Adult Basic and Advanced Life Support

2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care

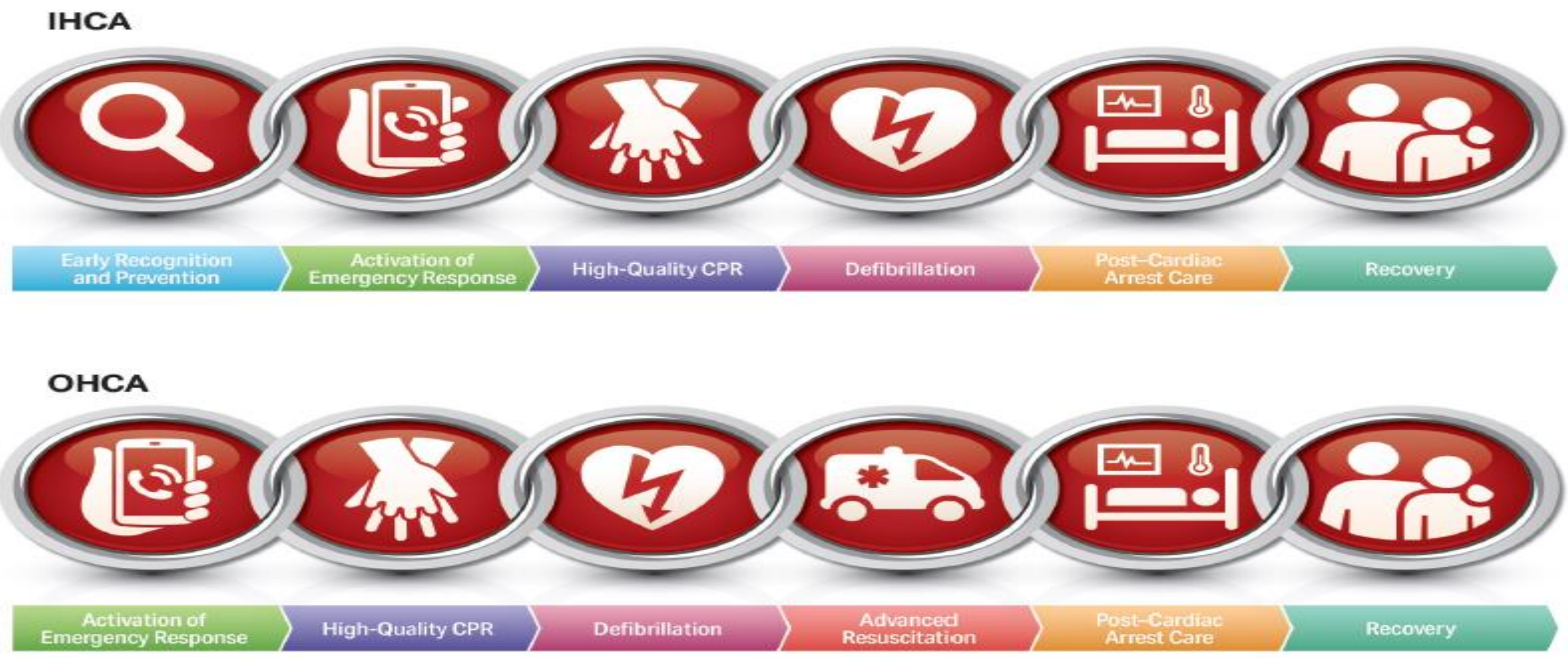
Dr.A.Seidabadi

Assistant Professor School of Medicine

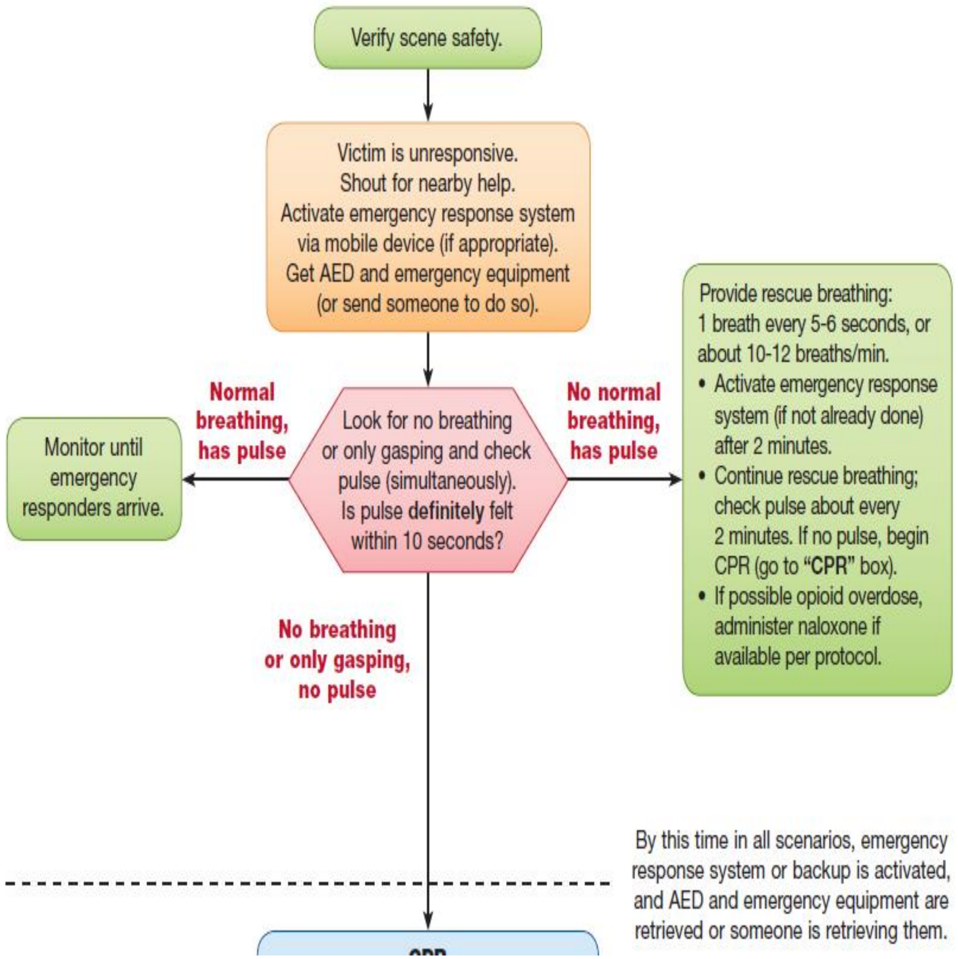
Emergency medicine department

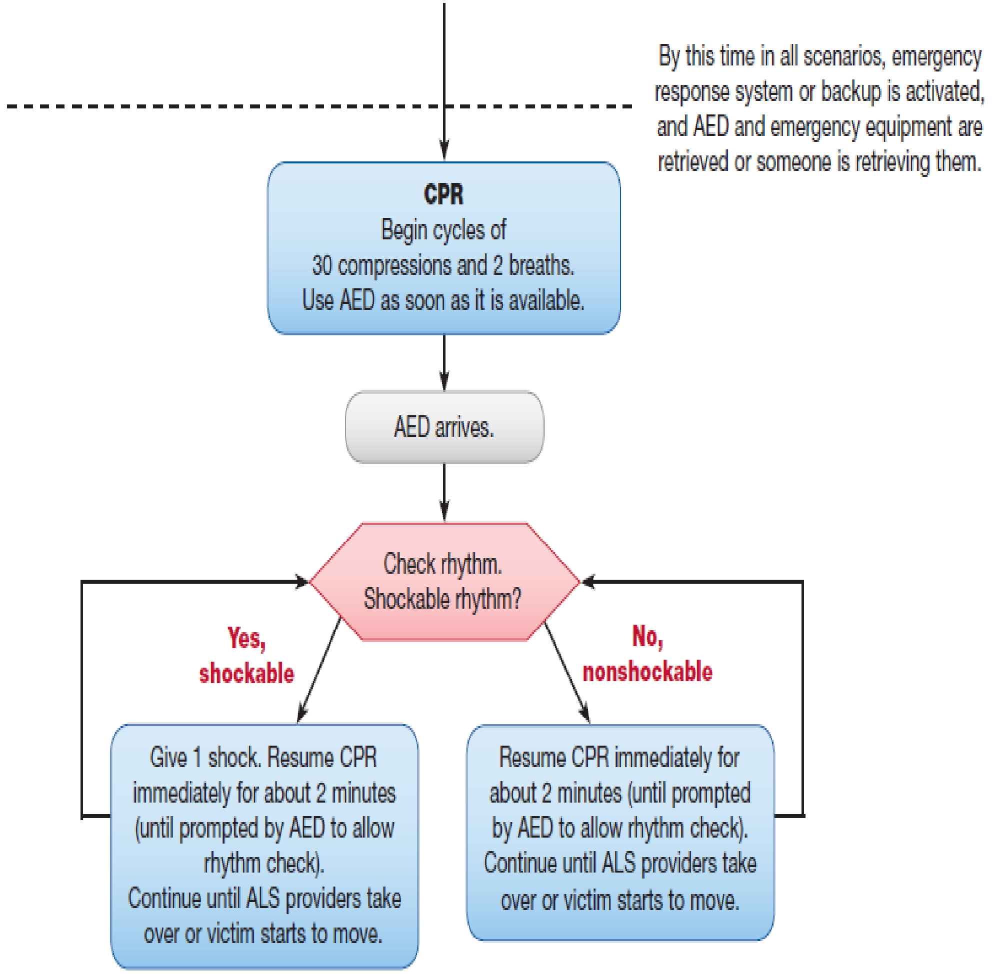
Adult Basic and Advanced Life Support

Figure 3. AHA Chains of Survival for adult IHCA and OHCA.



Adult Basic and Advanced Life Support





Adult Basic and Advanced Life Support

Managing the Airway

- A significant change is the initiation of chest compressions before ventilation
- change in the sequence from A-B-C to C-A-B

Adult Basic and Advanced Life Support

- BLS is the foundation for saving lives after cardiac arrest. Fundamental is …. immediate recognition of sudden cardiac arrest /activation of the emergency response system/early CPR/and rapid defibrillation (AED)
- it may be reasonable for rescuers to initiate CPR with chest compressions
- once chest compressions have been started, a trained rescuer delivers rescue breaths

Adult Basic and Advanced Life Support

- Untrained lay rescuers should provide compression-only CPR
- For trained lay rescuers, it is reasonable to provide ventilation in addition to chest compressions for the adult in cardiac arrest
- It is reasonable for healthcare providers to provide chest compressions and ventilation for all adult patients in cardiac arrest, from either a cardiac or noncardiac cause
- it is reasonable for rescuers to provide a compression-to-ventilation ratio of 30:2 for adults in cardiac arrest

Managing the Airway

Open the Airway: Lay Rescuer

