

CPR in Special Circumstances

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CPR in COVID-19 infection (AHA)

- ◆ *health care providers should put on full PPE before starting CPR on any patient with confirmed or suspected COVID-19.*
- ◆ *high-quality CPR should not be delayed for those with suspected or confirmed COVID-19*
- ◆ *For witnessed sudden cardiac arrests, chest compressions should be initiated immediately. Providers should not delay chest compressions to put on PPE or place face covering on patients (for fully vaccinated provider)*

...CPR in COVID-19 infection (AHA)

- ◆ Providers wearing appropriate PPE should replace providers without sufficient PPE
- ◆ Defibrillation should be performed as soon as indicated, and should not be delayed to put on PPE

PPE

- ◇ *appropriate PPE includes:*
- ◇ *N95 masks with eye protection or positive-airway pressure respirators,*
- ◇ *gloves*
- ◇ *gowns*

Reduce provider risk

Healthcare providers can significantly reduce their risk of infection by receiving the vaccine and approved boosters (if applicable) against the SARS-CoV2 virus ^{13, 14, 15}

Reduce provider exposure and provide timely care

- Rapidly provide chest compressions, without delay or interruption
- Do not delay chest compressions for provider PPE or to place a face covering on the patient
- Relieve initial resuscitation personnel with providers wearing appropriate PPE for AGPs as soon as possible
- Don appropriate PPE for AGPs (N95 masks with eye protection or positive-airway pressure respirators, gloves and gowns) prior to confirmed AGPs including bag-mask ventilation, intubation and positive pressure ventilation
- Limit unprotected rescuers from exposure of AGPs
- Consider using mechanical CPR devices *if available and personnel are already trained*
- Communicate COVID-19 status of the patient to any new providers and clearly communicate expectations of appropriate risk-matched PPE

Specific additional resuscitation strategies

Pediatric and adult cardiac arrest

- Defibrillate as soon as possible when indicated; do not delay defibrillation for application of masks or other PPE.
- For agonal breathing, consider passive oxygenation until HEPA filtered ventilation can be provided
- Securely attach a HEPA filter to any ventilation device
- Ventilate with a bag-mask-HEPA filter with tight seal until a supraglottic or endotracheal airway is placed
- Engage the intubator with the highest chance of first pass success
- Consider use of video laryngoscopy, if available and personnel are already trained
- Maximize chest compression fraction, pausing to intubate only if needed
- Minimize endotracheal administration of medications to avoid aerosol generation
- Minimize closed ventilation circuit disconnections
- Commit to ethical and evidence-based termination of resuscitation policies

Out-of-hospital cardiac arrest

- For adults, prioritize chest compressions and defibrillate when indicated; compressors should apply their own masks if immediately available and retrieval does not delay treatment
- For pediatrics, prioritize oxygenation and HEPA filtered ventilation with chest compressions; compressors should apply their own masks when available

Maternal and neonatal cardiac arrest

- Newborn babies are unlikely to be a source of SARS-CoV2 transmission
- For newborns, bag-mask or T-piece / mask ventilation with appropriate risk-matched PPE is safe
- Maternal respiratory secretions and fluids may be potential sources of SARS-CoV2 transmission for the neonatal team and newborn

