



**Dr.Siamak Rimaz Anesthesiologist**  
**(G.U.M.S)**

**Drowning**

# *Drowning*

- According to the WHO, drowning is a serious and neglected public health threat claiming the lives of more than 372,000 people a year worldwide, or 40 people every hour of every day. More than 90% of these deaths occur in low- and middle-income countries.

**TABLE 2.** Severity Grades for Submersion Events Based on Clinical Findings With Associated Mortality Rates

Severity Grade	Clinical Findings	Mortality (%) <sup>29</sup>
1	Some coughing, normal auscultation	0
2	Coughing; with abnormal auscultation: rales in some lung fields on one side	0.6
3	Coughing; abnormal auscultation with acute pulmonary edema (bilateral rales); good cardiac function (no hypotension)	5.2
4	Coughing; abnormal auscultation with acute pulmonary edema (bilateral rales) with poor cardiac function (hypotension)	19.4
5	No spontaneous respirations, pulse is present	44
6	Cardiopulmonary arrest: no spontaneous breathing, no pulse	93







**FIGURE 76-1** ■ Drowning chain of survival. (Adapted from Szpilman D, Morizot-Leite L, Vries W, et al. First aid courses for the aquatic environment. In: Bierens JJ, ed. Handbook on Drowning: prevention, rescue, and treatment. Berlin: Springer-Verlag; 2006, p. 342–7.)

# تعریف احیاء قلبی- ریوی

- احیاء قلبی- ریوی شامل اقداماتی است که برای بازگرداندن اعمال حیاتی دو عضو مهم قلب و ریه انجام میشود و تلاش میشود تا گردش خون و تنفس به طور مصنوعی تا زمان برگشت جریان خون خودبخودی بیمار برقرار شود.
- اما بدلیل اینکه بدون این اقدامات به علت فقدان اکسیژن مرگ مغزی دائمی در عرض زمان کمتر از ۶-۴ دقیقه (زمان طلایی) ایجاد میشود، واژه احیاء قلبی- ریوی (CPR) به پیشنهاد پیتز سفر (پدر علم احیاء) بخاطر اهمیت احیاء مغز و حفظ کارکرد آن به احیاء قلبی، ریوی، مغزی (CPCR) تغییر نام داد .

## احیاء قلبی- ریوی به سه مرحله تقسیم میشود:

- **مرحله اول:** حمایت حیاتی پایه (BLS) که خود شامل چهار مرحله A) باز کردن راه هوایی، B) (حمایت تنفسی و برقراری تهویه تنفسی)، C) برقراری گردش خون با فشردن قفسه سینه به عنوان اولین اقدام ) و D) (انجام دفیبریلاسیون سریع) میباشد.
- **مرحله دوم:** حمایتها و اقدامات پیشرفته حفظ حیات (ACLS) که خود شامل سه مرحله میباشد.
- دسترسی عروقی یا داخل استخوانی برای تجویز داروها و مایعات
- الکتروکاردیوگرافی و پایش ریتم قلبی
- بکارگیری وسایل پیشرفته در اداره راه هوایی
- تشخیصهای افتراقی و جستجو و درمان علل برگشت پذیر ایست قلبی
- **مرحله سوم:** حمایتها و اقدامات طولانی مدت حفظ حیات بعد از برگشت فعالیت قلبی



# تظاهرات بالینی ایست قلبی – ریوی

- عدم پاسخگویی (Unresponsiveness)
- آینه یا فقط (gaspings)
- عدم وجود نبض (Pulselessness)

# *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 immediate activation of the emergency medical services (EMS) system.

# ***Basic Life Support for Drowning***

- The rescuer must always be aware of personal safety.
- The rescuer should get to the victim as quickly as possible, preferably by some conveyance (boat, raft, surfboard, or flotation device).
- ***Routine stabilization of the cervical spine is not necessary*** unless the circumstances leading to the submersion episode indicate that trauma is likely(% , , , 9).
- ***These circumstances include a history of diving, use of a water slide, signs of injury, or signs of alcohol intoxication.***

## ***Basic Life Support***

- ***The position of a drowning victim for transport out of the water is preferably as near to horizontal as possible but with the head still maintained above body level.***
- ***The airways should be kept open at all times, if possible.***
- **Once on land, the victim should be placed supine with trunk and head at the same level.**

# ***Basic Life Support***

- ***The lay rescuer will check for general signs of circulation (breathing, coughing, or movement in response to rescue breaths).***
- ***The healthcare provider will check for general signs of circulation plus the presence of a central pulse.***



- ***Basic Life Support***
- As soon as the unresponsive victim is removed from the water, the rescuer should open the airway, check for breathing:
- **If unconscious but breathing, the recovery position should be used**
- If the victim is not breathing, ventilation is essential.
- For this reason, it is important that CPR follows the traditional Airway-Breathing-Circulation (ABC) sequence.



[heart.org/BackToSports](http://heart.org/BackToSports)



**BACK TO SPORTS**



# ***Basic Life Support for Drowning***

- **Chest Compressions:**
- If there is no breathing, **give 2 rescue breaths** that make the chest rise (if this was not done 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.



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If you suspect the victim has a neck injury, place your hands alongside the cheeks and pull the face toward you with your index fingers

ADAM.

***Try to avoid head tilt !***



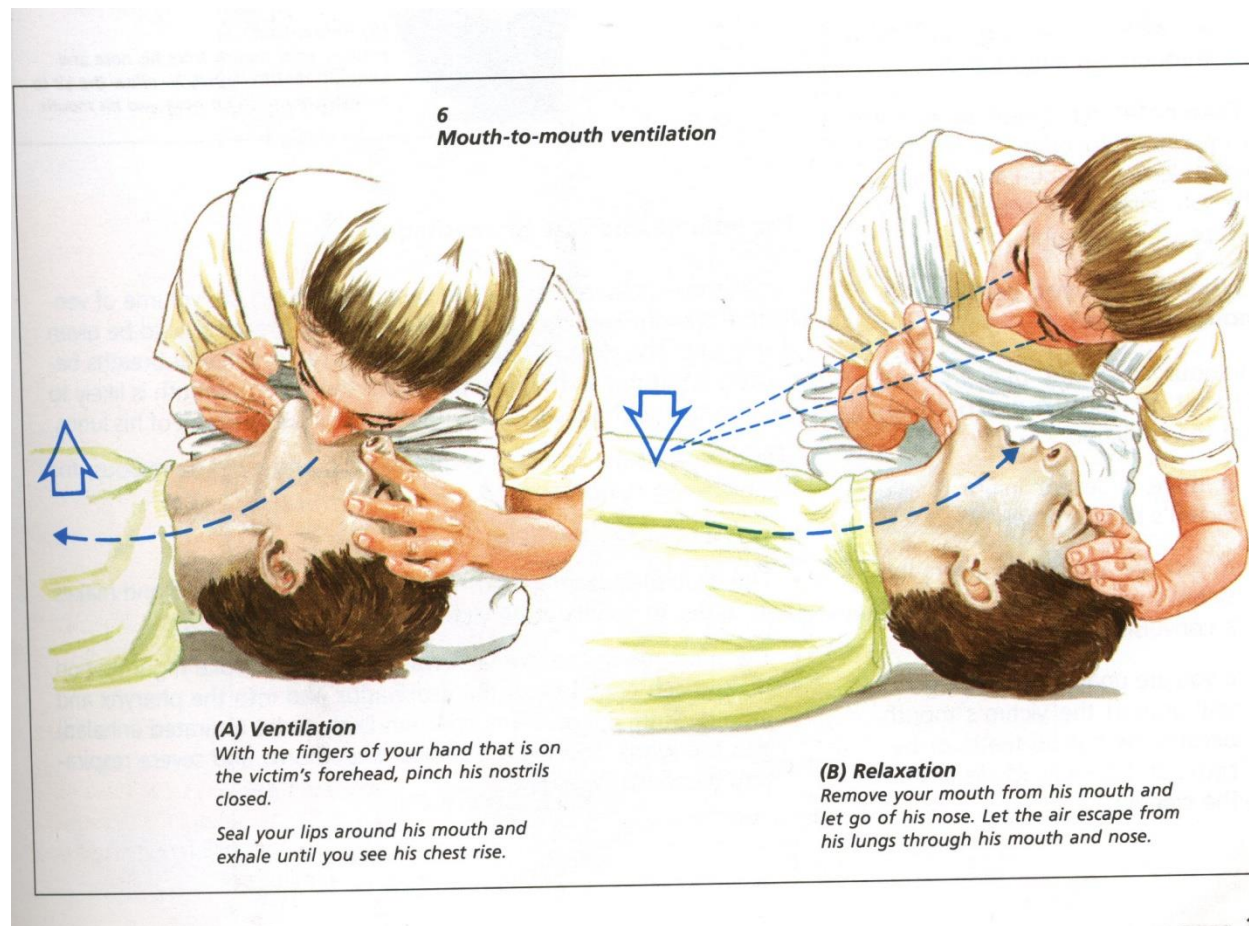
پالس وی را بمدت ۱۰ ثانیه چک کنید (شیرخواران شریان براکیال-کودکان  
کاروتید یا فمورال)