- The trained lay rescuer who feels confident that perform both compressions and ventilations using a head tilt–chin lift maneuver
- with suspected spinal injury, rescuers should initially use manual spinal motion restriction rather than immobilization devices, because use of immobilization devices by lay rescuers may be harmful

Open the Airway: Healthcare Provider

- A healthcare provider uses the head tilt–chin lift maneuver to open the airway
- In suspect to cervical spine injury, they should open the airway using a jaw thrust without head extension use the head tilt–chin lift maneuver if the jaw thrust does not adequately open the airway

Managing the Airway

Rescue Breathing (Ventilation Without Advanced Airway)

- Deliver each rescue breath over 1 second
- Give a sufficient tidal volume to produce visible chest rise
- Use a compression to ventilation ratio of 30 chest compressions to 2 ventilations

Managing the Airway

Rescue Breathing

- tidal volumes approximately 500 to 600 mL (6 to 7 mL/kg) is suffice This volume produces visible chest rise.
- Excessive ventilation cause gastric inflation and increases intrathoracic pressure, decreases venous return to the heart

Mouth-to-Mouth Rescue Breathing

- To provide mouth-to-mouth rescue breaths, open the victim’s airway,
- pinch the victim’s nose, and create an airtight mouth-to-mouth seal.
- Give 1 breath over 1 second, take a “regular” (not a deep) breath, and give a second rescue breath over 1 second

Managing the Airway

Mouth-to–Barrier Device Breathing

- Some healthcare providers and lay rescuers state that they may hesitate to give mouth-to-mouth rescue breathing
- When using a barrier device the rescuer should not delay chest compressions while setting up the device.