Hepa filter



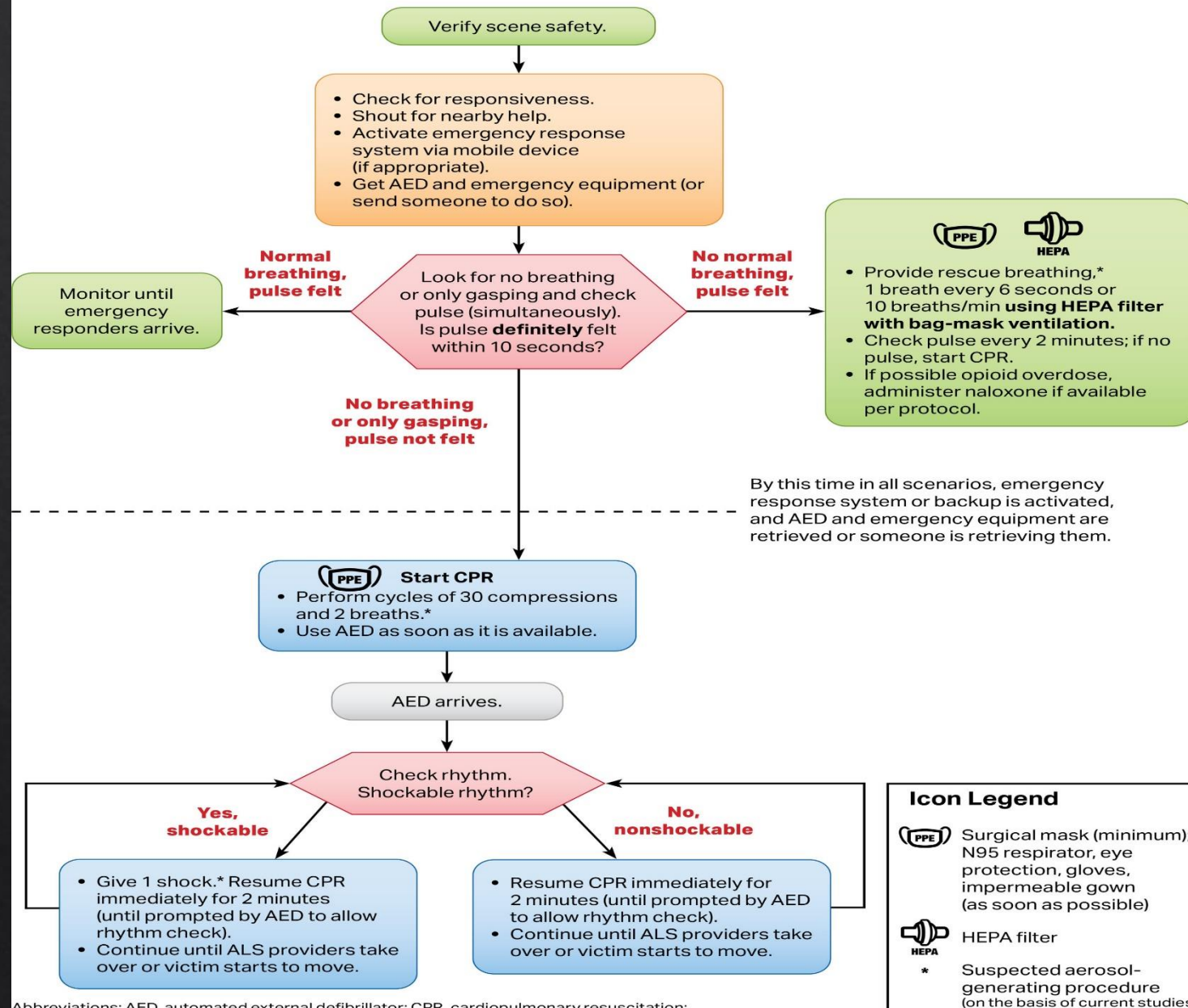
Attaching heap filter



<p>Is masking of the patient during the initial compressions necessary?</p>	<p>Chest compressions without ventilation results in tidal volumes far less than that of normal breathing.^{47, 48, 49} In addition, the airway of cardiac arrest patients is typically initially obstructed by the tongue further reducing the risk of aerosol transmission.²⁹ Thus, in the unlikely event that an unmasked patient with suspected or confirmed COVID-19 suffers an unanticipated cardiac arrest, <i>do not delay compressions</i>. If within immediate reach, the concerned compressor may apply a surgical mask or layered cloth over the mouth and nose of the patient, but this should not delay initiation of chest compressions. The aerosol potential of agonal breathing requires further investigation.</p>
<p>Do first responders need to don masks for their safety?</p>	<p>There are no reports yet of chest compressions alone on COVID-19 positive patients resulting in transmission of the virus. It is reasonable for an unvaccinated first responder to don a mask immediately if within reach, but initiation of chest compressions should not be delayed. For completely vaccinated first responders, the risk of infection of COVID-19 from performing compressions without a mask for a short duration is likely negligible while providing an effective treatment for cardiac arrest. Ventilations, which are a priority in pediatric and neonatal arrests, are suspected to be an AGP and an N-95 wearing provider should replace an unmasked first responder as soon as possible.</p>

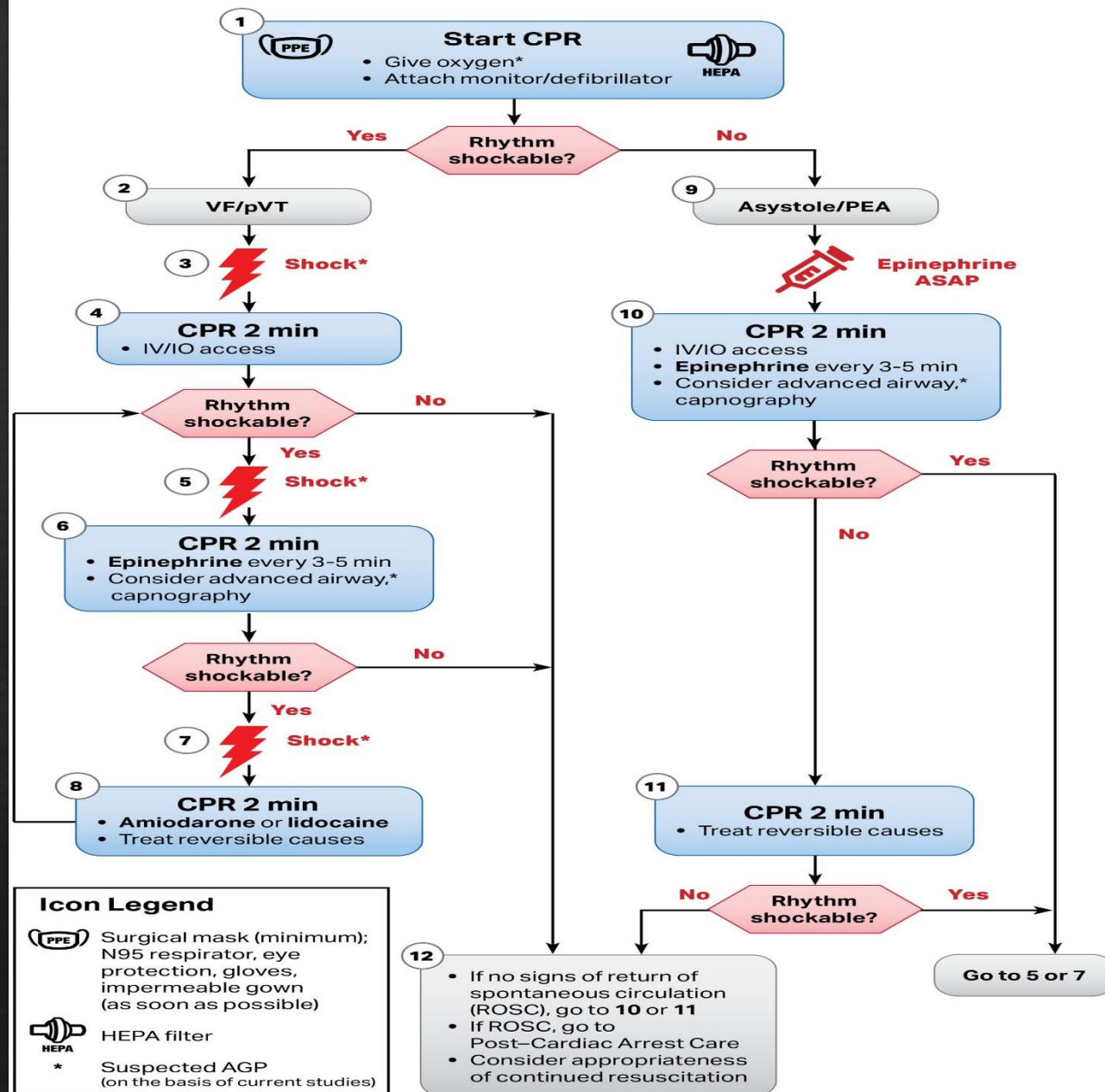
BLS in covid 19

Adult Basic Life Support Algorithm for Healthcare Providers for Suspected or Confirmed COVID-19