# ***Basic Life Support***

- If there is no breathing:
- Ventilation should be started with 5 initial breaths followed by 30 chest compressions
- and then continued with two breaths to 30 compressions until:
  - signs of life reappear,
  - rescuer exhaustion occurs,
  - or ALS becomes available.
- Because cardiac arrest in drowning victims is caused by asphyxia, cardiac compression-only CPR is useless

# نحوه تنفس دهان به دهان

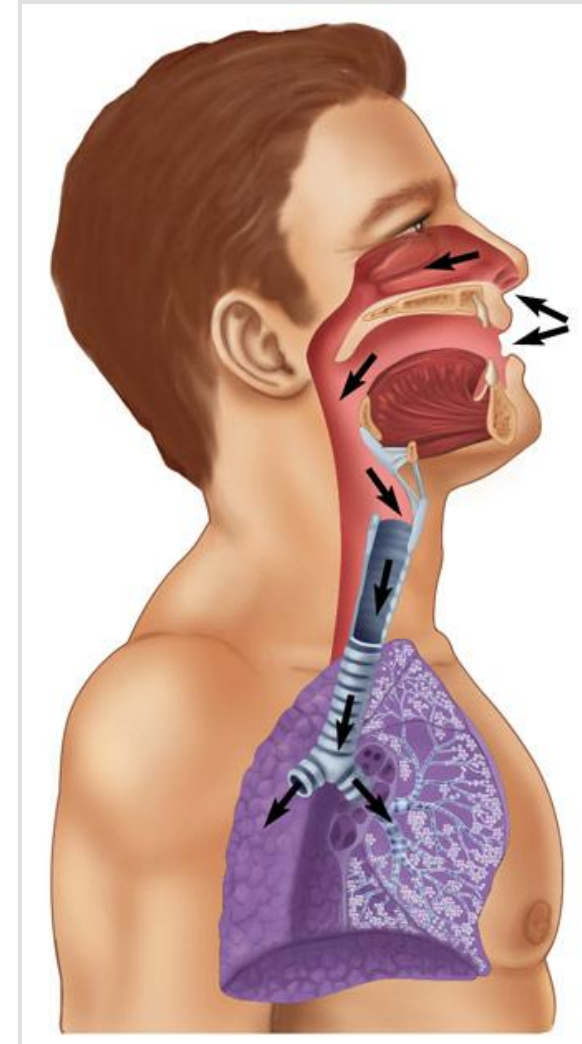


# ***Basic Life Support for Drowning***

- ***Rescue Breathing***
- If it is difficult for the rescuer to pinch the victim's nose, support the head, and open the airway in the water, mouth-to-nose ventilation may be used as an alternative to mouth-to-mouth ventilation.
- Untrained rescuers should not try to provide care while the victim is still in deep water.

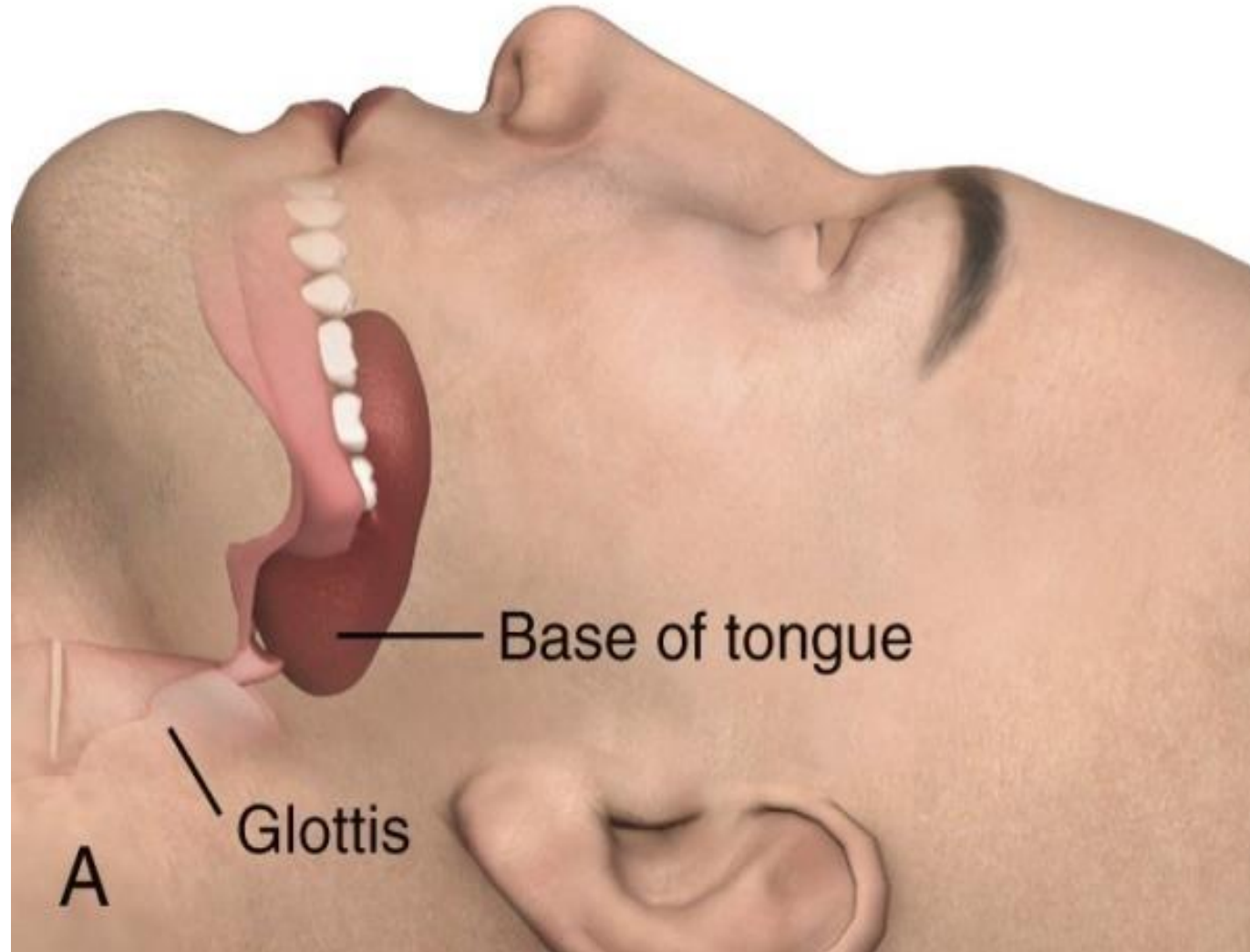
# Airway Management

- Air reaches the lungs only through the trachea.
- In a compromised airway, clearing the airway and maintaining patency are vital.





