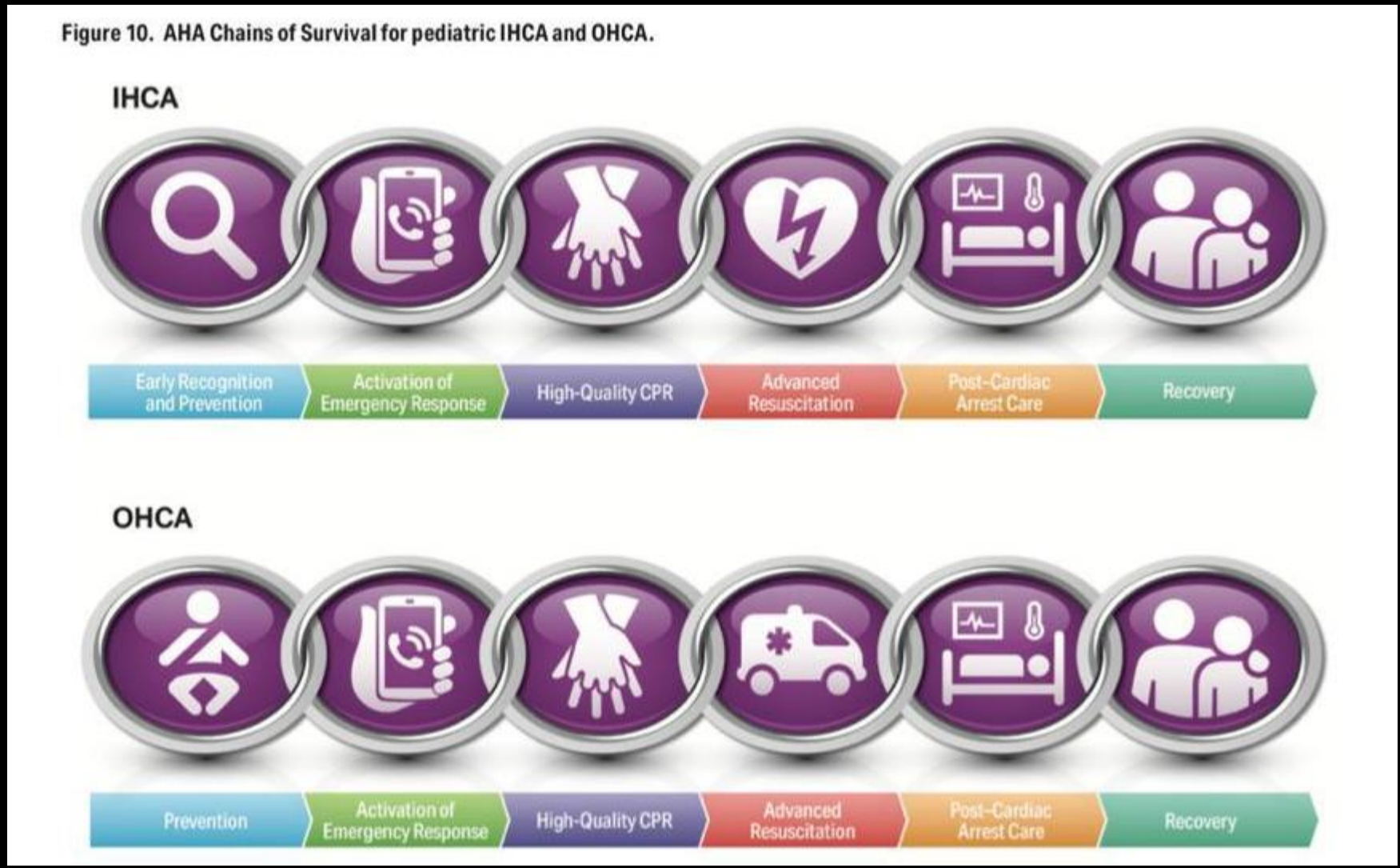
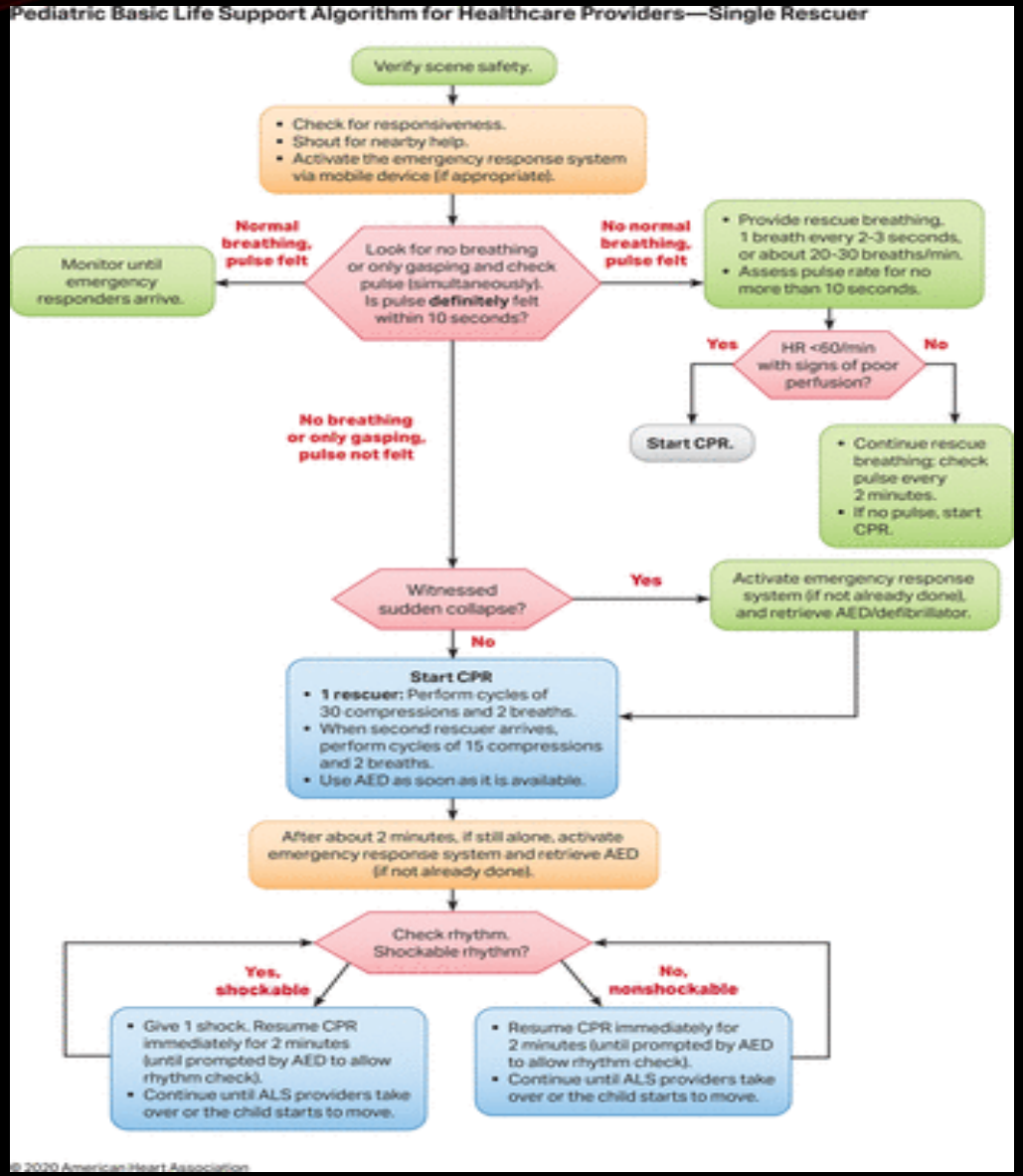
PEDIATRIC BASIC AND ADVANCED LIFE SUPPORT: PBLS &PALS

احیا پایه وپیشرفته درکودکان

Dr.Somaye Jafrate
Pediatric intensivist

Figure 10. AHA Chains of Survival for pediatric IHCA and OHCA.




