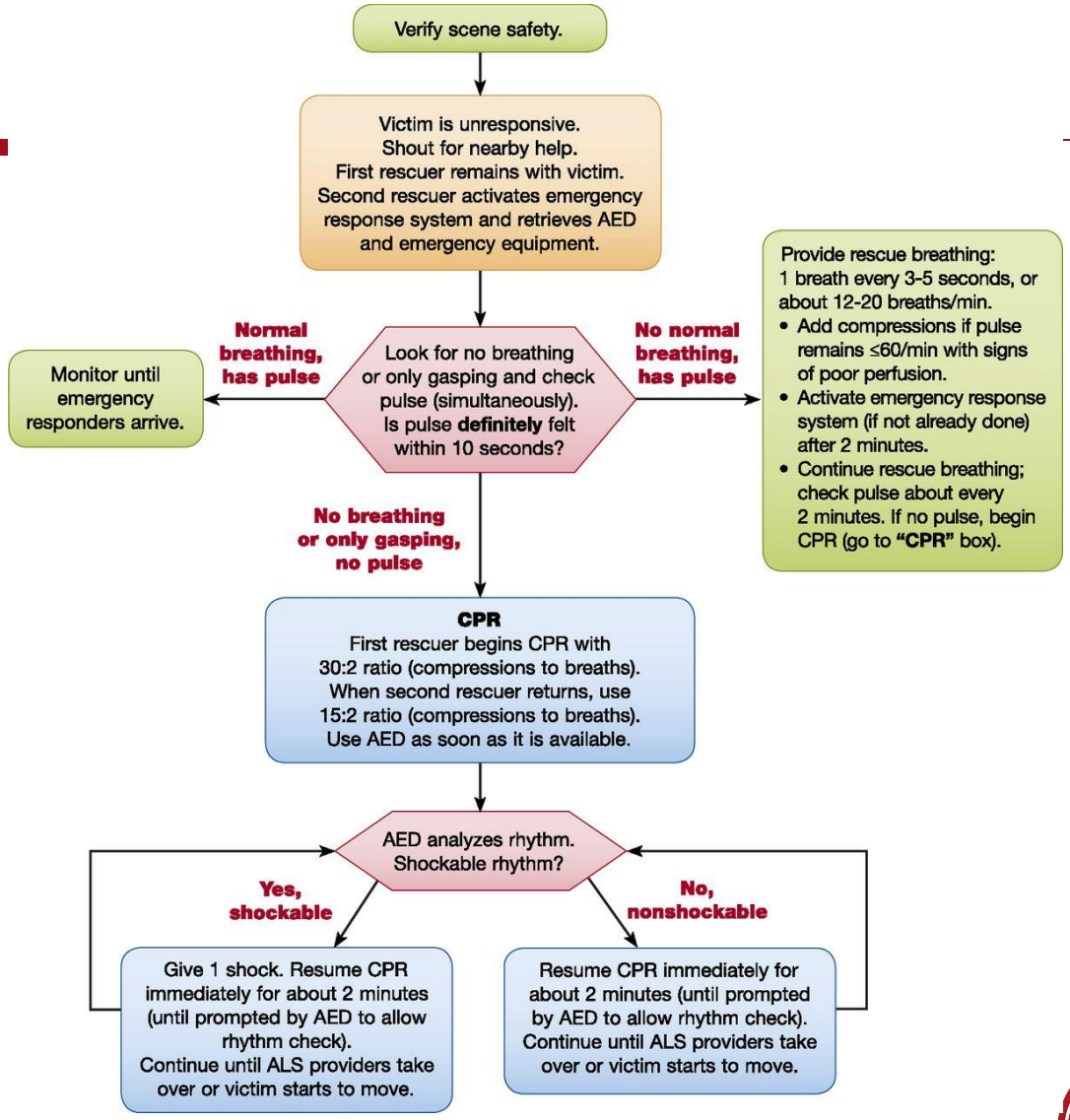

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Drug therapy of VF/pVT in infants and children

- Patients who received epinephrine within 5 minutes of CPR compared to those who received epinephrine more than 5 minutes after CPR initiation were more likely to survive to discharge
- Four observational studies of pediatric OHCA demonstrated that earlier epinephrine administration increased rates of ROSC

- Administration of lidocaine, but not amiodarone, was associated with higher rates of ROSC and survival to hospital admission
- Neither lidocaine nor amiodarone significantly affected the odds of survival to hospital discharge; neurological outcome was not assessed

- Bicarbonate administration was associated with worse survival outcomes for both IHCA and OHCA
- There are special circumstances in which bicarbonate is used, such as the treatment of hyperkalemia and sodium channel blocker toxicity, including from tricyclic antidepressants

- Administration of calcium during cardiac arrest demonstrated worse survival and ROSC with calcium administration
- There are special circumstances in which calcium administration is used, such as hypocalcemia, calcium channel blocker overdose, hypermagnesemia, and hyperkalemia

Outcome of CPR

- Outcomes from pediatric in-hospital cardiac arrest (IHCA) have markedly improved over the past decade
- From 2001 to 2009, rates of pediatric IHCA survival to hospital discharge improved from 24% to 39%
- Unlike IHCA, survival from out-of-hospital cardiac arrest (OHCA) remains poor
- Prolonged CPR is not always futile, with 12% of patients who receive CPR for more than 35 minutes surviving to discharge and