Mouth-to-Nose and Mouth-to-Stoma Ventilation

- Mouth-to-nose ventilation is recommended if ventilation through the victim's mouth is impossible
- mouth-to-stoma rescue via tracheal stoma
- A reasonable alternative is to create a tight seal over the stoma with a round, pediatric face mask

Managing the Airway

Ventilation With Bag and Mask

- Rescuers can provide bag-mask ventilation with room air or oxygen
- If oxygen available start free flow otherwise room air acceptable in BLS

Ventilation With an Advanced Airway

- With an advanced airway in place during CPR, rescuers no longer deliver cycles of 30 compressions and 2 breaths
- deliver 1 breath every 6 seconds (10 breaths per minute) while continuous chest compressions are being performed

Figure 3-1 Manual airway maneuvers. **A,** The most common cause of airway obstruction in an unconscious patient is the tongue. Initial maneuvers for opening the airway include head tilt/chin lift (**B**) and jaw thrust (**C**).

The Head-Tilt/Chin-Lift Maneuver

- place the tips of the index and middle fingers beneath the patient's chin(bone)
- Lift the chin cephalad and toward the ceiling
- head is tilted and the neck is extended.

The Jaw-Thrust Maneuver

- middle or index fingers behind the angle of the mandible
- Lift the mandible toward the ceiling until the lower incisors are anterior to the upper incisors.

OROPHARYNGEAL AIRWAY INSERTION

OROPHARYNGEAL AIRWAY INSERTION

For oropharyngeal airway insertion, first measure. An airway of correct size will extend from the corner of the mouth to the earlobe or the angle of the mandible.

Open the patient's mouth with your thumb and index finger, then insert the airway in an inverted position along the patient's hard palate.

When the airway is well into the mouth, rotate it 180°, with the distal end of the airway lying in the hypopharynx. It may help to pull the jaw forward during passage.

Alternatively, open the mouth widely and use a tongue blade to displace the tongue inferiorly, and advance the airway into the oropharynx. No rotation is required with this method.

BAG-MASK VENTILATION

BAG-MASK VENTILATION

ONE-HANDED TECHNIQUE

The "C-E" clamp technique provides the most effective seal.

Use your thumb and index finger to form a letter "C" and provide anterior pressure on the mask.

Use your third, fourth, and fifth fingers to lift the mandible up into the mask. It may be possible to place the fifth finger behind the mandible and perform a jaw thrust.

TWO-HANDED TECHNIQUE

The traditional technique is the "double C-E" method.

Use the thumb and index fingers of both hands to encircle the top of the mask.

Use the third, fourth, and fifth fingers of each hand to lift both sides of the mandible to meet the mask. It is difficult to do a good jaw lift with this method.

A better two-handed method is to hold the mask in place with the thenar eminences of both hands.

Use the long fingers under the mandible to do a jaw lift while also pressing the mask firmly against the face. This allows the operator to do a good jaw lift and create a good seal with the strongest muscles of the hands.

EXTRAGLOTTIC AIRWAY DEVICES

LMA Classic (or Single-Use LMA Unique)

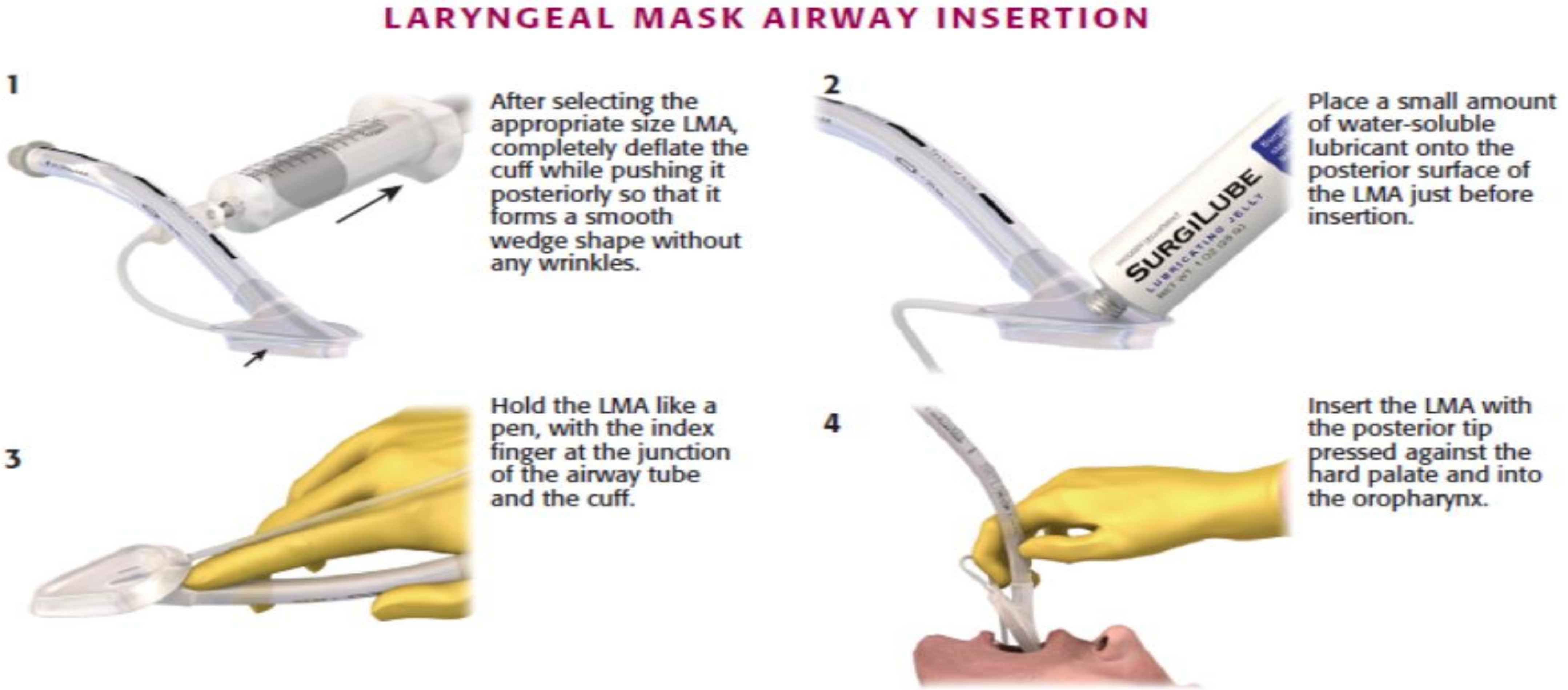
- can be used in the “cannot-intubate/cannot-ventilate” scenario when face mask ventilation is difficult because of massive facial trauma, or obesity
- can be inserted in less than 30 seconds and provide effective ventilation in more than 98% of patients