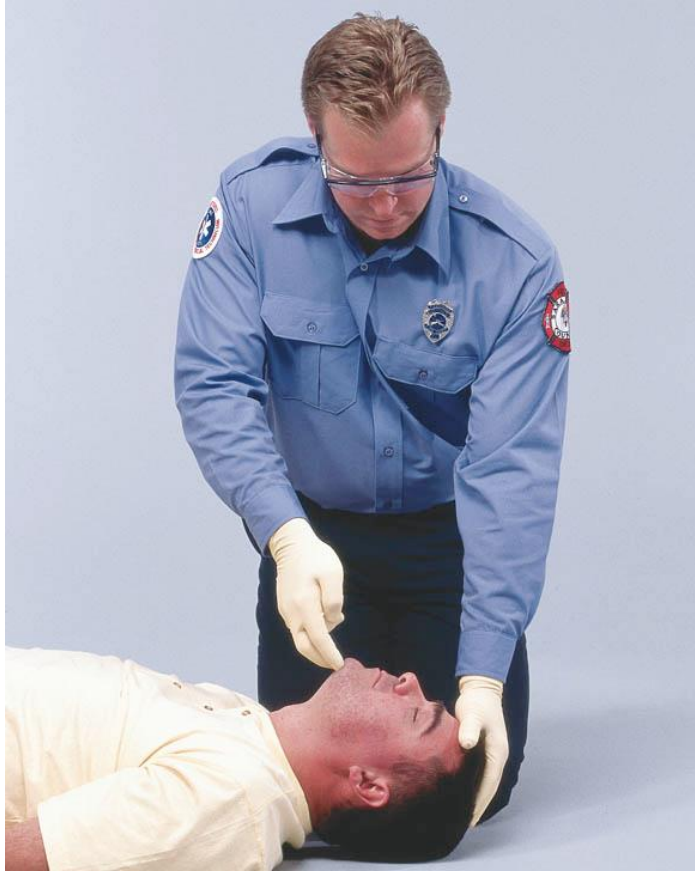
The airway can be obstructed by the tongue and or collapse of the airway.