ACLS in Covid 19

Adult Cardiac Arrest Algorithm for Patients With Suspected or Confirmed COVID-19 (VF/pVT/Asystole/PEA)



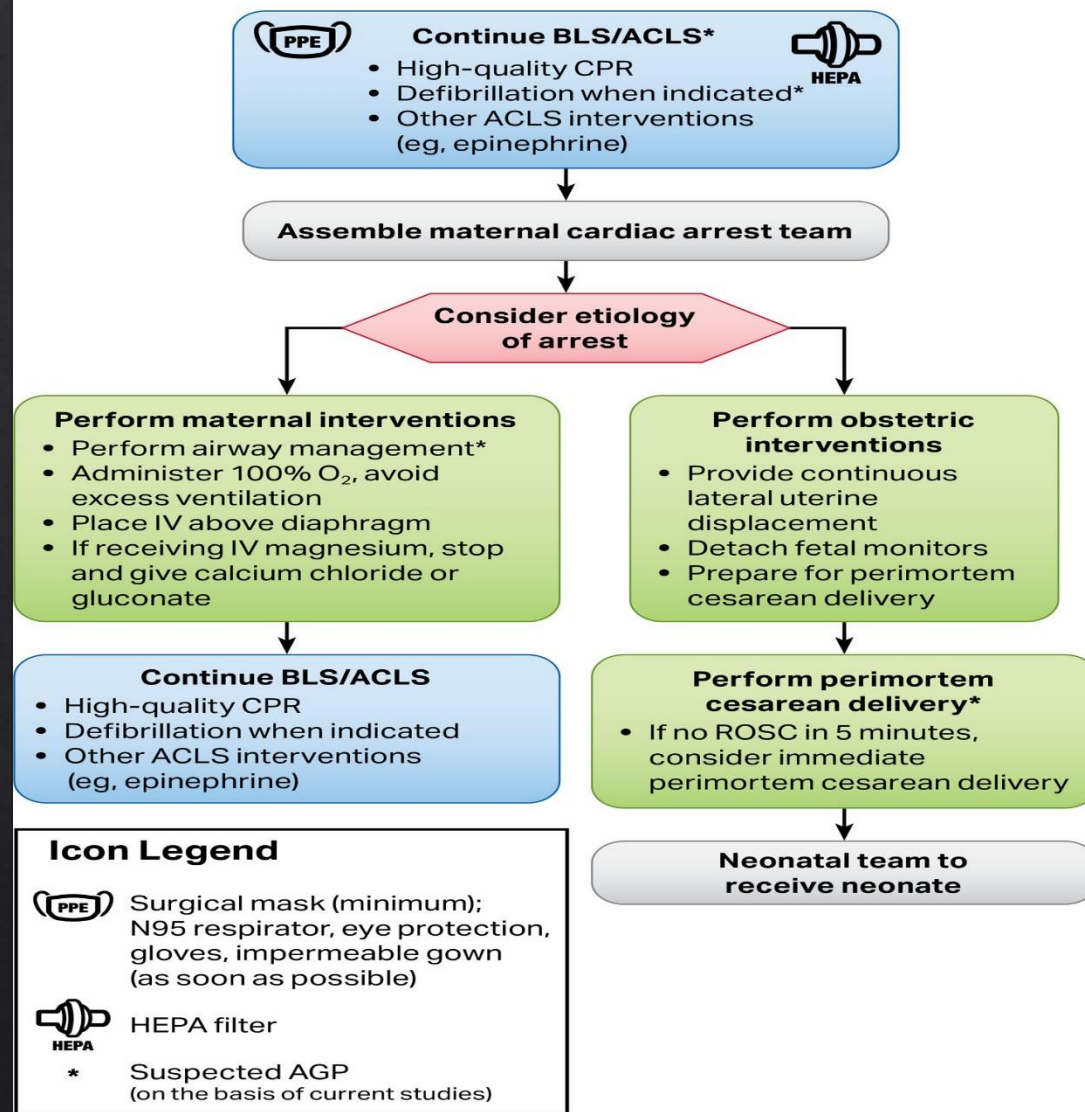
Abbreviations: AGP, aerosol-generating procedure; CPR, cardiopulmonary resuscitation; ET, endotracheal; HEPA, high-efficiency particulate air; IO, intraosseous; IV, intravenous; PEA, pulseless electrical activity; PPE, personal protective equipment; ROSC, return of spontaneous circulation; VF, ventricular fibrillation; pVT, pulseless ventricular tachycardia.

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CPR Quality
<ul style="list-style-type: none"> Push hard (at least 2 inches [5 cm]) 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, 30:2 compression-ventilation ratio. Quantitative waveform capnography <ul style="list-style-type: none"> If PETCO₂ is low or decreasing, reassess CPR quality.
Shock Energy for Defibrillation
<ul style="list-style-type: none"> Biphasic: Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered. Monophasic: 360 J
Drug Therapy
<ul style="list-style-type: none"> Epinephrine IV/IO dose: 1 mg every 3-5 minutes Amiodarone IV/IO dose: First dose: 300 mg bolus. Second dose: 150 mg. or Lidocaine IV/IO dose: First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.
Advanced Airway
<ul style="list-style-type: none"> Rapidly apply PPE before AGPs. Provide endotracheal intubation or supraglottic advanced airway. For all ventilation, use a HEPA filter. Perform waveform capnography or capnometry to confirm and monitor ET tube placement. Once advanced airway is in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions.
Return of Spontaneous Circulation (ROSC)
<ul style="list-style-type: none"> Pulse and blood pressure Abrupt sustained increase in PETCO₂ (typically ≥40 mm Hg) Spontaneous arterial pressure waves with intra-arterial monitoring
Reversible Causes
<ul style="list-style-type: none"> Hypovolemia Hypoxia Hydrogen ion (acidosis) Hypo-/hyperkalemia Hypothermia Tension pneumothorax Tamponade, cardiac Toxins Thrombosis, pulmonary Thrombosis, coronary

CPR in hospital for Covid-19 suspected pregnant patients

Cardiac Arrest in Pregnancy In-Hospital ACLS Algorithm for Patients With Suspected or Confirmed COVID-19



Abbreviations: ACLS, advanced cardiovascular life support; AGP, aerosol-generating procedure; BLS, basic life support; CPR, cardiopulmonary resuscitation; ET, endotracheal; HEPA, high-efficiency particulate air; IV, intravenous; PPE, personal protective equipment; ROSC, return of spontaneous circulation.