TABLE 3-1 Laryngeal Mask Airway, Disposable Laryngeal Mask Airway, and Intubating Laryngeal Mask Airway Size Recommendations Based on Weight*

WEIGHT (kg)	LMA	DISPOSABLE LMA	ILMA
<5	1	—	—
5-10	1.5	—	—
10-20	2	—	—
20-30	2.5	—	—
30-50	3	3	3
50-70	4	4	4
70-100	5	5	5
>100	6	—	—

ILMA, intubating laryngeal mask airway; *LMA*, laryngeal mask airway.
*Note that only a standard LMA is available for patients less than 30 kg.

LARYNGEAL MASK AIRWAY INSERTION



LARYNGEAL MASK AIRWAY INSERTION

5

Advance the LMA further by extending the index finger and pushing the posterior cuff along the soft palate and posterior pharynx. Exert counterpressure on the occiput during insertion.

6

When resistance is felt, carefully remove the index finger while holding the proximal end of the tube with the other hand.

7

Let go of the airway tube and inflate the cuff with enough air to achieve a good seal. This may require only half of the maximum cuff volume. *Do not overinflate the cuff!*

8

Attach a bag and ventilate while using chest rise, breath sounds, and capnography to confirm adequate gas exchange.

Tracheal Intubation

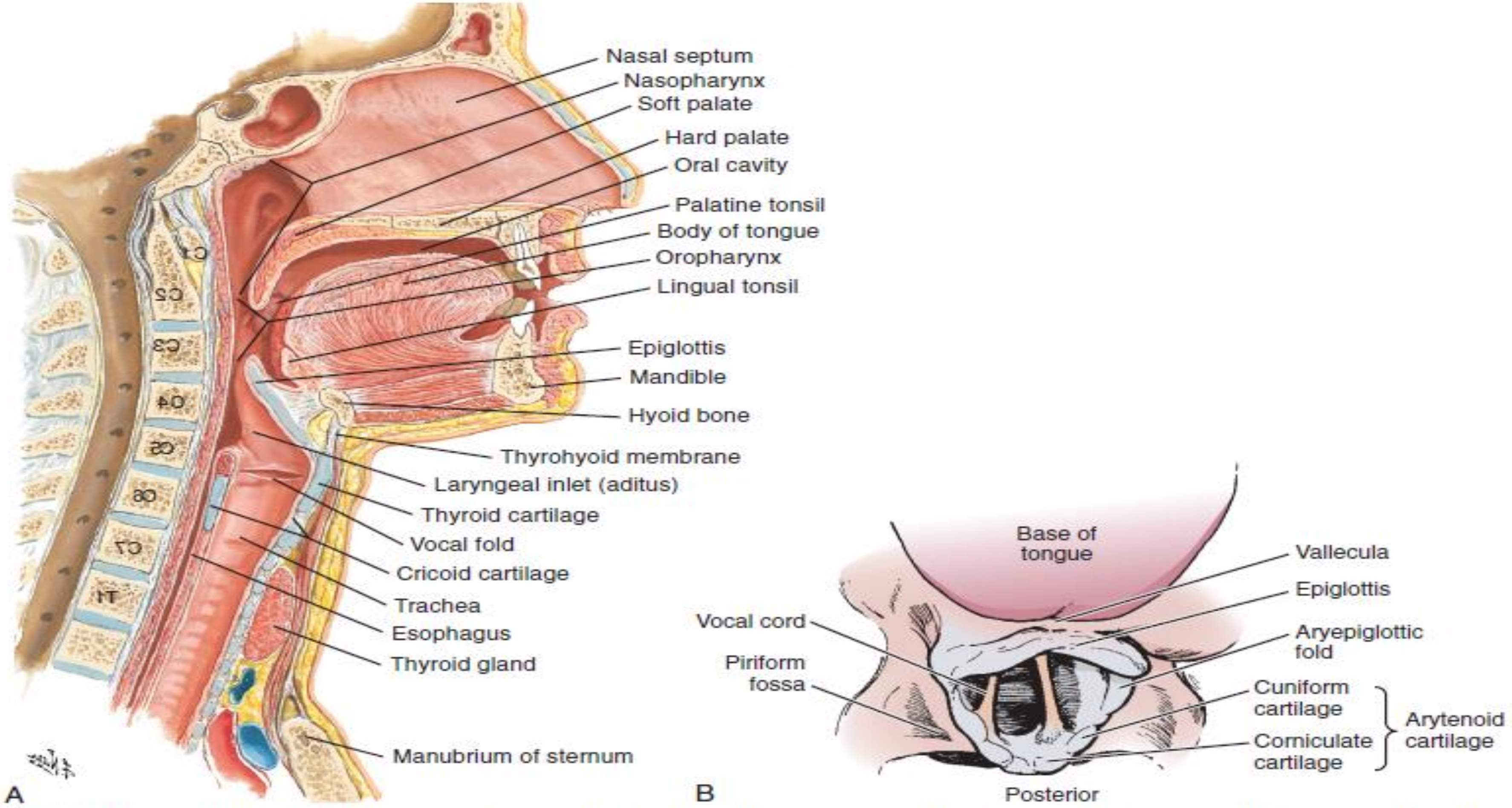


Figure 4-2 **A,** Anatomy of the upper airway. **B,** View of the larynx, epiglottis, and vocal cords seen with a laryngoscope. *(A, Netter illustration used with permission of Elsevier, Inc. All rights reserved.)*

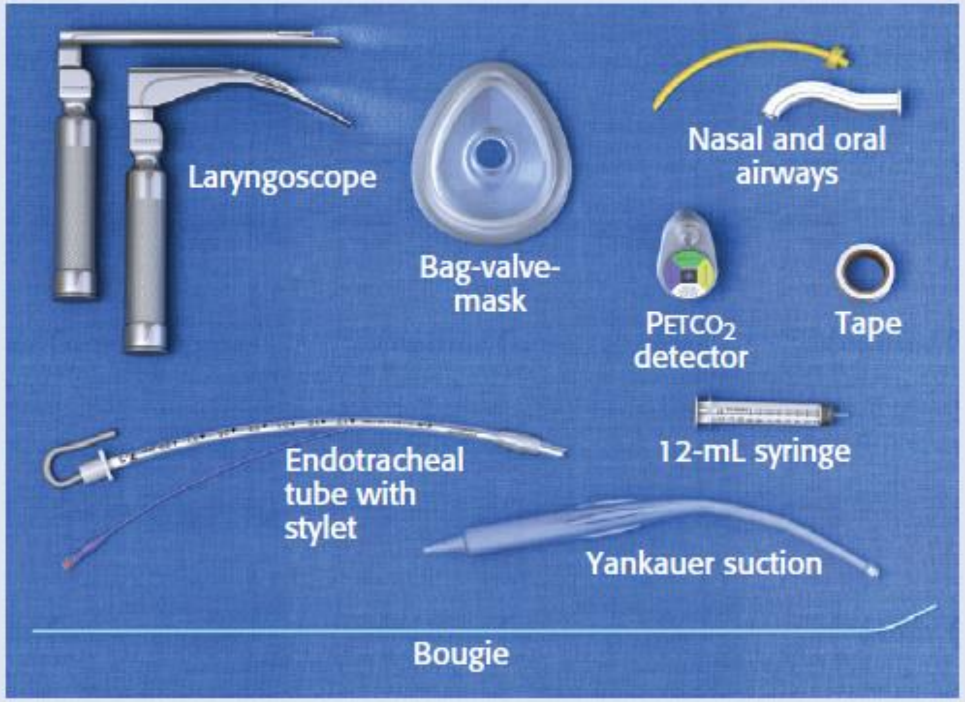
Tracheal Intubation

Direct Laryngoscopy

Indications
Routine emergency intubation
Difficult airways

Contraindications
Hypoxia (perform bag-mask ventilation instead)
Limited mouth opening
Upper airway distortion or swelling
Kyphosis (extreme curvature of the upper back)
Copious blood or secretions

Complications
Hypoxic brain injury
Cardiac arrest
Aspiration
Upper airway trauma
Dental trauma

Equipment


Review Box 4-1 Direct laryngoscopy: indications, contraindications, complications, and equipment.

Tracheal Intubation

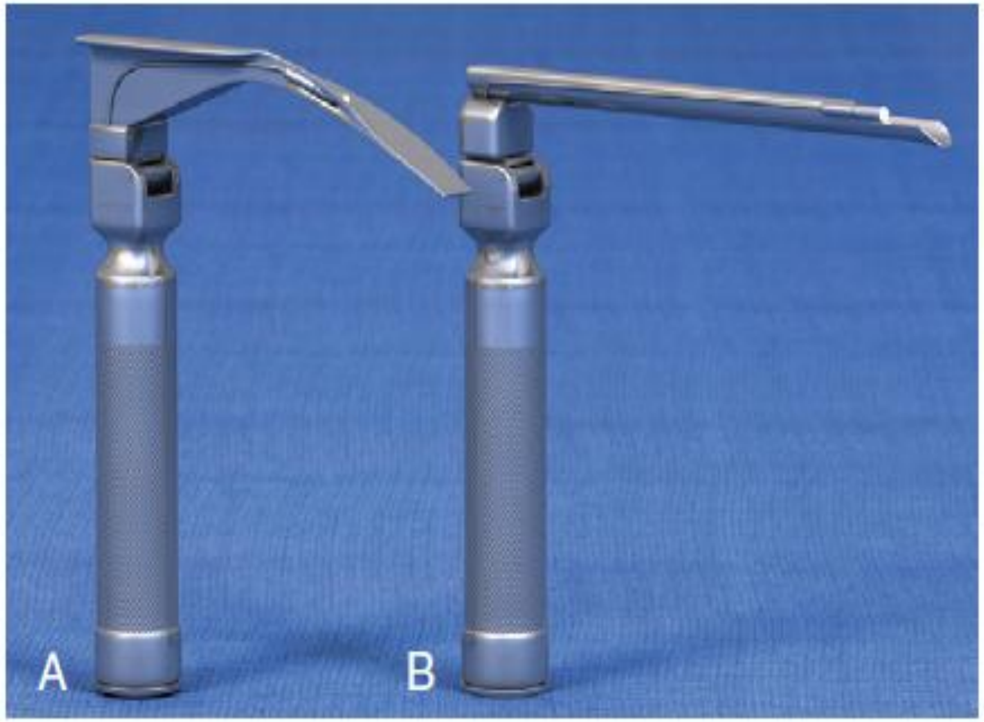


Figure 4-5 Macintosh (A) and Miller (B) laryngoscope blades.