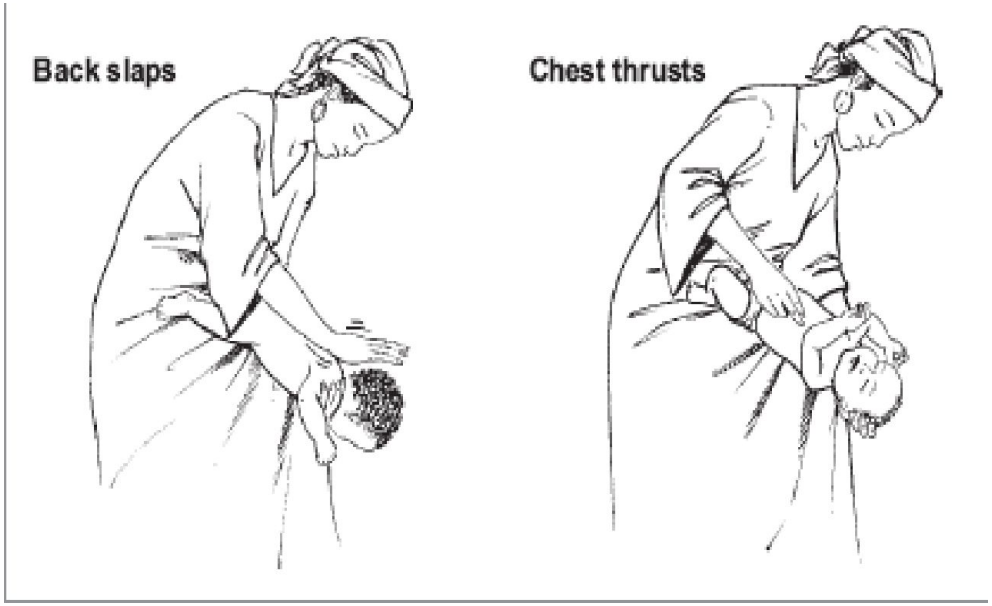
Family Presence During Resuscitation

What do you suggest?

Foreign-Body Airway Obstruction (Choking)

- More than 90% of deaths from foreign-body aspiration occur in children <5 years of age
- Signs of FBAO include a *sudden* onset of respiratory distress with coughing, gagging, stridor (noise breathing) , wheezing
- For a child, perform abdominal thrusts (Heimlich maneuver) until the object is expelled or the injured party becomes unresponsive
- For an infant, deliver 5 back blows (slaps) followed by 5 chest thrusts repeatedly until the object is expelled or the victim becomes unresponsive
- If the victim becomes unresponsive, lay should perform CPR but should look into the mouth before giving breaths

- Figure 6 chest thrusts and back slap



- figure 7 abdominal thrusts

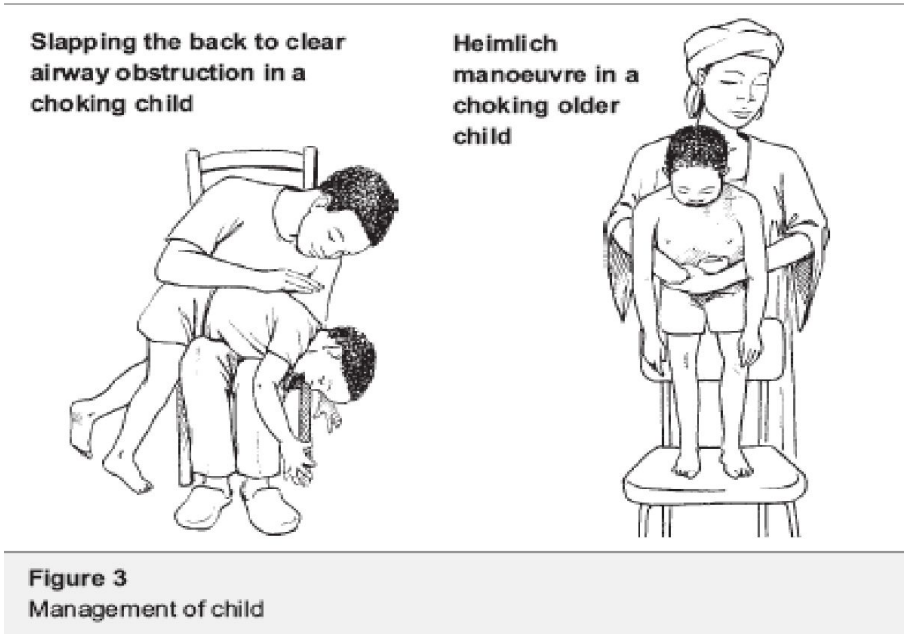


Figure 3
Management of child

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Post–Cardiac Arrest Care Treatment and Monitoring

- Successful resuscitation from cardiac arrest results in a post–cardiac arrest syndrome that can evolve in the days after ROSC
- The components of post–cardiac arrest syndrome are:
  - Brain injury
  - Myocardial dysfunction
  - Systemic ischemia and reperfusion response
  - Persistent precipitating pathophysiology

Post–cardiac arrest brain injury remains a leading cause of morbidity and mortality in adults and children because the brain has limited tolerance of ischemia, hyperemia, or edema

Pediatric post–cardiac arrest care focuses on anticipating, identifying, and treating this complex physiology to improve survival and neurological outcomes

CPR and COVID 19

Minimizing provider exposure

- All rescuers should don personal protective equipment (PPE) before entering a scene
- Personnel on the scene should be limited only to those essential for patient care.
- COVID-19 status should be communicated to any new providers before arrival on the scene or when transferring the patient to a second setting.

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Oxygenation/ventilation strategies

- If available, attach a high-efficiency particulate air (HEPA) filter in the path of any exhaled gas for manual or mechanical ventilation devices before administering any breaths
- Before intubation, use a bag-mask device with a HEPA filter and tight seal
- Consider manual ventilation, if intubation is delayed bag-mask device with a HEPA filter

- Ensuring the safety of personnel justifies selective constraints on resuscitation.
- CPR remains a critical component of care for many of our patients, particularly during this pandemic
- It does place rescuers at increased exposure

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Thank you

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