Maternal Cardiac Arrest

- Team planning should be done in collaboration with the obstetric, neonatal, emergency, anesthesiology, intensive care, and cardiac arrest services.
- Priorities for pregnant women in cardiac arrest should include provision of high-quality CPR and relief of aortocaval compression with lateral uterine displacement.
- The goal of perimortem cesarean delivery is to improve maternal and fetal outcomes.
- Ideally, perform perimortem cesarean delivery* in 5 minutes, depending on provider resources and skill sets.

Advanced Airway

- **Rapidly apply PPE before AGPs.**
- In pregnancy, a difficult airway is common. Use the most experienced provider.
- Provide endotracheal intubation or supraglottic advanced airway.
- Perform waveform capnography or capnometry to confirm and monitor ET tube placement.
- **For all ventilation, use a HEPA filter.**
- Once advanced airway is in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions.

Potential Etiology of Maternal Cardiac Arrest

- A** Anesthetic complications
- B** Bleeding
- C** Cardiovascular
- D** Drugs
- E** Embolic
- F** Fever
- G** General nonobstetric causes of cardiac arrest (H's and T's)
- H** Hypertension

دستور العمل کشوری احیا در کویید

1. در صورت امکان در هر بخش خصوصاً در اورژانس ترجیحاً یک اتاق یا محدوده مجزایی را جهت انجام CPR به بیماران مبتال یا مشکوک به COVID-19 اختصاص یابد و از احیاء سایر فضاها پرهیز شود.
2. همراهان بیمار و سایر مراجعان را تا پایان احیا و پس از آن، از محدوده ی اتاق یا فضای اختصاص داده شده برای CPR دور نگه دارید.
3. برای انجام CPR، از حداقل نیروی انسانی ممکن استفاده شود. توصیه میشود عالوه بر پزشک مسئول تیم احیا و مسئول راه هوایی در صورت امکان یک پزشک دیگر و دو پرستار (حداکثر 4 نفر) در فرآیند احیا شرکت نمایند. از حضور پرسنل بیش از این تعداد پرهیز شود و حتی الامکان از پرسنل کم تجربه نظیر دانشجویان، در تیم CPR کمتر استفاده شود.
4. پزشک مسئول تیم CPR پیش از پیوستن به فرآیند احیا، از همراهان و پرونده بیمار اطلاعات ضروری را اخذ نماید. به این ترتیب پس از ورود به فرآیند احیا، از رفت و آمد غیر ضروری به خارج از محدوده CPR خودداری خواهد شد.
5. پیش از پوشیدن تجهیزات ایمنی فردی تلفن همراه، مُهر و هر وسیله دیگری که ممکن است تا پایان فرآیند CPR به آن نیاز نداشته باشید را خارج کنید. به این ترتیب تا پایان عملیات احیا، از تماس دستها با لباس فرم جیبها و ... پرهیز نمایید.
6. بسته کامل PPE را از محل تعیین شده در بخش خود بردارید. پیش از شروع CPR آن را بپوشید. این بسته میبایست شامل موارد زیر باشد: گان جراحی بلند یا گان یکسره ضد آب، دو جفت دستکش، یک عدد ماسک N95 یا FFP2 یا FFP3، کلاه، عینک یا شیلد صورت، و یک جفت روکفشی باشد. هرگز پیش از مجهز شدن به پوشش فوق، CPR را شروع نکنید.

نکات دستورالعمل در حین احیا بیمار کوئید 19

7. ا نتوباسیون باید فقط توسط فرد آموزش دیده و متبحر و در صورت امکان با کمک ویدیولارنگوسکوپ انجام شود. پیش از حضور مسئول راه هوایی، چنانچه حمایت تنفسی ضروری است، از ماسک و آمبوبگ فقط به صورت **Fixation Passive** استفاده شود
8. با توجه به خطر انتشار عفونت حتی در صورت کفایت عملکرد تنفسی، روی صورت بیمار ماسک اکسیژن فیکس شده باشد تا احتمال انتشار ریز قطرات تنفسی به حداقل برسد. اگر **Autopulse** در دسترس می باشد، برای **chest compression** از آن استفاده شود.
9. در صورت نیاز به سمع ریه و قلب، فقط از گوشی پزشکی که از قبل برای موارد مشکوک یا مبتال معین شده است؛ استفاده شود. پس از اتمام احیا آن را در کنار سایر وسایل نیازمند ضد عفونی قرار داده شود
10. هنگام انجام **CPR** و پس از آن، تجهیزات آلوده (مخصوصا آلوده به ترشحات تنفسی) مانند الرنگوسکوپ، ماسک بیمار و ... را از بالین بیمار، در سینی یا ظرف از پیش شده وسایل آلوده قرار داده شود

دستورالعمل احیا در کویید بعد از احیا

- (11) پس از ختم CPR، ضروری است کلیه تجهیزات قابل استفاده مجدداً از جمله لارنگوسکوپ، گوشی پزشکی مطابق پروتکل کمیته کنترل عفونت بیمارستان ضد عفونی و استریل شوند. همچنین کلیه لوازم مصرفی غیرقابل استفاده مجدداً، از جمله چست لید، لوله تراشه و ... نیز میبایست به عنوان پسماند عفونی در نظر گرفته شده و در سطل مخصوص زباله‌های عفونی دفع شوند.
- (12) پس از ختم CPR، کلیه تجهیزات ایمنی فردی را طبق پروتکل مربوطه ابالغی کشوری خارج نمایند و در نزدیکترین سطل مخصوص زباله عفونی (زرد رنگ) قرار داده شود
- (13) به هیچ عنوان پس از ختم CPR با تجهیزات پوشش فردی در سایر قسمتهای بخش رفت و آمد صورت نگیرد..
- (14) پس از خارج کردن PPE، دستها به شیوه صحیح با آب و صابون شسته شود و در صورت عدم دسترسی، با محلولهای الکلی، ضد عفونی گردد.
- (15) پس از پایان CPR (اعم از موفق یا ناموفق) برای بررسی ضرورت ارسال نمونه COVID-19، نحوه جابجایی بیمار یا متوفی و سایر اقدامات ضروری مربوط به درمان یا کنترل عفونت با پزشک مسئول (متخصص عفونی، داخلی، ...) و یا مسئول کنترل عفونت بیمارستان تماس گرفته شود.