# *The Head-Tilt/Chin-Lift Maneuver*



# Head-Tilt Chin-Lift Maneuver



# *The Jaw-Thrust Maneuver*



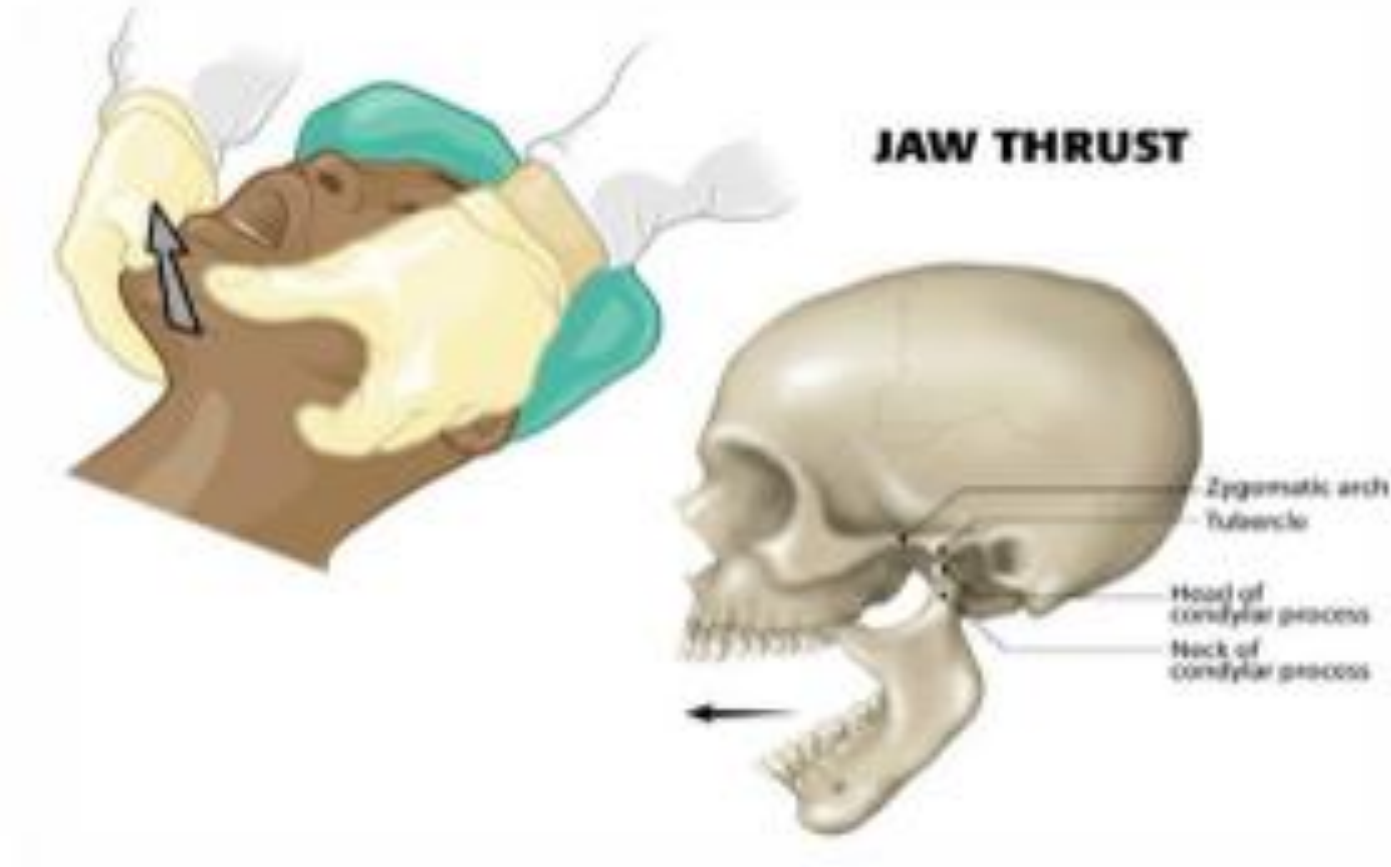


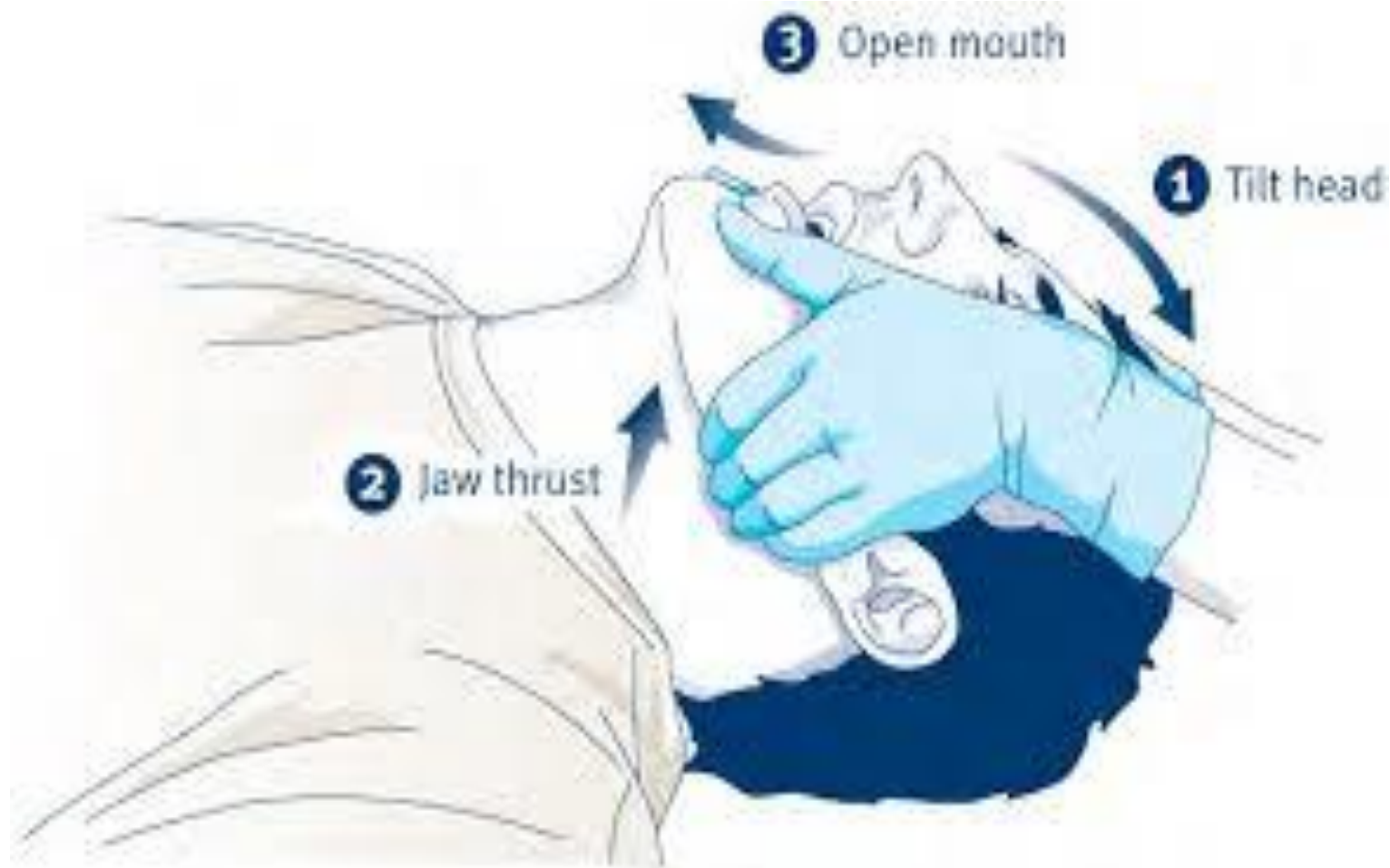
# Jaw-Thrust Maneuver





# Jaw-Thrust Maneuver





# Oropharyngeal (Oral) Airway

- Curved, hard plastic device
- Fits over back of the tongue
- Should be inserted in unresponsive patients who have no gag reflex



# Find the correct size

- Paranasal sinuses
  - Prevent contaminants from entering respiratory tract
- Fractures may cause:
  - Cerebrospinal rhinorrhea
  - Cerebrospinal otorrhea



# Oropharyngeal Airway Placement



# Oropharyngeal Airway Placement

- Palate
  - Separates oropharynx and nasopharynx
  - Hard palate and soft palate
- Palatopharyngeal arch: entrance to the throat (pharynx)





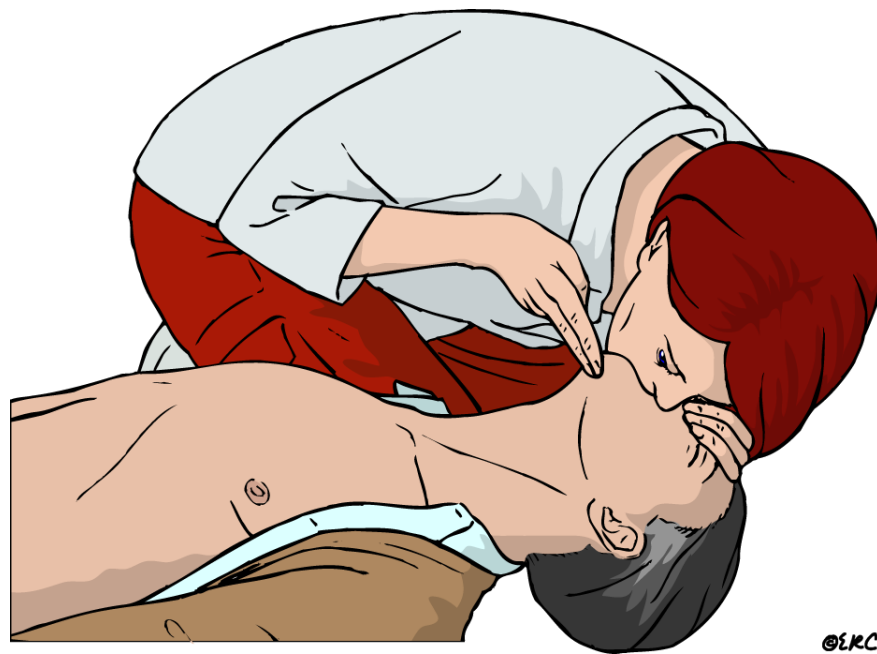
# Oropharyngeal Airway



# ***Basic Life Support for Drowning***

- ***Chest Compressions:***
- If the healthcare provider does not definitely feel a pulse within 10 seconds, the healthcare provider should start cycles of compressions and ventilations.
- Only trained rescuers should try to provide chest compressions in the water.