Pediatric Basic Life Support Algorithm for Healthcare Providers—Single Rescuer
Verify scene safety.
Check for responsiveness.
Shout for nearby help.
Activate the emergency response system via mobile device (if appropriate).
Look for no breathing or only gasping and check pulse (simultaneously). Is pulse definitely felt within 10 seconds?
Normal breathing, pulse felt
Monitor until emergency responders arrive.
No normal breathing, pulse felt
Provide rescue breathing. 1 breath every 2-3 seconds, or about 20-30 breaths/min.
Assess pulse rate for no more than 10 seconds.
HR <60/min with signs of poor perfusion?
Yes
No
Start CPR.
Continue rescue breathing; check pulse every 2 minutes.
If no pulse, start CPR.
No breathing or only gasping, pulse not felt
Witnessed sudden collapse?
Yes
Activate emergency response system (if not already done), and retrieve AED/defibrillator.
No
Start CPR
1 rescuer: Perform cycles of 30 compressions and 2 breaths.
When second rescuer arrives, perform cycles of 15 compressions and 2 breaths.
Use AED as soon as it is available.
After about 2 minutes, if still alone, activate emergency response system and retrieve AED (if not already done).
Check rhythm. Shockable rhythm?
Yes, shockable
No, nonshockable
Give 1 shock. Resume CPR immediately for 2 minutes (until prompted by AED to allow rhythm check).
Continue until ALS providers take over or the child starts to move.
Resume CPR immediately for 2 minutes (until prompted by AED to allow rhythm check).
Continue until ALS providers take over or the child starts to move.
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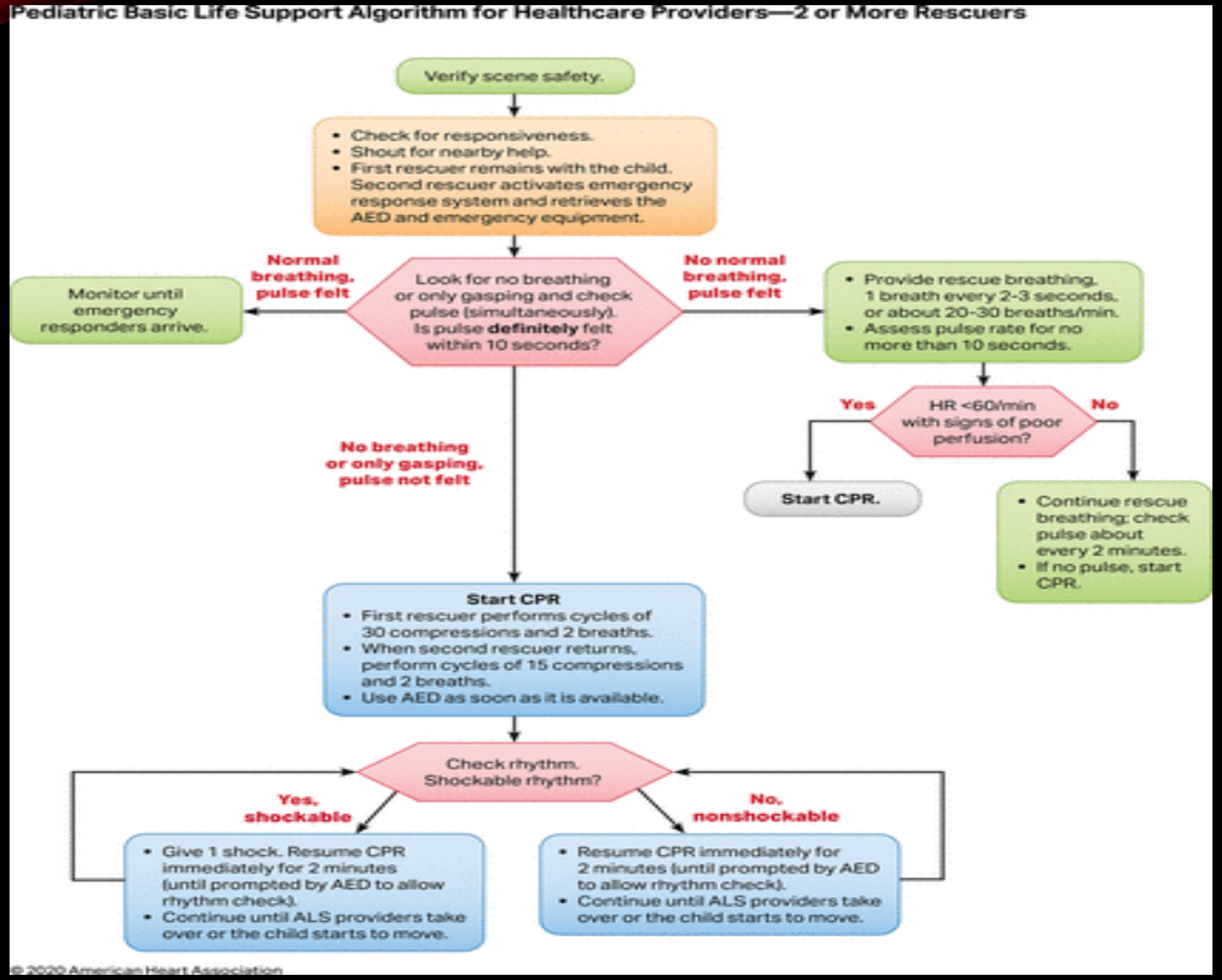
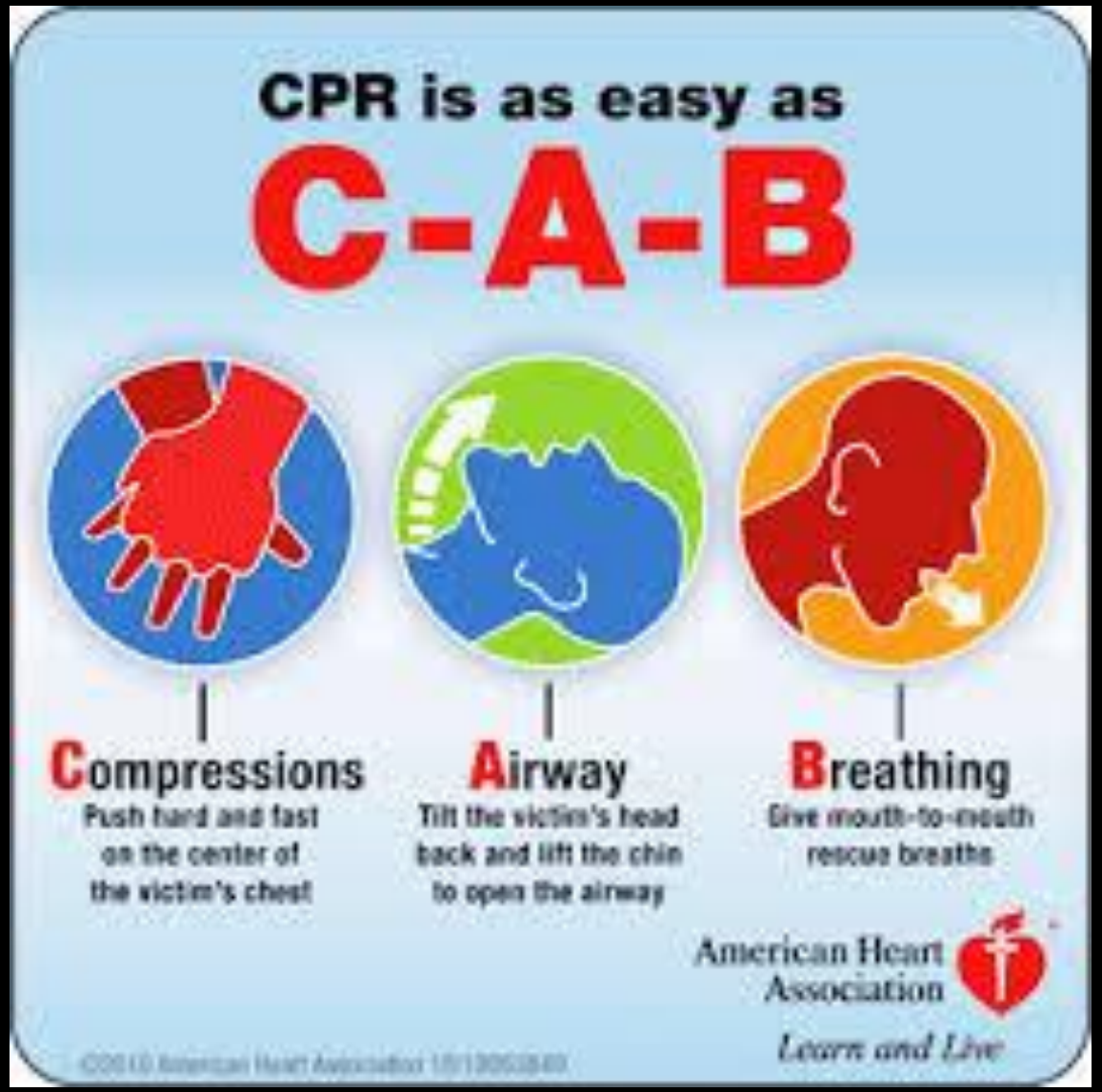
Pediatric Basic Life Support Algorithm for Healthcare Providers—2 or More Rescuers




CPR is as easy as
C-A-B
Compressions
Push hard and fast on the center of the victim's chest
Airway
Tilt the victim's head back and lift the chin to open the airway
Breathing
Give mouth-to-mouth rescue breaths
American Heart Association
Learn and Live

STEP 1

Make sure the scene is safe.

Check to see if the person is awake and breathing normally.

STEP 2

Shout for help.

If you're alone

- **With a cell phone,** phone 9-1-1, perform CPR (30 compressions and then 2 breaths) for 5 cycles, and then get an AED
- **Without a cell phone,** perform CPR (30 compressions and then 2 breaths) for 5 cycles, and then phone 9-1-1 and get an AED

If help is available, phone 9-1-1. Start CPR while you send someone to get an AED.

STEP 3

Repeat cycles of 30 compressions and then 2 breaths.

- Child CPR

  Push in the middle of the chest at least one third the chest depth or approximately 2 inches with 1 or 2 hands.

- Infant CPR

  Push in the middle of the chest at least one third the chest depth or approximately 1½ inches with 2 fingers.

Use the AED as soon as it arrives.

Continue CPR until EMS arrives.