Cardiac Arrest Associated With Pulmonary Embolism

Treatment Recommendations in PE

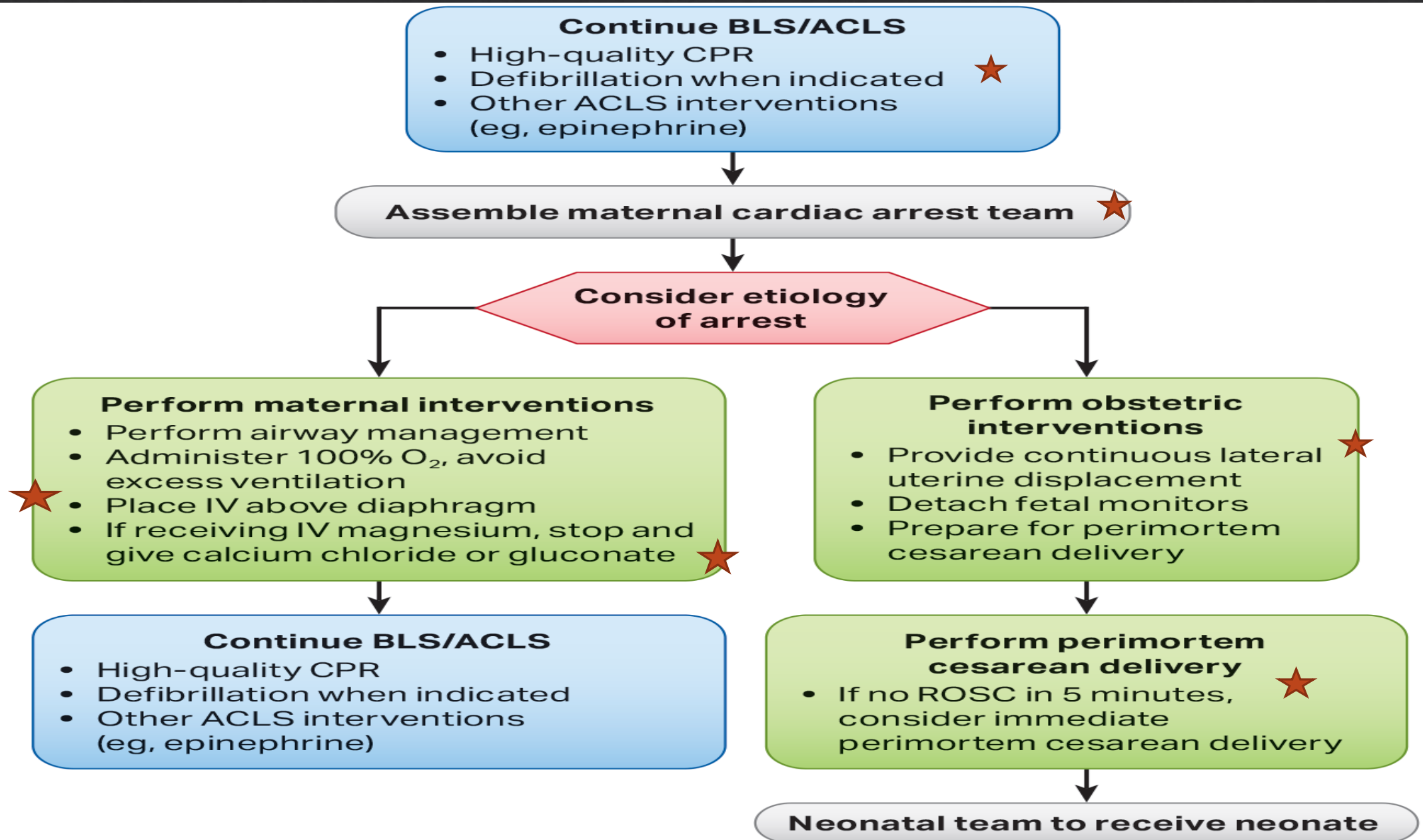
- ◆ AHA suggest administering fibrinolytic drugs for cardiac arrest when PE is the suspected cause of cardiac arrest
- ◆ AHA suggest the use of fibrinolytic drugs or surgical embolectomy or percutaneous mechanical thrombectomy for cardiac arrest when PE is the known cause of cardiac arrest

Fibrinolytic in CPR

- ◆ Ongoing CPR is not an absolute contraindication to fibrinolysis
- ◆ 100 mg of Alteplase over 2 hours (10-milligram IV bolus followed by 90 milligrams infused over 2 h)

Cardiac Arrest in Pregnancy

Cardiac Arrest in Pregnancy In-Hospital ACLS



وضعیت دادن به خانم باردار



- در حاملگی خوابیده به پهلو ی چپ باید از **تخته و ج** شکل استفاده شود

- موقع **CPCR** باید این بیماران را در زاویه **27-30 درجه** قرار داد یا با دست رحم را به سمت چپ جابجا کرد.