TABLE 4-1 Tracheal Tube Sizes for Average Patients*

AGE	INTERNAL DIAMETER (mm)	EQUIVALENT TRACHEOTOMY TUBE SIZE
Children		
Newborn	2.5	00
6 mo	3.5	00-0
1 yr	4.5	0-1
2 yr	5.0	1-2
4 yr	5.5	2
6 yr	6.0	3
8 yr	6.5	4
10 yr	7.0	4
12 yr	7.5	4
14 yr	8.0	5
Adults		
Female	7.0-8.0	5
Male	7.5-9.0	6
Special cases		8-10

Modified from Applebaum EL, Bruce DL, eds. *Tracheal Intubation*. Philadelphia: Saunders; 1976.

*A slightly smaller size may be required for nasotracheal intubation.

Tracheal Intubation

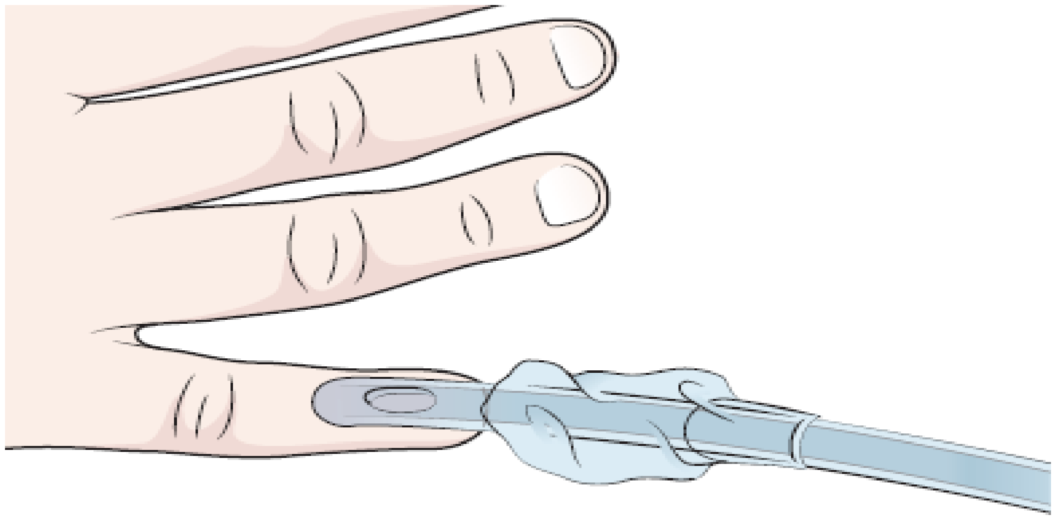


Figure 4-6 Pediatric endotracheal (ET) tube size estimation using the fingernail width of the little finger. In children, a cuffed or uncuffed ET tube may be used. If an uncuffed ET tube is used for emergency intubation, it is reasonable to select a tube 3.5 mm in internal diameter (ID) for infants up to 1 year of age and a 4.0-mm-ID tube for patients between 1 and 2 years of age. If a cuffed tube is used for emergency intubation of an infant younger than 1 year, it is reasonable to select a 3.0-mm-ID tube. For children between 1 and 2 years of age, it is reasonable to use a cuffed ET tube with an ID of 3.5 mm After age 2, ET tube size can be estimated by the following formulas: estimated size of an *uncuffed* ET tube in millimeters = [4 + age]/4 and estimated size of a *cuffed* tube in millimeters = [3 + age]/4.