توالی احیا

*حفظ سلامتی احیاگروقربانی در صحنه حادثه،

*بررسی پاسخ بیمار :هشیاری:توخوب هستی؟

*کمک خواستن

*در احیا دونفره: نفردوم اورژانس را خبر کرده و دفیبریلاتور را فعال میکند

*بررسی نفس کشیدن

*حداکثرطی ۱۰ثانیه : بررسی نبض

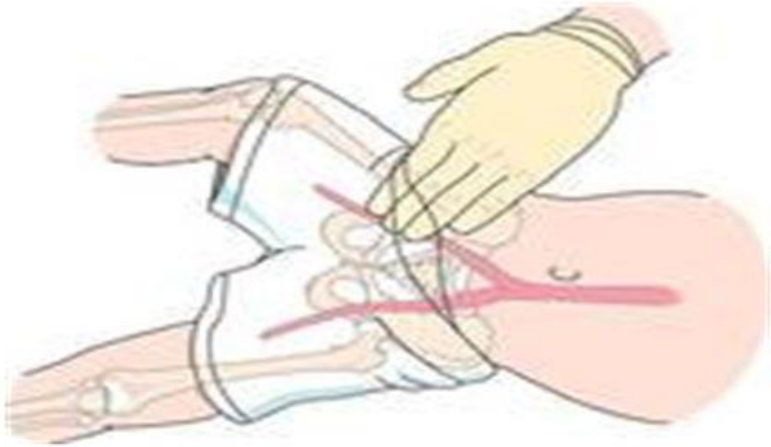
*شیرخوار:نبض براکیال

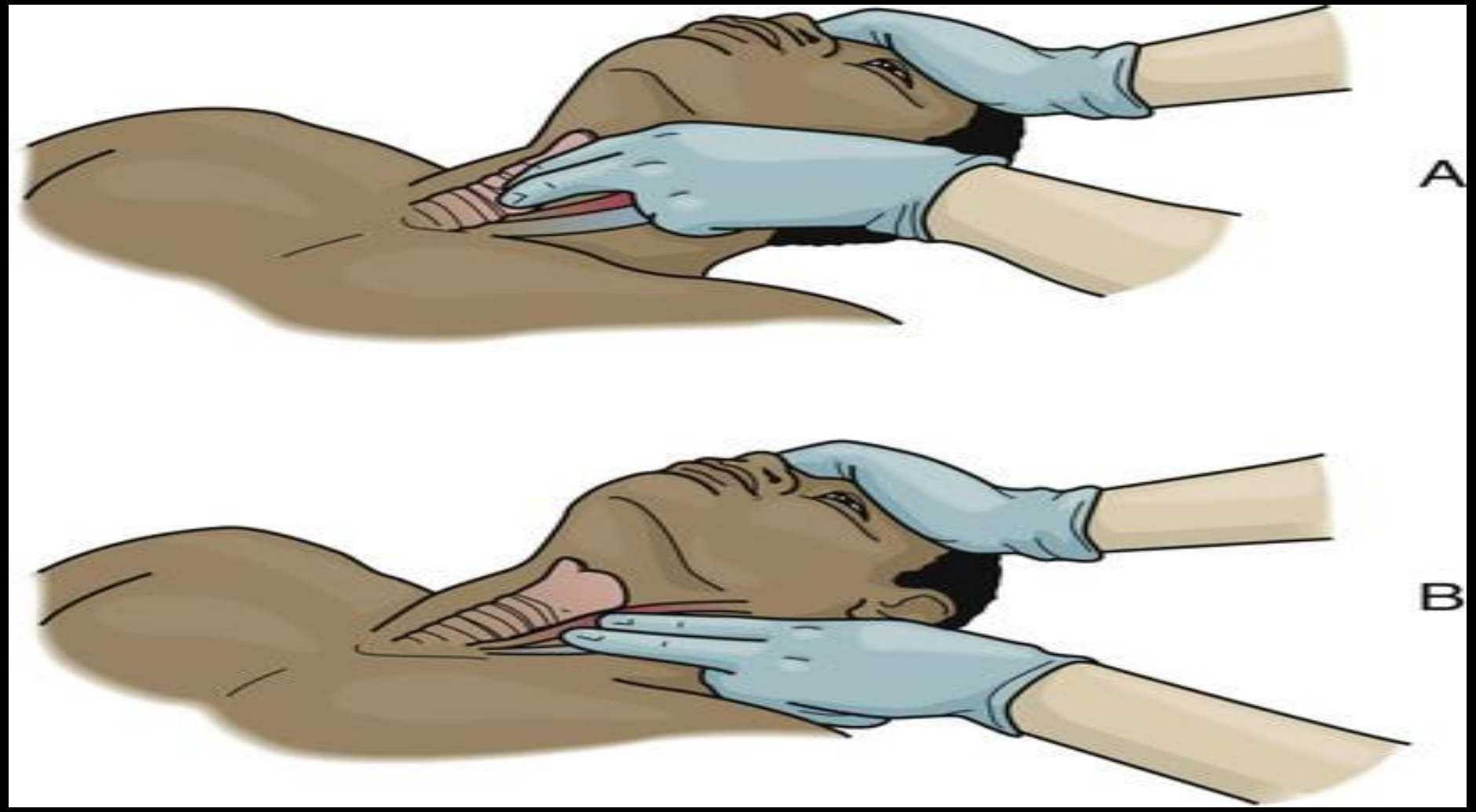
*کودک ونوجوان:نبض کاروتید یا فمورال

Infant/Child Basic Life Support

Brachial site

Femoral site




A
B

۱-قربانی تنفس ونبض دارد
۲-قربانی تنفس نرمال ندارد،نبض دارد
۳-قربانی تنفس نرمال ندارد و نبض نیز ندارد:
*احیای تک نفره

*احیای دونفره

Normal Breathing –Present Pulse:

فرد تنفس طبیعی دارد ونبض لمس میشود

Single Rescuer: Activate ERS-Return To Patient-Monitor Until ER Arrives

*احیا تک نفره: خبر کردن اورژانس ،بازگشت نزد بیمار وپایش تا زمان رسیدن اورژانس

Two or more Rescuers: Monitor Until ER Arrives

*احیا دونفره: پایش تا زمان رسیدن اورژانس

فرد تنفس غیرطبیعی داردنبض لمس Abnormal Breathing Present Pulse می شود

یک تنفس هردوتاسه ثانیه می دهیم
۲۰-۳۰ تنفس دردقیقه

❑1-!Give Rescue Breath

اگر نبض کمترومساوی ۶۰ عدداست وعلایم اختلال خونرسانی به ارگانها دیده میشود : ماساژقلبی

❑2- if PR<60 With Poor Perfusion:
Do Chest Compression!