وضعت دادن به خانم باردار

- تکنیک دیگر برای برداشتن فشار از روی آئورت و اجوف:
جابجایی رحم به سمت چپ با تکنیک 1 و 2 دستی



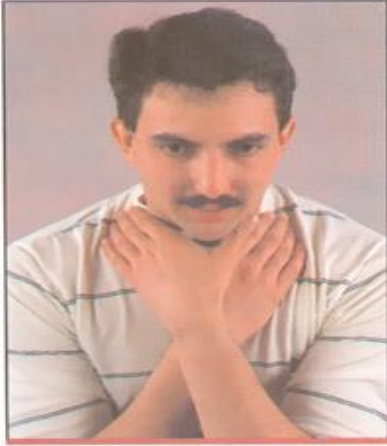
Cardiac Arrest in Pregnancy

- ◇ *Treatment Recommendation*
- ◇ This treatment recommendation (below) is unchanged from 2015.
- ◇ We suggest delivery of the fetus by perimortem cesarean delivery for women in cardiac arrest in the second half of pregnancy **(weak recommendation, very low-quality evidence)**.
- ◇ There is insufficient evidence to define a specific time interval by which delivery should begin.
- ◇ High-quality usual resuscitation care and therapeutic interventions that target the most likely cause(s) of cardiac arrest remain important in this population.
- ◇ There is insufficient evidence to make a recommendation about the use of left-lateral tilt and/or uterine displacement during CPR

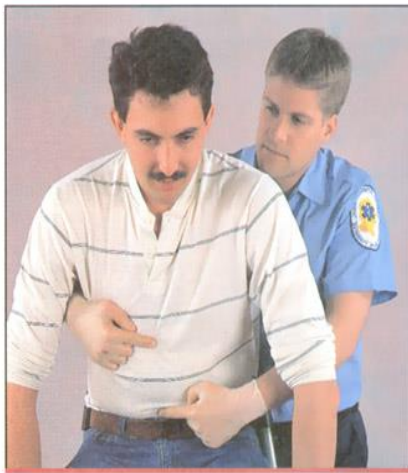
Choking

Pediatrics Infants and Adult

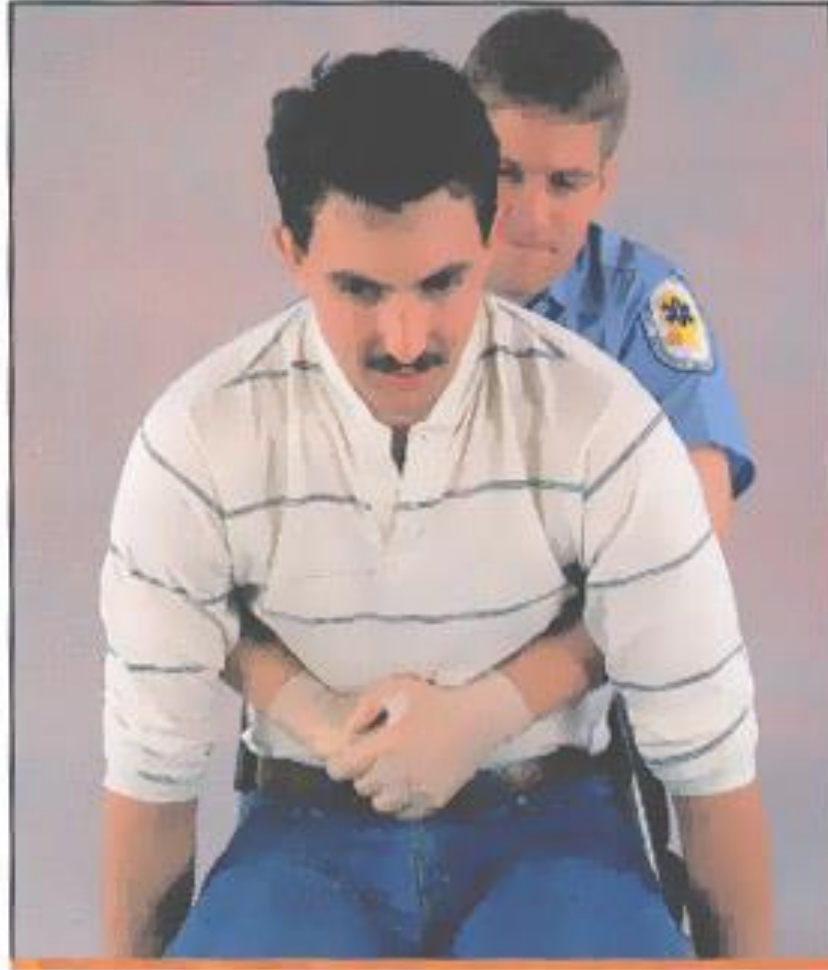
Heimlich Maneuver



A sign of choking.



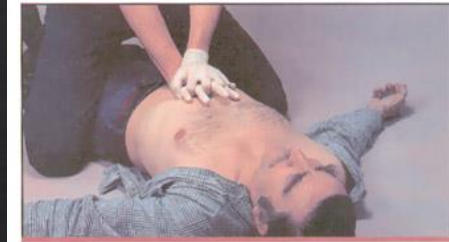
Locate the patient's xiphoid process and navel.



Apply abdominal thrusts (Heimlich Maneuver).



Locate the xiphoid process and the navel in an unconscious patient.



Perform an abdominal thrust on an unconscious adult.



Chest thrusts for a pregnant woman.

foreign body airway obstruction

- ◊ Backslaps ---→ when cough is ineffective
- ◊ Manual extraction ----→ for visible items
- ◊ No blind sweeps
- ◊ Abdominal thrust --→ older than one year old
- ◊ Chest thrust --→ for unconscious individual
- ◊ Magill forceps -----→ trained provider
- ◊ Suction-based clearance device--→ Not suggest routinely

Choking (PALS)

- ❑ If the infant or child is conscious, maintaining his or her own airway, and able to cough and make some sounds, *do not interfere*.
- ❑ Administer supplemental oxygen if indicated. Encourage the child to cough
- ❑ If the conscious infant or child cannot cough or make any sound, clear the obstruction by performing abdominal thrusts (if the patient is 1 year or older) or back slaps and chest thrusts (if the patient is younger than 1 year)



Choking Infant



FIGURE 109-3. Back blows to clear airway of choking infant. (Image used with permission of Rita K. Cydulka, MD, MS, MetroHealth Medical Center.)



FIGURE 109-4. Chest thrusts to clear airway of choking infant. (Image used with permission of Rita K. Cydulka, MD, MS, MetroHealth Medical Center.)

Opioid Toxicity

CPR

“ We recommend the use of naloxone by IV, intramuscular, subcutaneous, IO, or intranasal routes in respiratory arrest associated with opioid toxicity (strong recommendation, very low-quality evidence).

The dose of
naloxone required will depend on the route.”