Tracheal Intubation

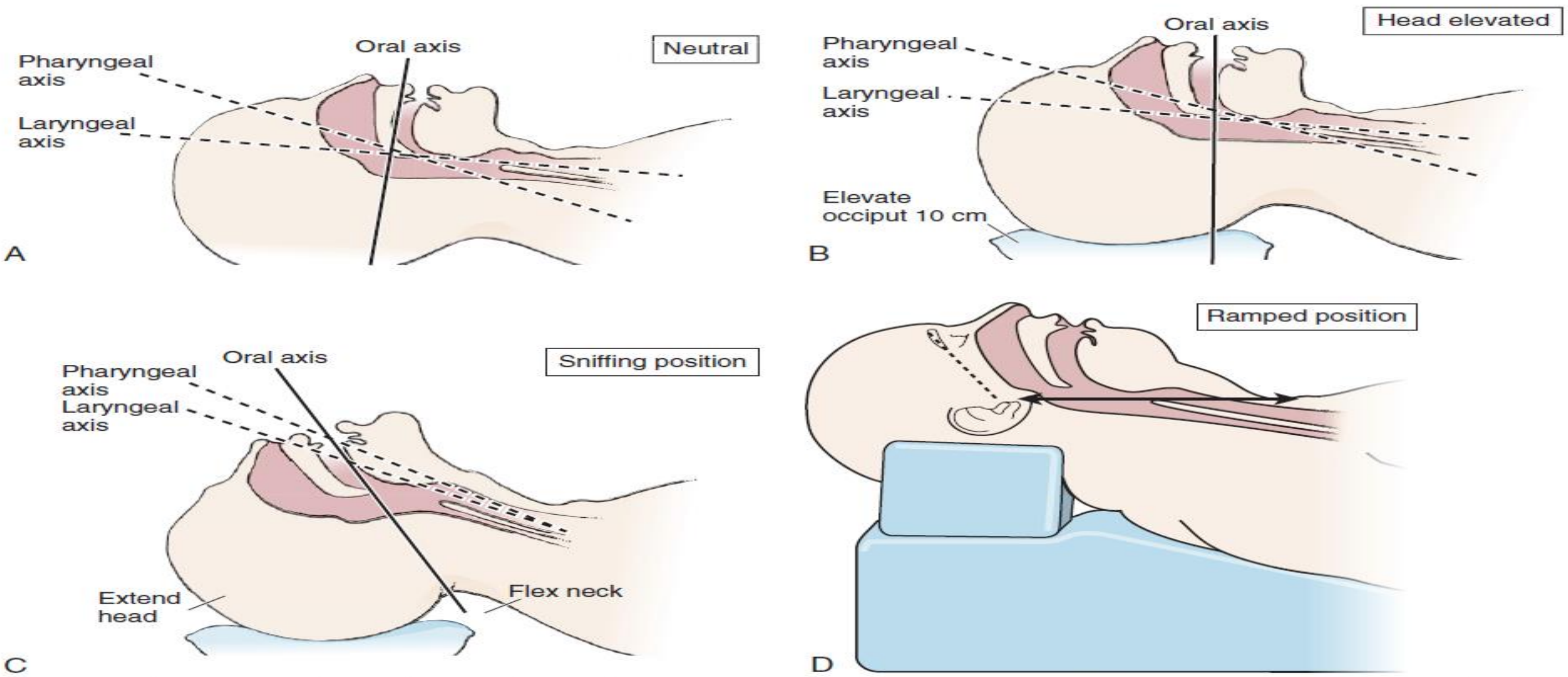


Figure 4-8 Head positioning for tracheal intubation. **A,** Neutral position. **B,** Head elevated. **C,** "Sniffing" position with a flexed neck and extended head. Note that flexing the neck while extending the head lines up the various axes and allows direct laryngoscopy. **D,** Morbidly obese patients are best intubated in a ramped position with elevation of the upper part of the back, neck, and head; the ideal position aligns the external auditory canal and the sternum.

Tracheal Intubation

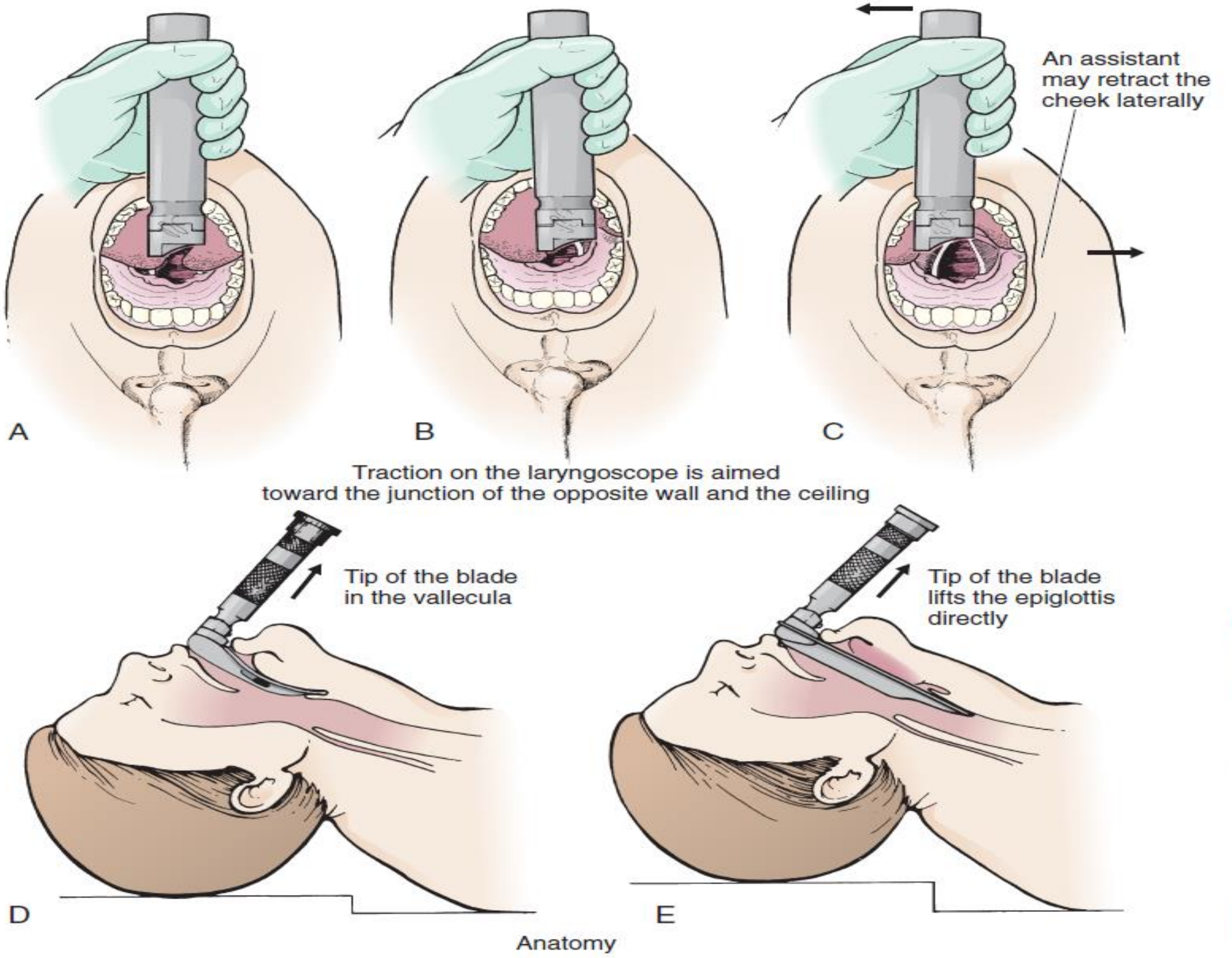


Figure 4-11 Common problems encountered when using a laryngoscope. **A,** The laryngoscope blade is under the middle of the tongue, with the sides of the tongue hanging down and obscuring the glottis. **B,** The tongue is not pushed far enough to the left and is obscuring the glottis. **C,** Correct blade position with the tongue elevated and to the left. **D,** Use of the curved (Macintosh) laryngoscope blade. **E,** Use of the straight (Miller) blade.