هردودقیقه بررسی نبض،اگر نبض ندارد:احیا

❑3-check pulse Q 2 min:If No Pulse:CPR

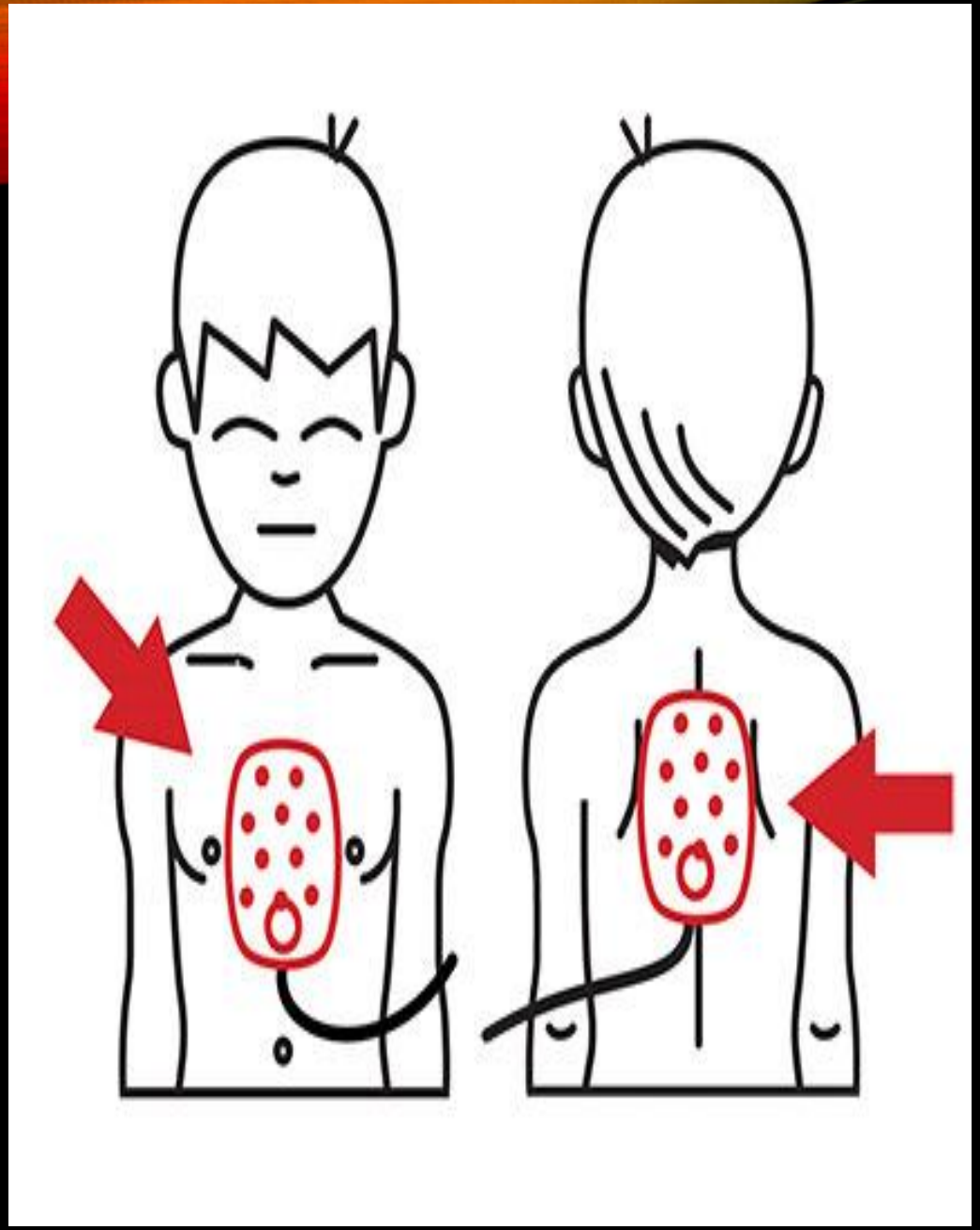
AED : AUTOMATED EXTERNAL DEFIBRILLATOR

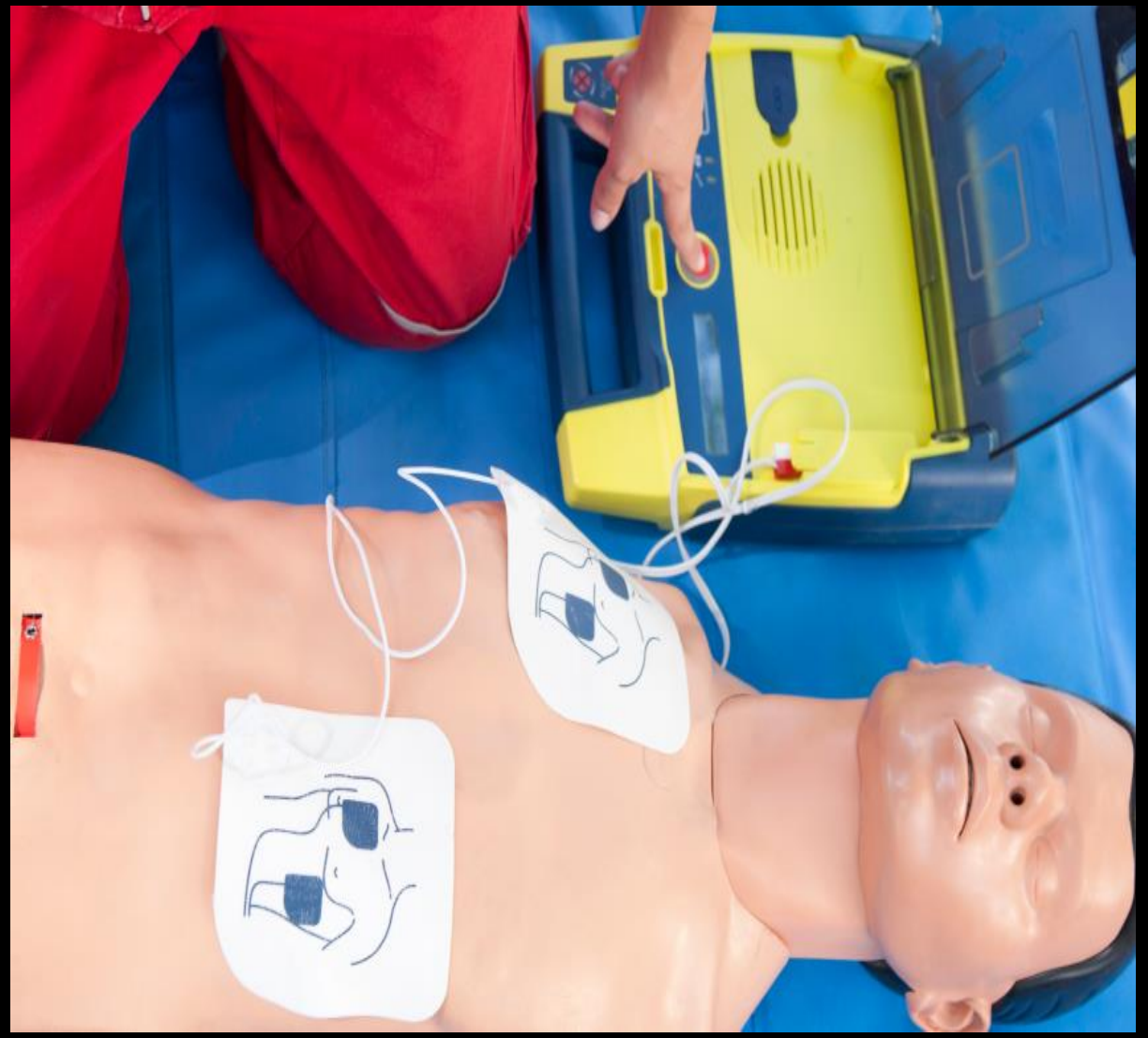
Victims>8 Years

- ❑Use AED As Soon As It Is Available
- ❑Only Use Adult Pads
- ❑Place The Pads As Illustrated On The Pads

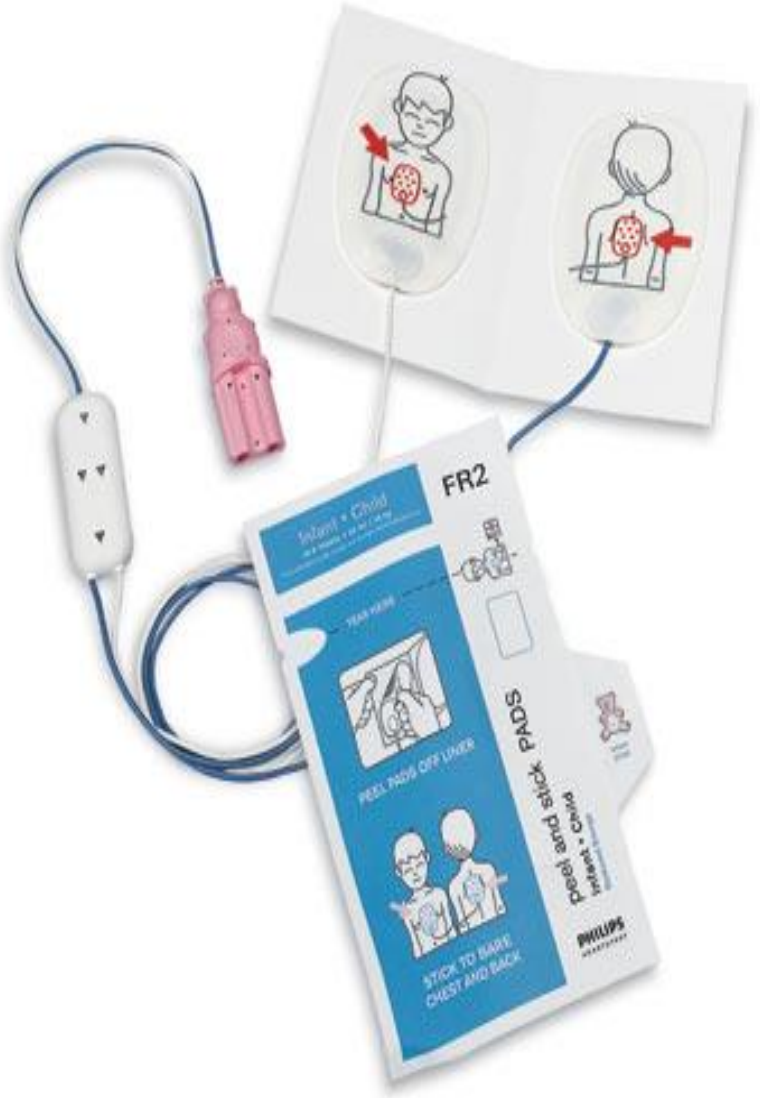
Victims <8Years

- ❑Use AED As Soon As It Is Available
- ❑Use Pediatric Pads
- ❑Place The Pads As Illustrated On The Pads
- ❑If You Don't Have Pediaric Pads:Use Adult Pads : Not Covering Each Other
- ❑If AED Has A Key or Switch That Will Deliver A Child Dose,Turn The Key Or Switch





AED : AUTOMATED EXTERNAL DEFIBRILLATOR



NOT BREATHING- ABSENT PULSE تنفس ندارد ونبض لمس نمیشود

احیای تک نفره:!