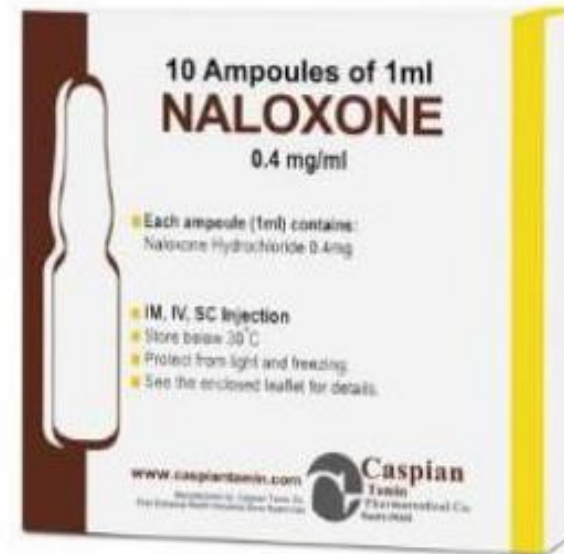
2020

AHA Recommendation

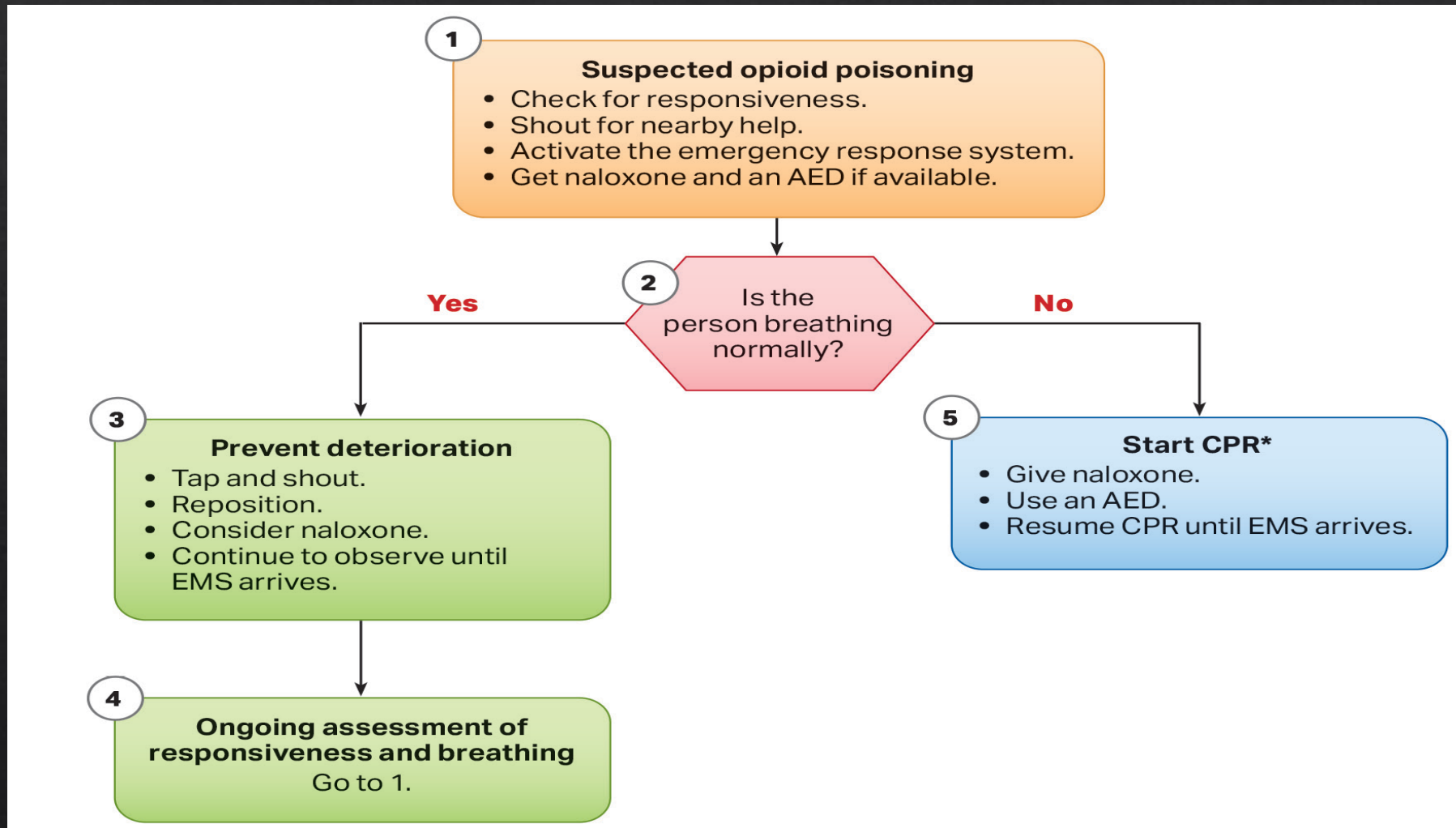
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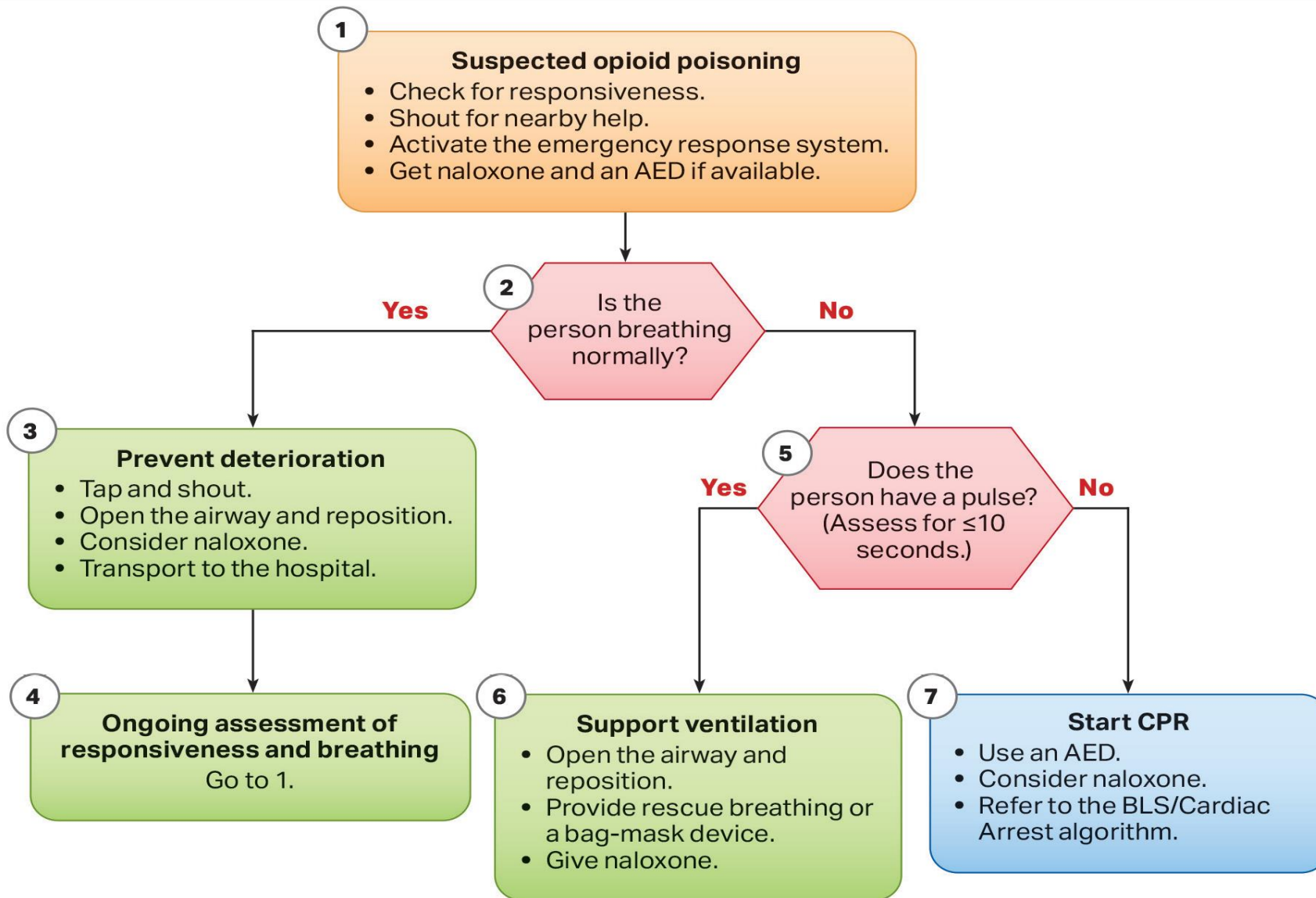
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Opioid-Associated Emergency for Lay Responders Algorithm