به ازای هر ۳۰ ماساژ ۲ بار تنفس دهید

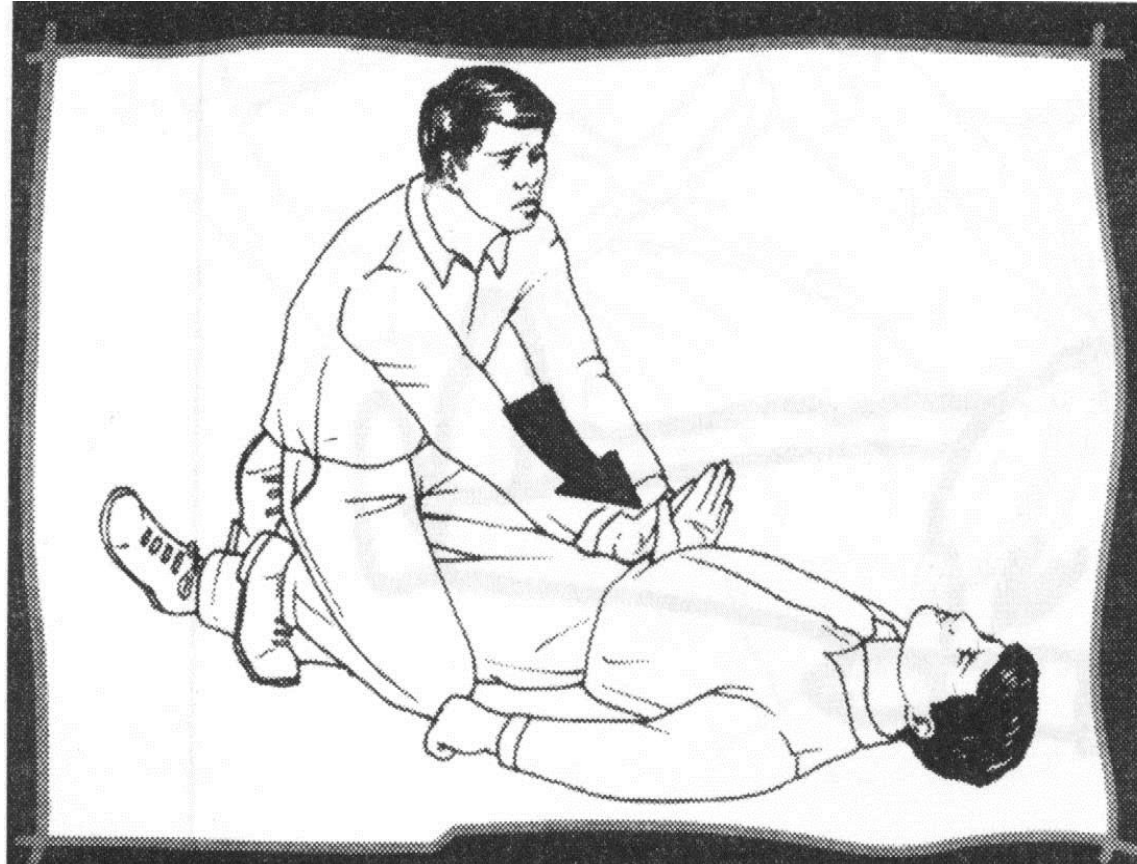


# ***Basic Life Support for Drowning***

- ***Rescue Breathing***

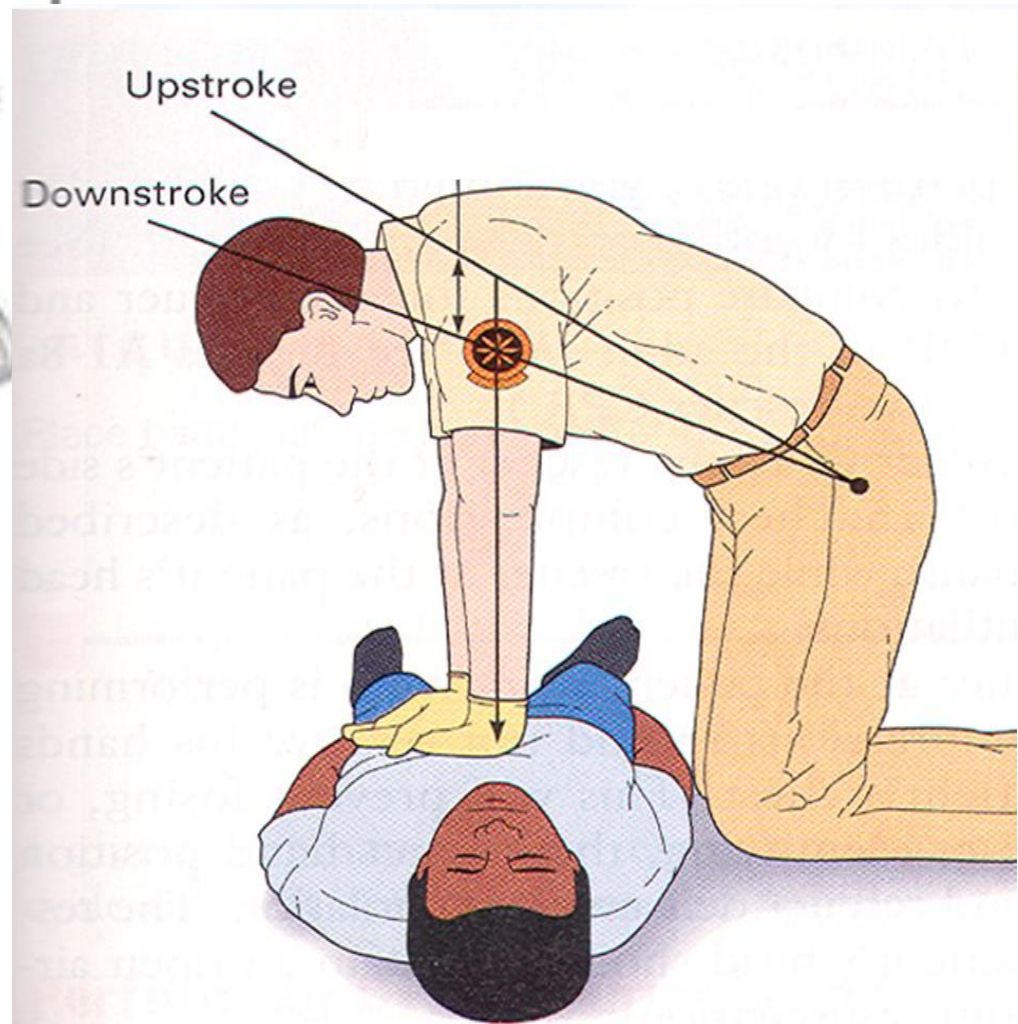
- There is no need to clear the airway of aspirated water, because only a modest amount of water is aspirated by the majority of drowning victims and it is rapidly absorbed into the central circulation, so it does not act as an obstruction in the trachea.
- Attempts to remove water from the breathing passages by any means other than suction (eg, abdominal thrusts or the Heimlich maneuver) are unnecessary and potentially dangerous.