- احیاگرخودش شاهد این اتفاق(کلاپس) بوده:
  خبرکردن اورژانس وآوردن دفیبریلاتور

- احیاگرخودش شاهد
  این کلاپس نبوده:

احیای دو نفره ← **انجام احیا برای دو دقیقه**

CPR:احیای قلبی ریوی

- Chest Compresion (ماساژ قلبی)/Breaths(تنفس):

*Single Rescuer: 30/2

*Two Or More : 15/2

Changing Their Place Q 2 min

- Breaths:Advanced Airway Is In Place(Intubated) : Q 2-3 sec
- After 5Cycles Of CPR(2 min) : AED

CHEST COMPRESSIONS: ماساژ قلبی

- Place: Lower Half Of The Sternum
- Push Fast : 100-120 Beats/min : All Ages

- Push Hard: 1/3 Chest AP Diameter:Allow Complete Chest Recoil After Each Compression
- Minimize Interruptions :Only For : Ventilation,Rhythm Check,Shock Delivery

- Once Advanced Airway(Intubation,..) Fixed: Continuous Chest Compressions

- Single Rescuer: *Infant → 2Finger Technique
  *Child → 1-2 Hands
- Two Or More : *Child
  *Infant → Thumb Encircling

Recommendations for Components of High-Quality CPR		
COR	LOE	Recommendations
1	B-NR	1. CPR using chest compressions with rescue breaths should be provided to infants and children in cardiac arrest.[25–29]
1	B-NR	2. For infants and children, if bystanders are unwilling or unable to deliver rescue breaths, it is recommended that rescuers should provide chest compressions only.[27,28]
1	C-EO	3. After each compression, rescuers should allow the chest to recoil completely.[2,3,30]
2a	C-LD	4. It is reasonable to use a chest compression rate of ≈100–120/min for infants and children.[31,32]
2a	C-LD	5. For infants and children, it is reasonable for rescuers to provide chest compressions that depress the chest at least one third the anterior-posterior diameter of the chest, which equates to approximately 1.5 inches (4 cm) in infants to 2 inches (5 cm) in children. Once children have reached puberty, it is reasonable to use the adult compression depth of at least 5 cm but no more than 6 cm.[33–36]
2a	C-EO	6. For healthcare providers, it is reasonable to perform a rhythm check, lasting no more than 10 s, approximately every 2 min.
2a	C-EO	7. It is reasonable to ventilate with 100% oxygen during CPR.
2a	C-EO	8. When performing CPR without an advanced airway, it is reasonable for single rescuers to provide a compression-to-ventilation ratio of 30:2 and for 2 rescuers to provide a compression-to-ventilation ratio of 15:2.[35]
2b	C-LD	9. When performing CPR in infants and children with an advanced airway, it may be reasonable to target a respiratory rate range of 1 breath every 2–3 s (20–30 breaths/min), accounting for age and clinical condition. Rates exceeding these recommendations may compromise hemodynamics.[5]

AFTER 2 MIN CPR(5 CYCLES): USE AED

Shockable Rhythm

- ❑Give 1 Shock
- ❑Immediately Resume CPR for 2 mins
- ❑Continue By Retriving AED After 2min CPR
- ❑Continue Until ALS Providers Take Over OR The Victim Starts To Move

Non-Shockable Rhythm

- ❑Immediately Resume CPR for 2 mins
- ❑Continue By Retriving AED After 2min CPR
- ❑Continue Until ALS Providers Take Over OR The Victim Starts To Move

BREATHS:تنفس

**برای مفید واقع شدن تنفس:راه هوایی ابتدا باید باز باشد که راههای زیر مطرح است:

❑Opening The Airway Methods:

1-Head Tilt-Chin Lift (HT-CL)

2-Jaw Thrust: Suspicious Neck Trauma: If This Maneuver Didn't Help In Neck Trauma : use HT-CL

❑Neutral –Sniffing Head Position:

External Auditory Canal At The Level Or Anterior To Infants Shoulder

VENTILATION:تهویه

- With A Mouth to Barrier Device(eg Pocket Mask) :Single Rescuer

- With Bag And Mask Ventilation: Two Rescuers

*Proper Mask Size

**Sniffing(Neutral) Position-Head Tilt Chin Lift

***E-C Clamp Technique

****Give Each Breath Over 1 sec

*****One Person-Two person

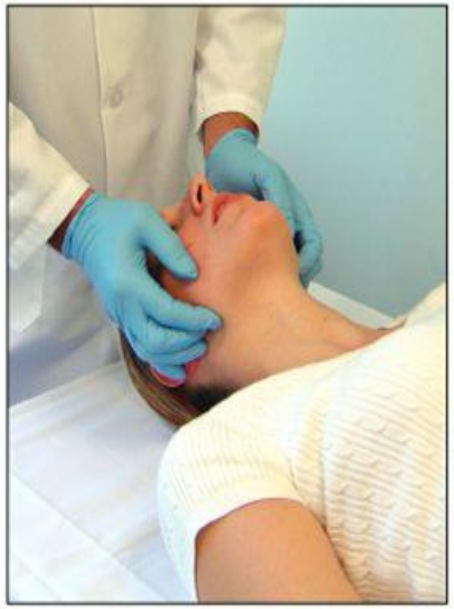
Figure 62-2 Opening the airway with the head-tilt/chin-lift maneuver. One hand is used to tilt the head, extending the neck. The index finger of the rescuer's other hand lifts the mandible outward by lifting the chin. Head-tilt should not be performed if a cervical spine injury is suspected.

Bag Mask Ventilation: Opening Airway

Head Tilt and Chin Lift

- One hand applies downward pressure to forehead and index and middle finger of the second hand lift at chin.
- Lifts tongue from posterior pharynx

Jaw Thrust



- For unstable cervical spine
- Place heels of hands on parieto-occipital area
- Grasp angles of mandible with fingers, and displace jaw anteriorly.

Figure 62-4 Rescue breathing in a child. The rescuer's mouth covers the child's mouth, creating a mouth-to-mouth seal. One hand maintains the head-tilt; the thumb and forefinger of the same hand are used to pinch the child's nose.

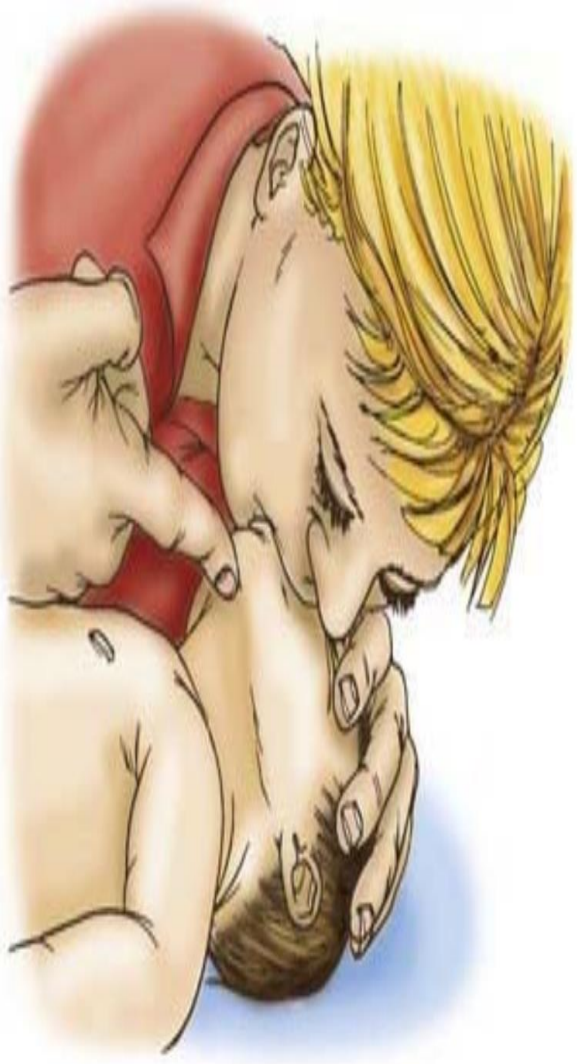


Figure 62-3 Rescue breathing in an infant. The rescuer's mouth covers the infant's nose and mouth, creating a seal. One hand performs the head-tilt while the other hand lifts the infant's jaw. Avoid head-tilt if the infant has sustained head or neck trauma.