Opioid-Associated Emergency for Healthcare Providers Algorithm



Naloxan side effects

◆ Cardiovascular

Common (1% to 10%): Tachycardia, hypotension, hypertension

Uncommon (0.1% to 1%): Arrhythmia, bradycardia

Rare (less than 0.1%): Fibrillation, cardiac arrest

◆ Nervous system

Common (1% to 10%): Dizziness, headache

Uncommon (0.1% to 1%): Tremor

Rare (less than 0.1%): Seizures

◆ General

This drug may precipitate abrupt opioid withdrawal in physically dependent persons

◆ Gastrointestinal

Common (1% to 10%): Nausea, vomiting

Uncommon (0.1% to 1%): Diarrhea, dry mouth

◆ Respiratory

Very rare (less than 0.01%): Pulmonary edema

Frequency not reported: Dyspnea

Opioid Toxicity

◇ Treatment Recommendations

- ◇ This treatment recommendation (below) is unchanged from 2015
- ◇ We recommend the use of naloxone by IV, **intramuscular, subcutaneous, IO, or intranasal** routes in respiratory arrest associated with opioid toxicity **(strong recommendation, very low-quality evidence).**
- ◇ We can make no recommendation about the modification of standard ALS in opioid-induced cardiac arrest

Resuscitation in Drowning

AHA 2020

ILCOR Summary Statement 2021

“

We suggest against the use of age, EMS response time, water type (fresh or salt), water temperature, and witness status when making prognostic decisions

”

AHA 2020

Drowning CPR

Resuscitation on a Boat After Drowning

- ◆ In the meantime, we highlight our 2020 recommendation and suggest that bystanders who are trained, able, and willing to give rescue breaths and chest compressions do so for all adult patients in cardiac arrest due to drowning on a boat

In-Water Resuscitation in Drowning

- ◆ The 2005 treatment recommendation is unchanged: In-water,
- ◆ expired-air resuscitation may be considered by trained rescuers, preferably with a flotation device, but **chest compressions should not be attempted in the water**

BLS Modifications in Drowning

- ❖ *The most important and detrimental consequence of submersion is hypoxia; therefore, oxygenation, ventilation, and perfusion should be restored as rapidly as possible. This will require immediate bystander CPR plus activation of the EMS system. With the 2010 AHA Guidelines for CPR and ECC, CPR now begins with chest compressions in a C-A-B sequence.*
- ❖ However, the guidelines recommend individualization in sequence based upon the presumed etiology of the arrest. CPR for drowning victims should use the traditional A-B-C approach in view of the hypoxic nature of the arrest.

Rescue Breathing

- ◇ Rescue breathing is usually performed once the unresponsive victim is in shallow water or out of the water.
- ◇ **Some victims aspirate no water because they develop laryngospasm or breath-holding. Even if water is aspirated, there is no need to clear the airway of aspirated water, because only a modest amount of water is aspirated by the majority of drowning victims, and aspirated water is rapidly absorbed into the central circulation**
- ◇ Attempts to remove water from the breathing passages by any means other than suction (eg, abdominal thrusts or the Heimlich maneuver) are unnecessary and potentially dangerous. The routine use of abdominal thrusts or the Heimlich maneuver for drowning victims is not recommended

DROWNING BLS

if there is no breathing, give 2 rescue breaths that make the chest rise (if this was not done previously in the water). After delivery of 2 effective breaths, the lay rescuer should immediately begin chest compressions and provide cycles of compressions and ventilations according to the BLS guidelines

ACLS in drowning

- ◆ Victims in cardiac arrest may present with asystole, PEA, or pulseless VT/VF. For treatment of these rhythms, follow the appropriate PALS or ACLS guidelines.

موفق و پیروز باشید