# *Heimlich m.*

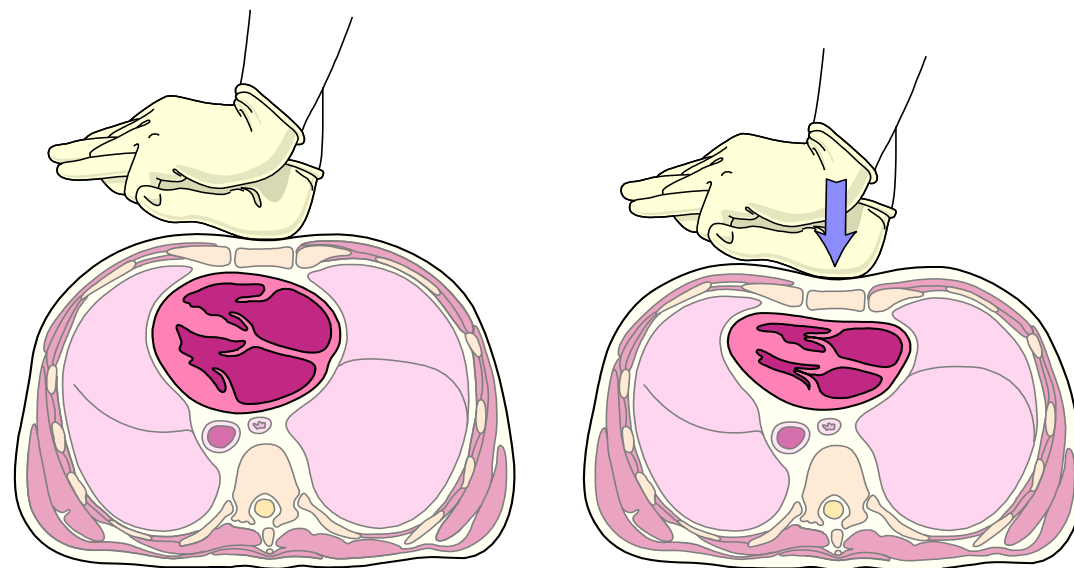


- ***Basic Life Support***
- The most frequent complication during drowning resuscitation is regurgitation of stomach contents, which occurs in more than 65% of victims who need rescue breathing alone, and in 86% of victims who require CPR.
- The presence of vomitus in the airway can result in further aspiration injury and impairment of oxygenation.





# در بالغین حداقل عمق ماساژ قلبی ۵-۶ سانتی متر است.



# ***Basic Life Support for Drowning***

- ***Chest Compressions:***
- Once the victim is out of the water, if the victim is unresponsive and not breathing (and the healthcare provider does not feel a pulse) after delivery of 2 rescue breaths, rescuers should attach an AED and attempt defibrillation if a shockable rhythm is identified.
- Dry the patient's chest before attaching electrodes for monitoring or for defibrillation.

# Management of SCA

## The Collapsed and Unresponsive Athlete

- Suspect SCA in any collapsed and unresponsive athlete
- An AED should be applied as soon as possible for rhythm analysis and shock if indicated







# به محض رسیدن AED لید های آن را به بیمار وصل کنید



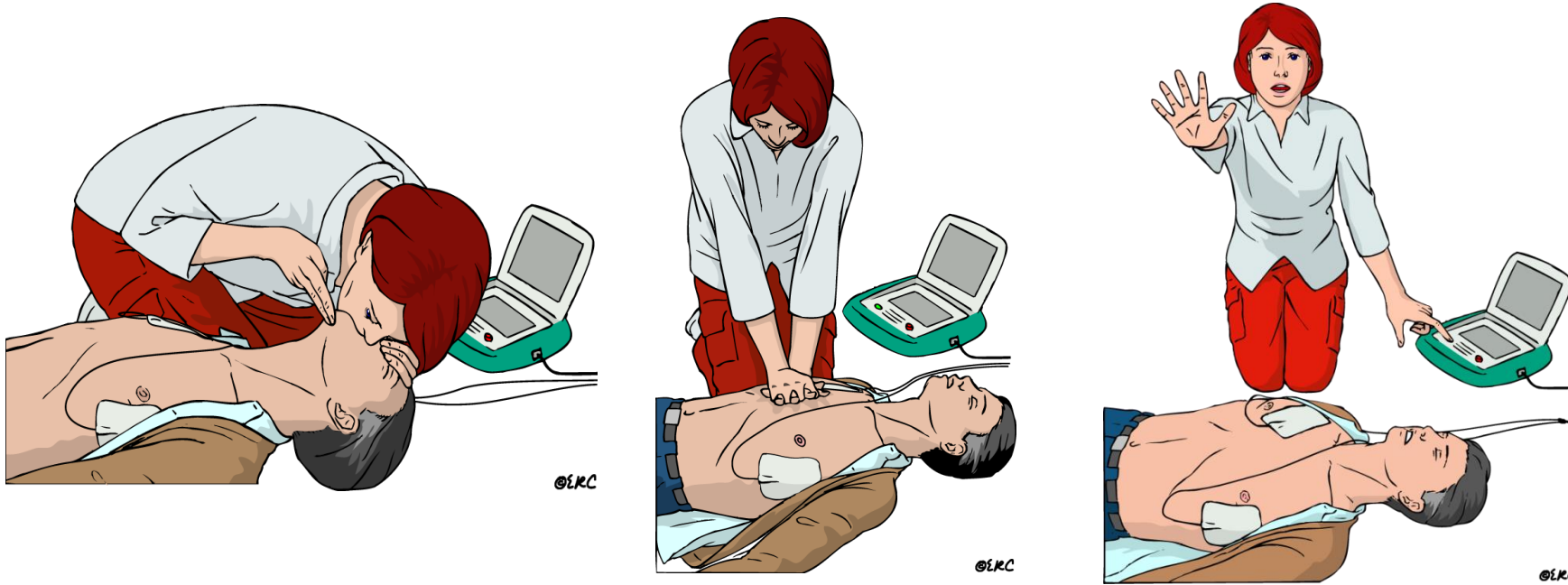
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یک شوک بدهید و به مدت ۵ سیکل دیگر ادامه دهید و سپس ریتم را چک کنید



# ***ACLS Guidelines for Submersion Victims***

- To save time, medical equipment should be brought to the victim instead of the victim to the ambulance. Advanced medical treatment.
- The first priority should be adequate oxygenation and ventilation using bag-mask ventilation with 15 liters of oxygen until an orotracheal tube can be inserted.

# One-handed Bag-Mask Ventilation Technique



# ***ACLS Guidelines for Submersion Victims***

- ***Airway and Breathing***
- Early tracheal intubation is valuable for:
  - Improved oxygenation and ventilation
  - Direct removal of foreign material from the tracheobronchial tree
  - Application of continuous positive airway pressure (CPAP) or positive endexpiratory pressure (PEEP)

# *Advanced Life Support*

- Suctioning of the orotracheal tube should be performed only when the presence of fluid makes effective ventilation impossible.
- Suctioning can disturb oxygenation and should be balanced against the need to ventilate and oxygenate.

# ایست قلبی می تواند در اثر ۴ ریتم بوجود آمده زیل باشد :

- (۱) فیبریلاسیون بطنی (VF)
- (۲) تاکی کاردی بطنی بدون نبض (VT)
- (۳) فعالیت الکتریکی بدون نبض (PEA)
- (۴) آسیستول (Asystol)





# *Advanced Life Support*

- For cardiac monitoring,
- the presenting rhythm in cases of cardiac arrest following drowning is **usually asystole or pulseless electrical activity (PEA)**.
- Ventricular fibrillation is rarely reported but may occur if there is a history of coronary artery disease, use of epinephrine, or in the presence of severe hypothermia.<sup>16</sup>

# *Advanced Life Support*

- If ventricular fibrillation is present, defibrillation should be attempted.
- Deliver up to 3 shocks. Then if hypothermia is present, evaluate the victim's core body temperature.
- If the victim's core body temperature is  $<30^{\circ}\text{C}$  ( $<86^{\circ}\text{F}$ ) and VF persists, do not give further shocks until the victim's core body temperature rises above  $30^{\circ}\text{C}$  ( $86^{\circ}\text{F}$ ). Resume BLS and ACLS care until that time.