Correct
Covers mouth, nose, and chin but not eyes

Incorrect
Too large: covers eyes and extends over chin

Incorrect
Too small: does not cover nose and mouth well

BAG-MASK VENTILATION:1&2 PERSON

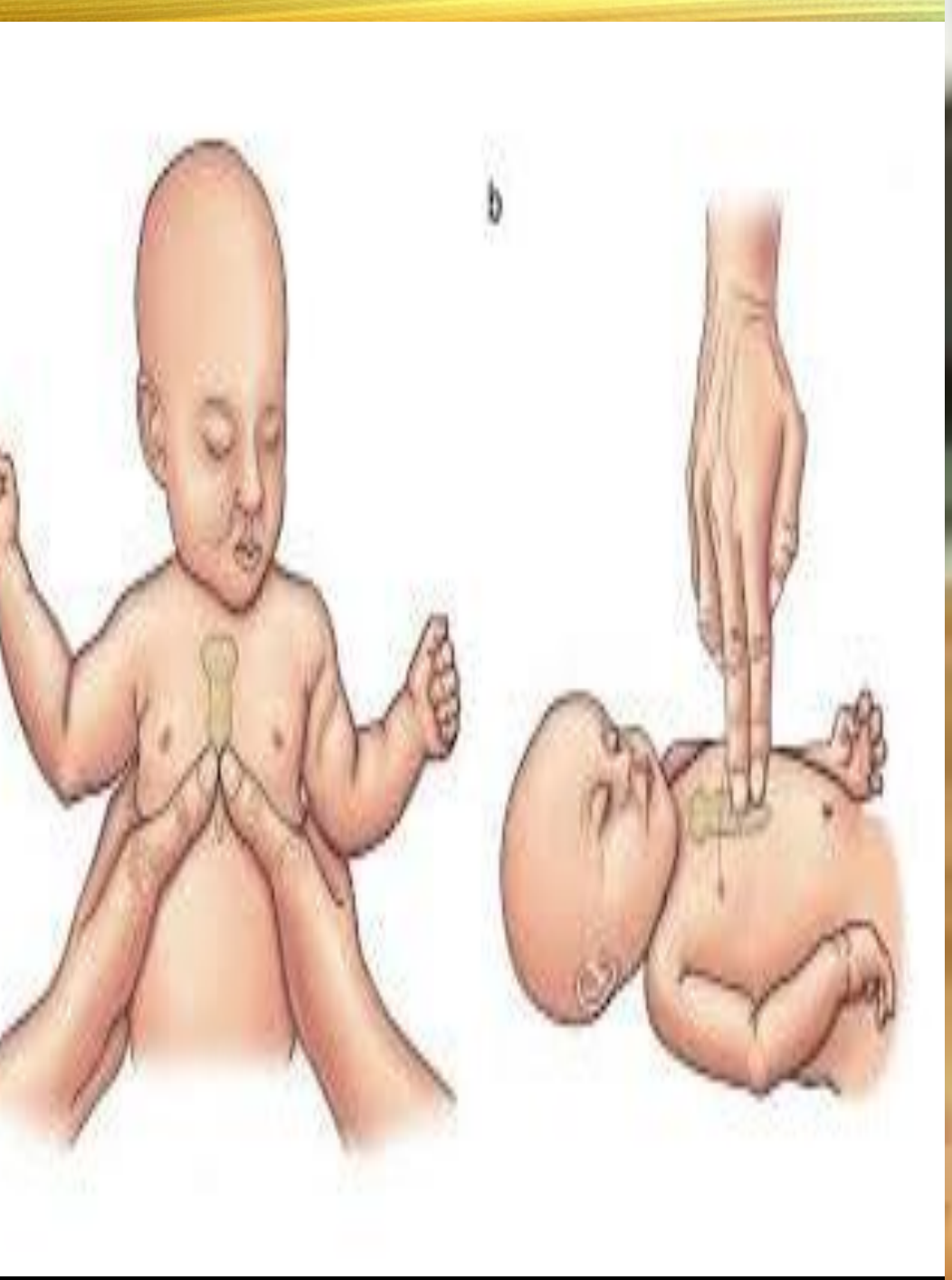
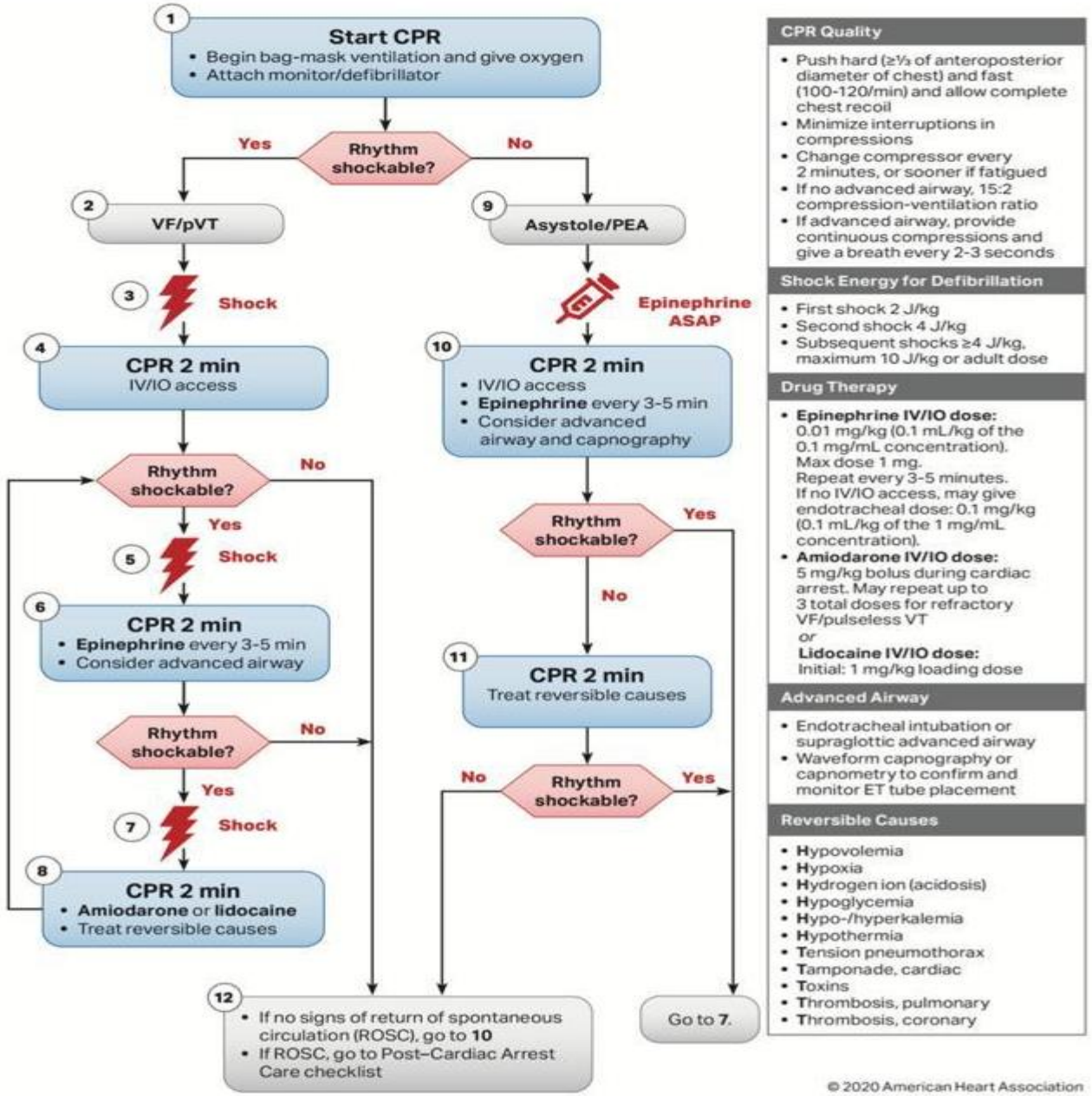
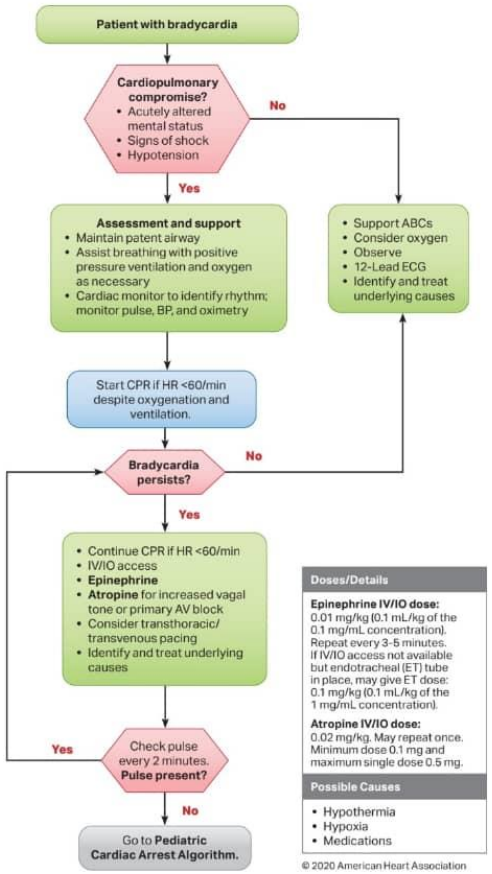


Figure 11. Pediatric Cardiac Arrest Algorithm.