Monitoring Physiologic Parameters During CPR

- Although no clinical study has examined physiologic parameters during CPR improves outcome
- it may be reasonable to use physiologic parameter like quantitative waveform capnography / arterial relaxation diastolic pressure / arterial pressure monitoring / and central venous oxygen saturation

Monitoring Physiologic Parameters During CPR

- Continuous waveform capnography is recommended in addition to clinical assessment as the most reliable method of confirming and monitoring correct placement of an ETT
- If continuous waveform capnometry is not available, a nonwaveform CO2 detector, esophageal detector device, or ultrasound used by an experienced operator is a reasonable alternative

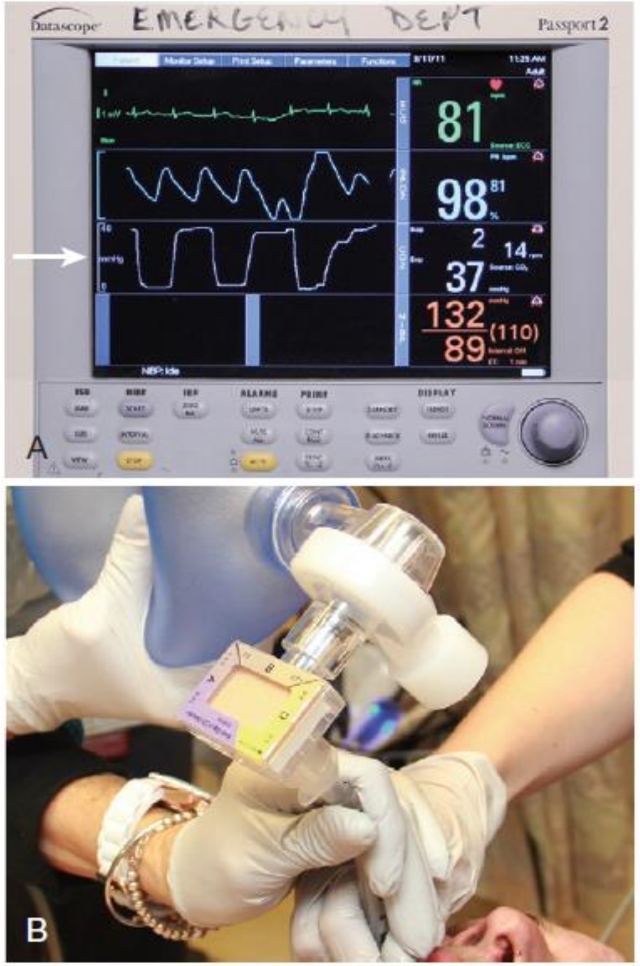


Figure 2-12 CO_2 monitors. **A,** Quantitative monitor. A capnography waveform (*arrow*) is displayed, as is a capnometry numerical reading (37). **B,** Qualitative device. This simple colorimetric detector is used to verify endotracheal tube position and changes color when exposed to CO_2.

Different rhythm in CPR

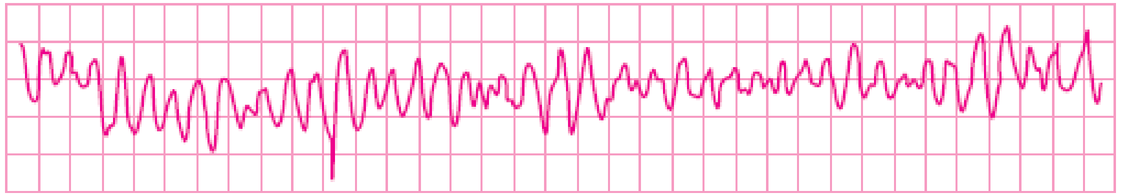


FIGURE 24-5. Ventricular fibrillation.

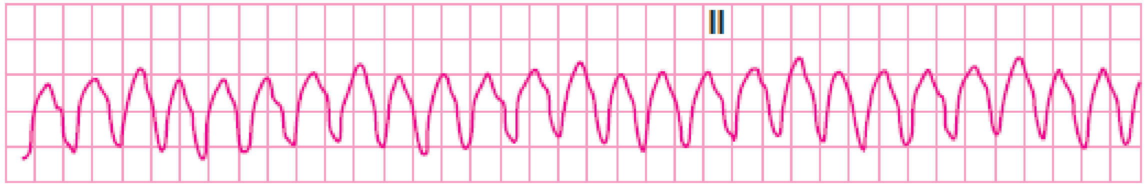


FIGURE 24-6. Pulseless ventricular tachycardia.

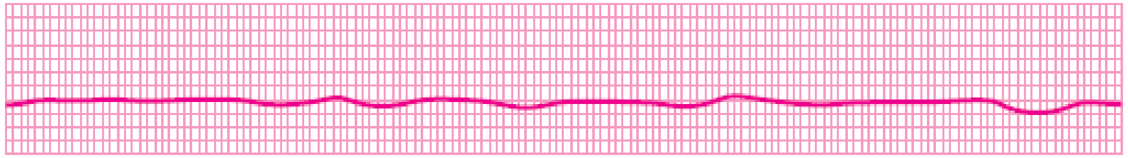


FIGURE 24-7. Asystole.

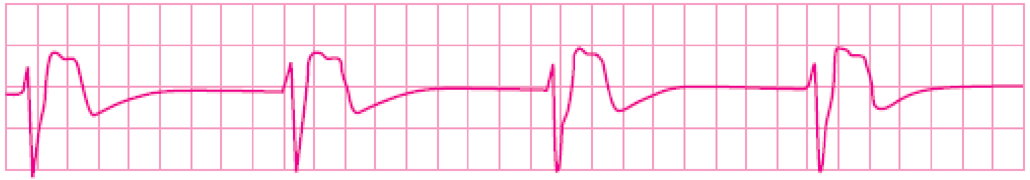


FIGURE 24-8. Pulseless electrical activity.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