# *Advanced Life Support*

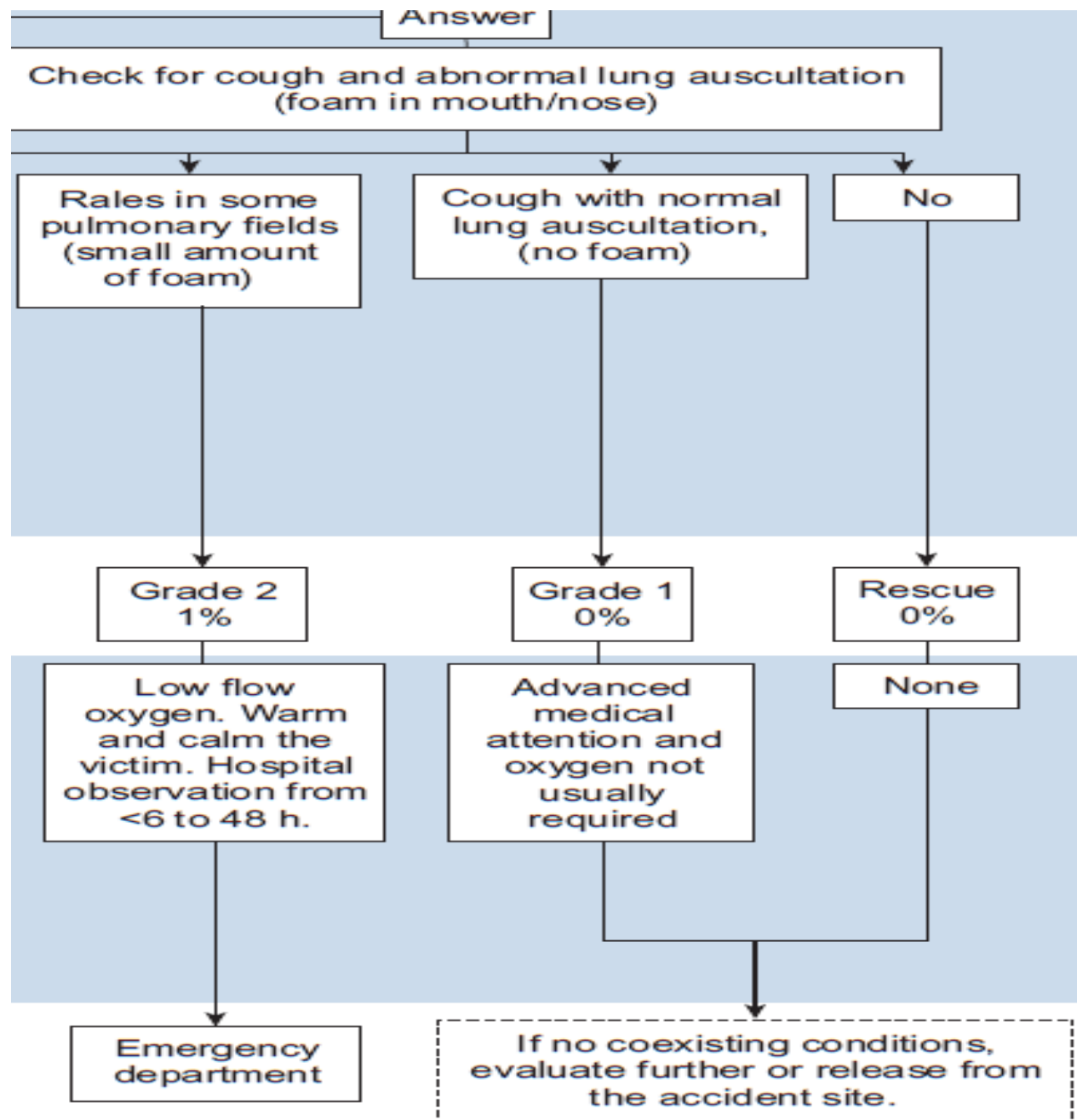
- **Peripheral venous access is the preferred route for drug administration in the prehospital setting.**
- **Endotracheal administration of drugs is not recommended for drowning.**
- **Doses of 1 mg epinephrine IV (or 0.01 mg/kg) can be considered.**
- **After the resuscitation process is well organized, an orogastric tube can be placed.**

# *Associated Hypothermia*

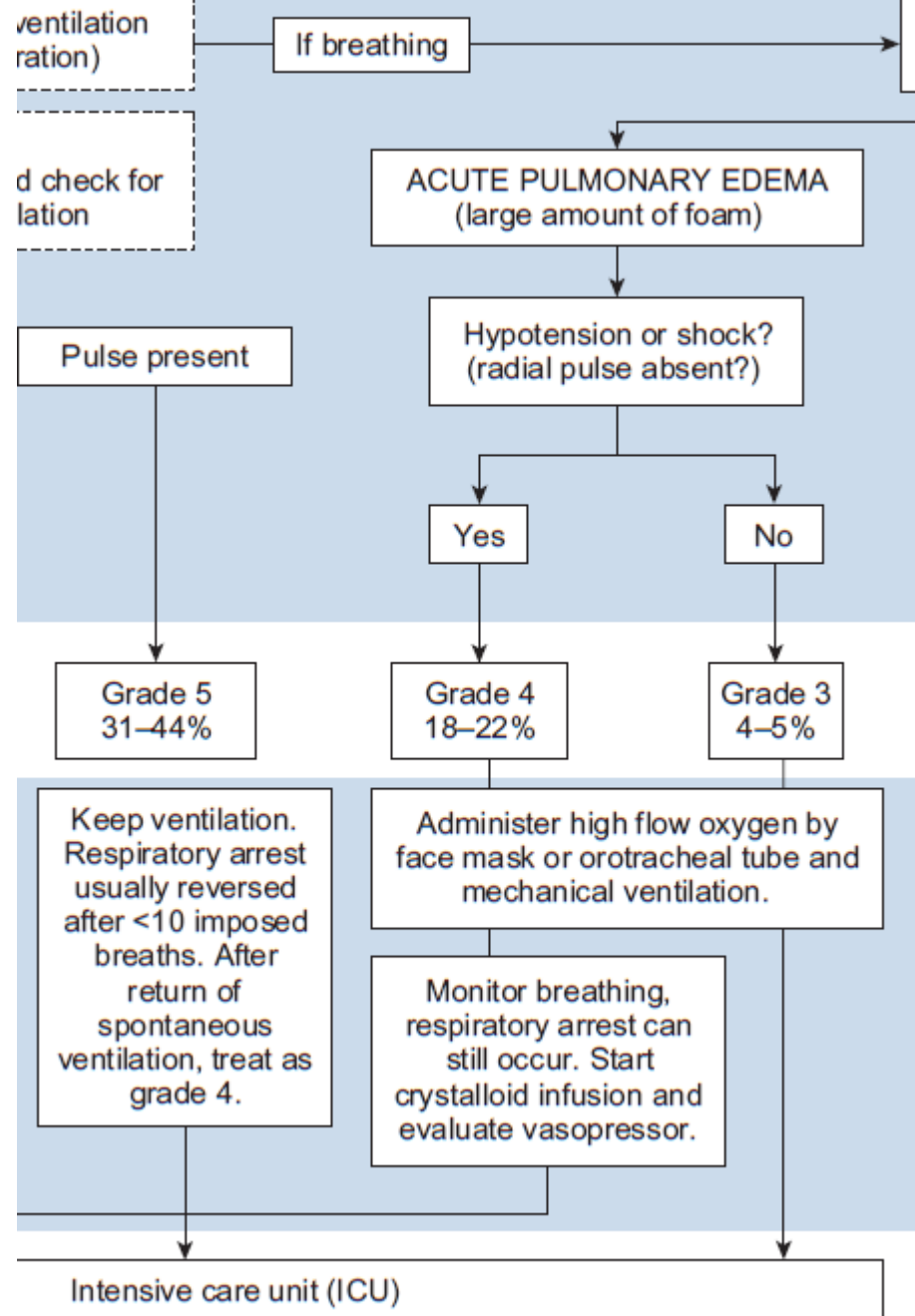
- To treat associated hypothermia, remove wet garments, dry the victim as soon as possible, and provide active rewarming when indicated.
- Cover the victim with blankets or other materials to provide passive rewarming and to prevent further heat loss.
- Obtain rectal or tympanic (core body) temperature as soon as practical, and initiate hypothermia protocols as indicated in the Hypothermia Algorithm