Pediatric Bradycardia With a Pulse Algorithm



Pediatric Tachycardia With a Pulse Algorithm

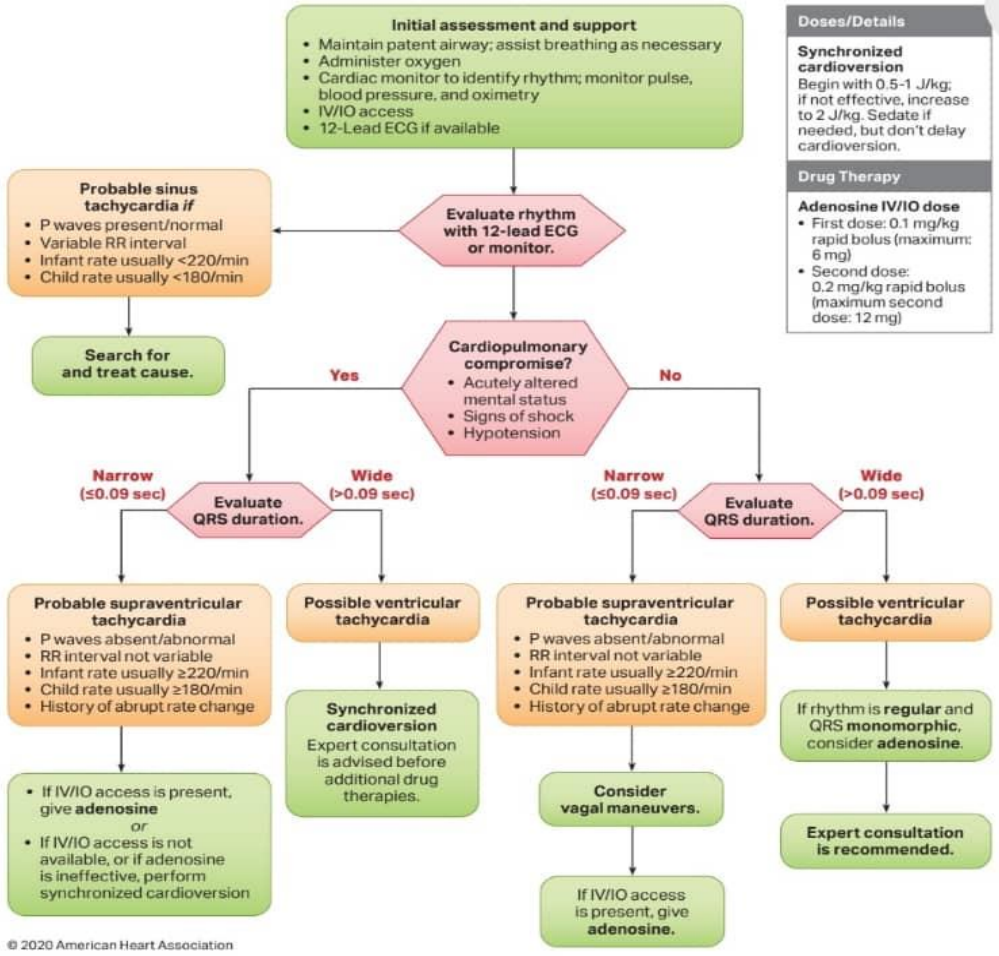


Figure 1. Summary of adjustments to CPR algorithms in suspected or confirmed COVID-19 patients.

Reduce provider exposure

- Don PPE before entering the room/scene
- Limit personnel
- Consider using mechanical CPR devices for adults and adolescents who meet height and weight criteria
- Communicate COVID-19 status to any new providers

Prioritize oxygenation and ventilation strategies with lower aerosolization risk

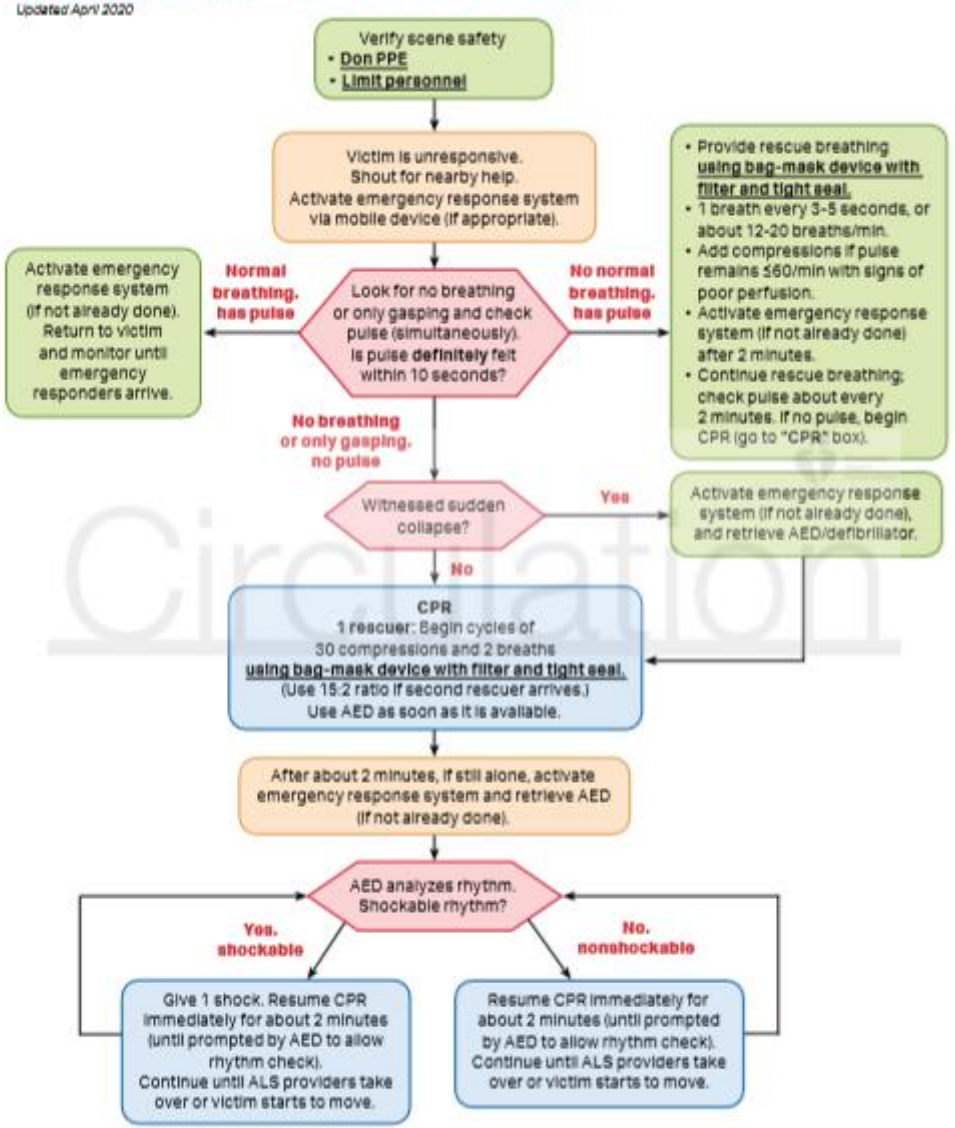
- Use a HEPA filter, if available, for all ventilation
- Intubate early with a cuffed tube, if possible, and connect to mechanical ventilator, when able
- Engage the intubator with highest chance of first-pass success
- Pause chest compressions to intubate
- Consider use of video laryngoscopy, if available
- Before intubation, use a bag-mask device (or T-piece in neonates) with a HEPA filter and a tight seal
- For adults, consider passive oxygenation with nonrebreathing face mask as alternative to bag-mask device for short duration
- If intubation delayed, consider supraglottic airway
- Minimize closed circuit disconnections

Consider resuscitation appropriateness

- Address goals of care
- Adopt policies to guide determination, taking into account patient risk factors for survival

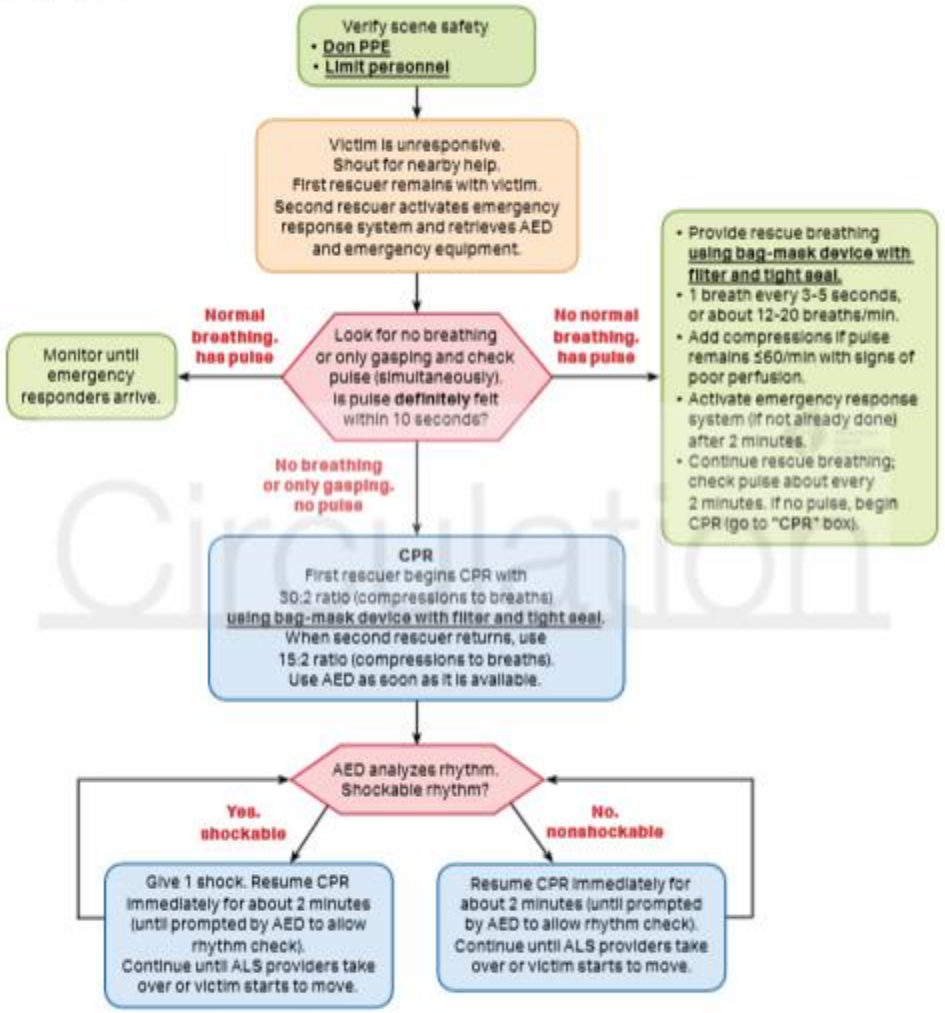
BLS Healthcare Provider
Pediatric Cardiac Arrest Algorithm for the Single Rescuer for Suspected or Confirmed COVID-19 Patients