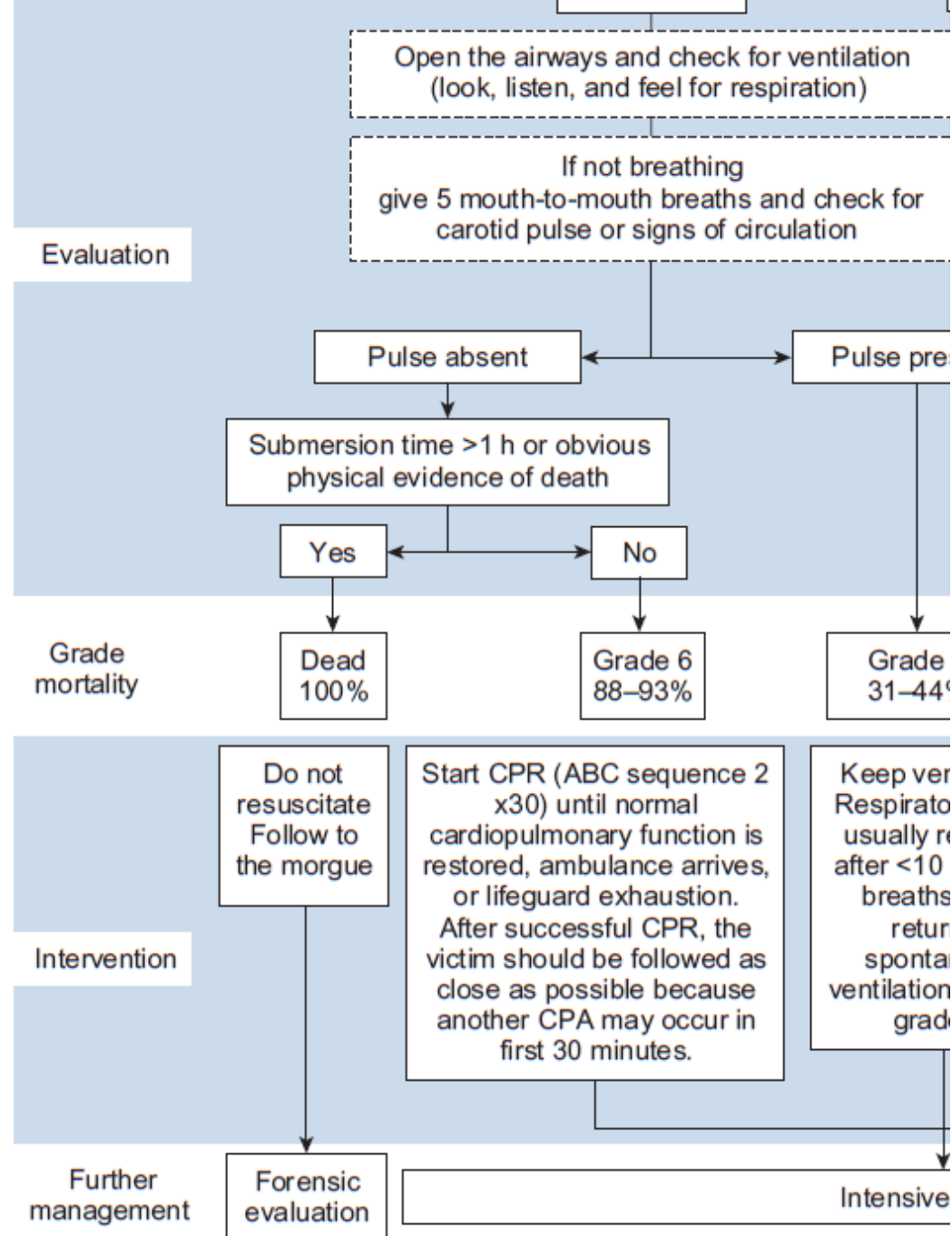
# *Advanced Life Support*

- If initial resuscitation efforts are not successful, the victim should be transported to a hospital where advanced warming measures can be accomplished while resuscitation is continued during transport.

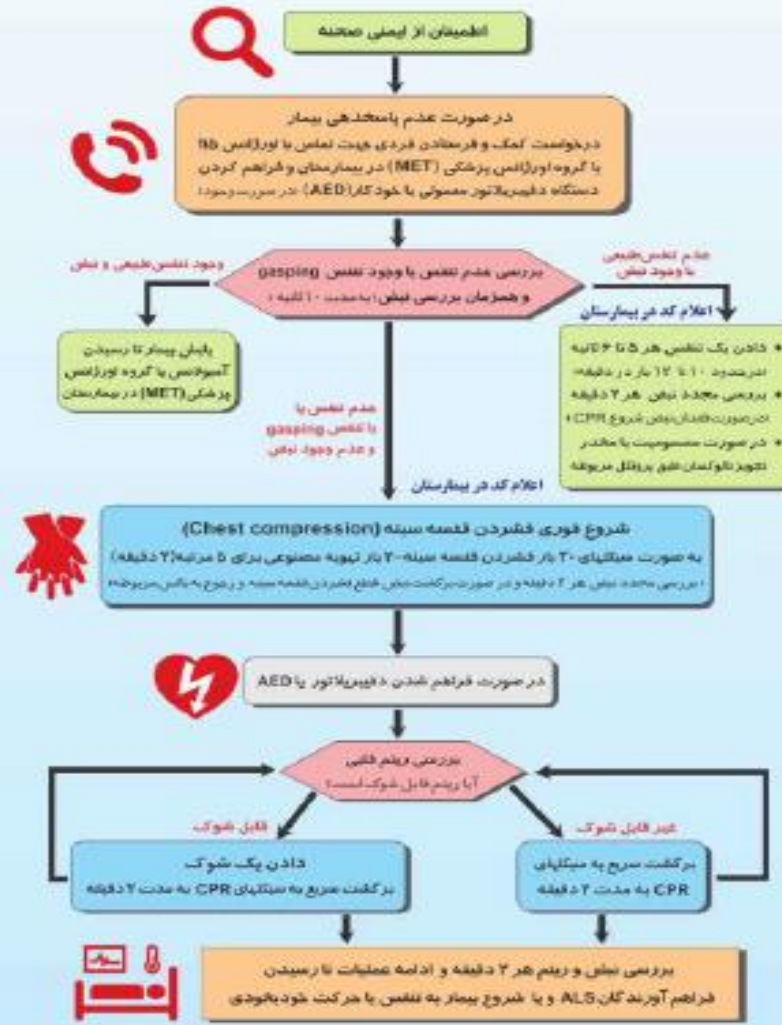








# Adult Basic Life Support





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