Updated April 2020



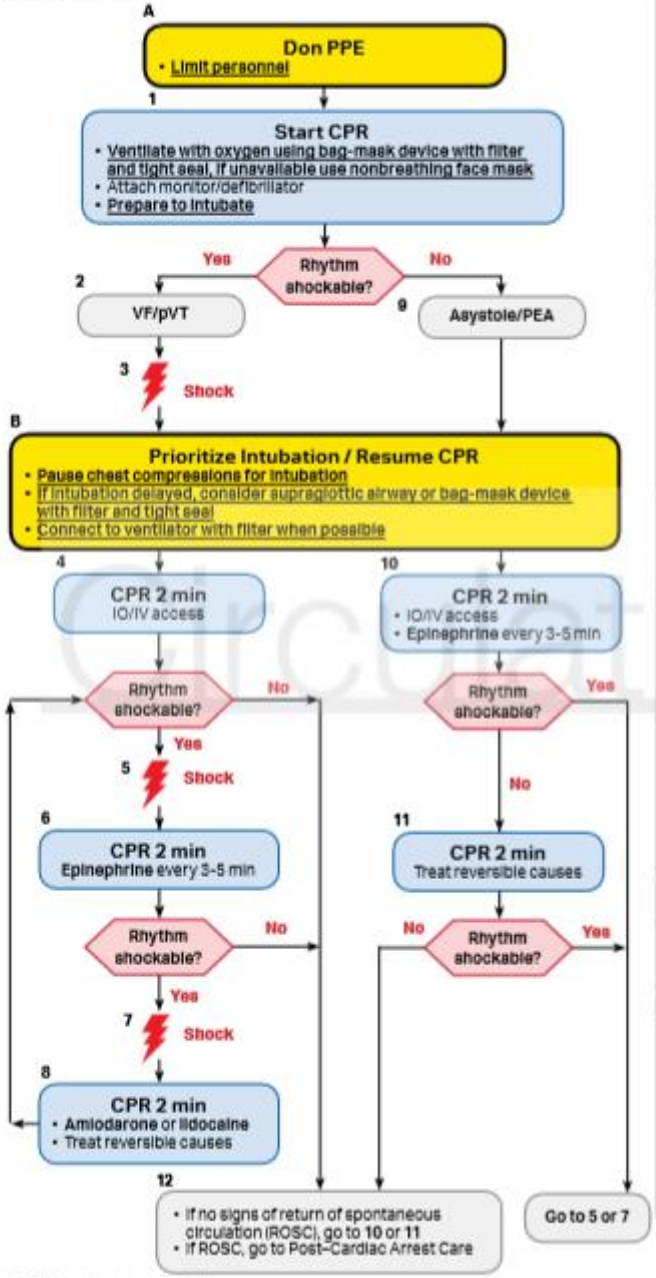
BLS Healthcare Provider
Pediatric Cardiac Arrest Algorithm for 2 or More Rescuers for Suspected or Confirmed COVID-19 Patients

Updated April 2020



Pediatric Cardiac Arrest Algorithm for Suspected or Confirmed COVID-19 Patients

Updated April 2020



CPR Quality

- Push hard (≥⅓ of anteroposterior diameter of chest) and fast (100–120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Change compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 15:2 compression–ventilation ratio.

Shock Energy for Defibrillation

First shock 2 J/kg, second shock 4 J/kg, subsequent shocks ≥4 J/kg, maximum 10 J/kg or adult dose

Advanced Airway

- Minimize closed-circuit disconnection
- Use intubator with highest likelihood of first pass success
- Consider video laryngoscopy
- Prefer cuffed endotracheal tube if available
- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

Drug Therapy

- **Epinephrine IO/IV dose:** 0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration). Repeat every 3–5 minutes.
- **Amiodarone IO/IV dose:** 5 mg/kg bolus during cardiac arrest. May repeat up to 2 times for refractory VF/pulseless VT.
  or
  Lidocaine IO/IV dose: Initial: 1 mg/kg loading dose. Maintenance: 20–50 mcg/kg per minute infusion (repeat bolus dose if infusion initiated >15 minutes after initial bolus therapy).

Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypoglycemia
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

مدیریت راه هوایی کودک مبتلا یا مشکوک به COVID-19

اسامی نویسندگان این بخش: دکتر بهاره یغمایی با همکاری دکتر عباس حسنی، دکتر مسعود محمدپور، دکتر میثم شریف‌زاده، دکتر زینب نجفی و دکتر بهداد قریب

توجه: بدون پوشش محافظت شخصی مناسب *(PPE) وارد اتاق نشوید!

آمادگی جهت اینتوبه کردن

چیدمان تیم مسئول

داخل اتاق
- پزشک ماهر در اینتوبه کردن
- فرد ماهر در اینتوبه کردن از گروه بیهوشی
- پرستار جهت تزریق داروها

خارج اتاق
- سرپرستار یا پرستار مسوول شیفت
- پرستار جهت آماده کردن داروها یا وسایل بر حسب نیاز
- رزیدنت یا اینترن جهت ثبت داروها و مراحل کار در پرونده

وسایل

- لوله تراشه سایز مناسب کاف دار
- LMA**
- Oral Airway
- ET Co2 Monitor
- آمبو بگ و ماسک با سایز مناسب
- در صورت امکان HEPA filter***
- NGT
- ساکشن و کانتر ساکشن
- اکسیژن
- لارنگوسکوپ (ترجیحا ویدئو لارنگوسکوپ)
- چسب آماده شده جهت ثابت کردن لوله تراشه

داروها

- Rocuronium 1.2 mg/Kg

Or

- Cisatracurium 0.2 mg/Kg
- Atropine 0.02 mg/Kg
- Ketamine 2 mg/Kg

پوشش حفاظت شخصی

- گان
- دستکش
- عینک ایمنی یا شیلد صورت
- ماسک N95 سایز مناسب

* PPE: Personal Protective Equipment

** LMA: Laryngeal Mask Airway

*** HEPA filter: High Efficiency Particulate Air filter

اینتوبه کردن بیمار

قبل از اینتوبه کردن

Pre-Oxygenation: اکسیژن ۱۰۰٪ به مدت ۵ دقیقه با ماسک رزروار یا هود

- قبل از برداشتن ماسک یا هود از صورت کودک، اکسیژن را قطع کنید تا آئروسل‌های راه هوایی کودک کمتر پخش شود.

Rapid Sequence Intubation:

- تا حد امکان از آمبوبگ و ماسک استفاده نشود ولی در کودکان کوچک و بیماری جدی ریه امکان‌پذیر نخواهد بود.

نکات مهم در استفاده از آمبوبگ و ماسک

- برای اطمینان از محکم بودن ماسک روی صورت کودک، به خصوص در کودک بزرگتر جهت جلوگیری از پخش آئروسل‌ها PPV دو نفره انجام شود.
- زمان آمبوبگ و ماسک حداقل باشد.

اینتوبه کردن

۱) برای حفظ فاصله بیشتر در صورت امکان از ویدئو لارنگوسکوپ برای اینتوبه کردن بیمار استفاده شود.
۲) مطمئن باشیم که بیمار آماده‌ی اینتوبه کردن است و حین انجام آن سرفه نمی‌کند.
۳) بعد از اینتوبه کردن بلافاصله کاف لوله تراشه پر شود.
۴) لوله تراشه به HEPA filter وصل شود.
۵) از محل مناسب لوله تراشه با ET co2 و گوش کردن به ریه‌ها مطمئن شوید.
۶) لوله تراشه را کلامپ کنید.
۷) بیمار را به ونتیلاتور وصل کنید.
8) لوله تراشه را ثابت کنید.

بعد از اینتوبه کردن

- در صورت امکان از ساکشن بسته استفاده کنید
- تا حد ممکن لوله تراشه و لوله‌های ونتیلاتور جدا نشوند
- کلامپ کردن لوله تراشه قبل از جدا کردن لوله تراشه از ونتیلاتور
- در زمان پروسیجرهای تولید کننده آئروسل *(AGP)** مثل اینتوباسیون، حداقل نفرات در اتاق باشند
- صحبت با اعضای تیم راجع به کار گروهی انجام شده فراموش نشود (Hot Debriefing) .

بهتر است پوشش حفاظت شخصی را با نظارت همکار خارج کنیم چراکه هنگام خارج کردن پوشش بیشترین احتمال آلودگی وجود دارد.

After learning *Basic Life support* from Online classes :