

# Emergency Cases ...

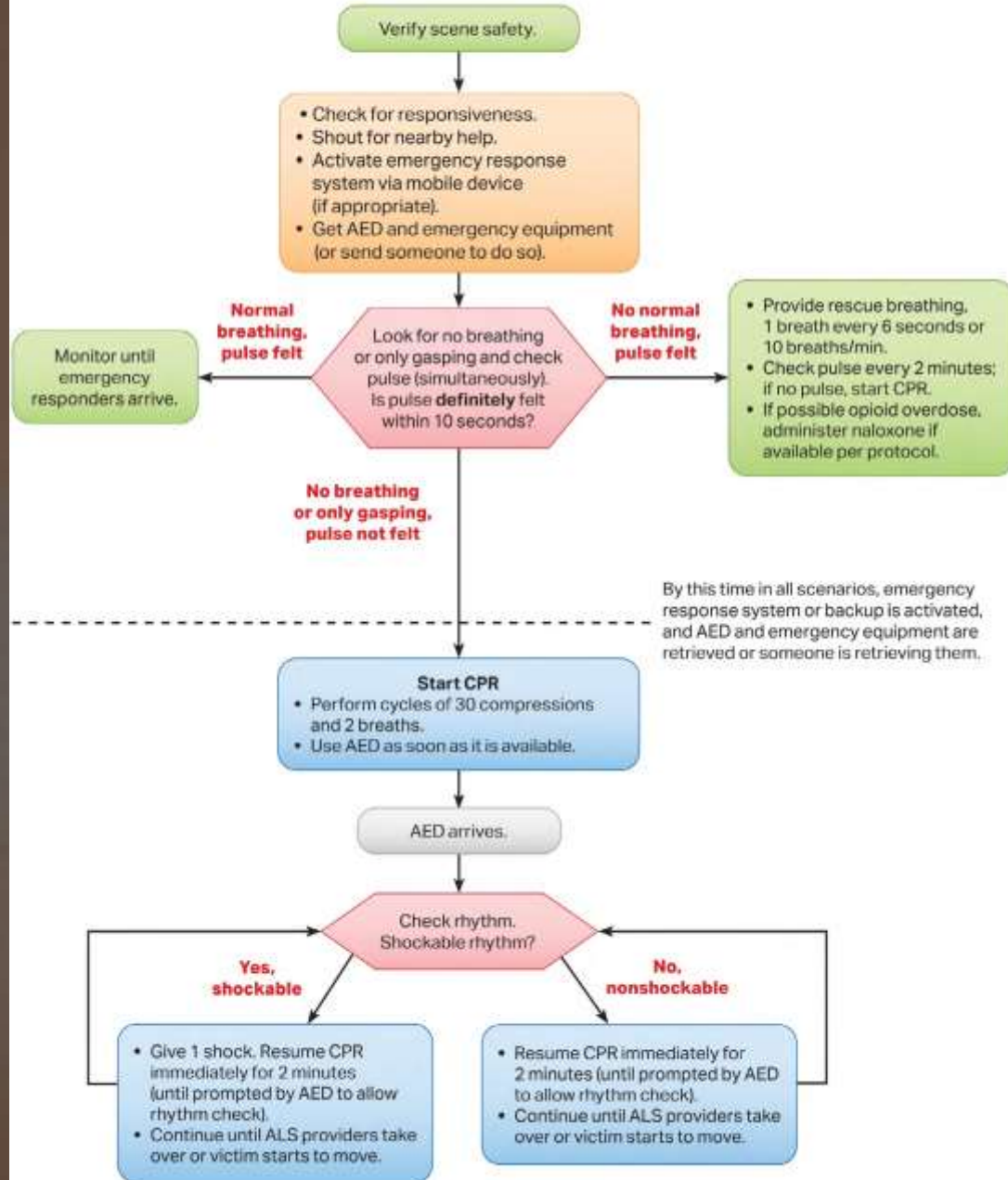
**dr. Angela Puspita, Sp.EM, FICEP**

What you do?

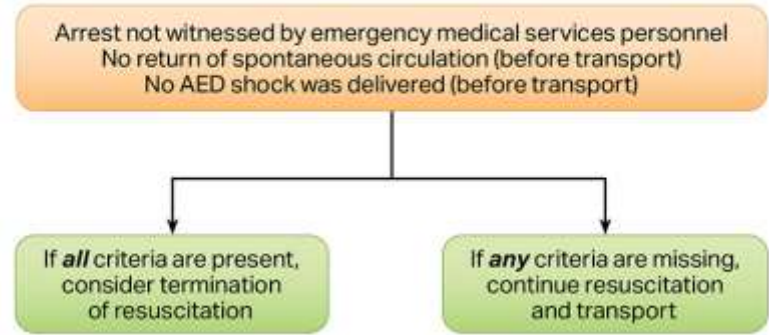
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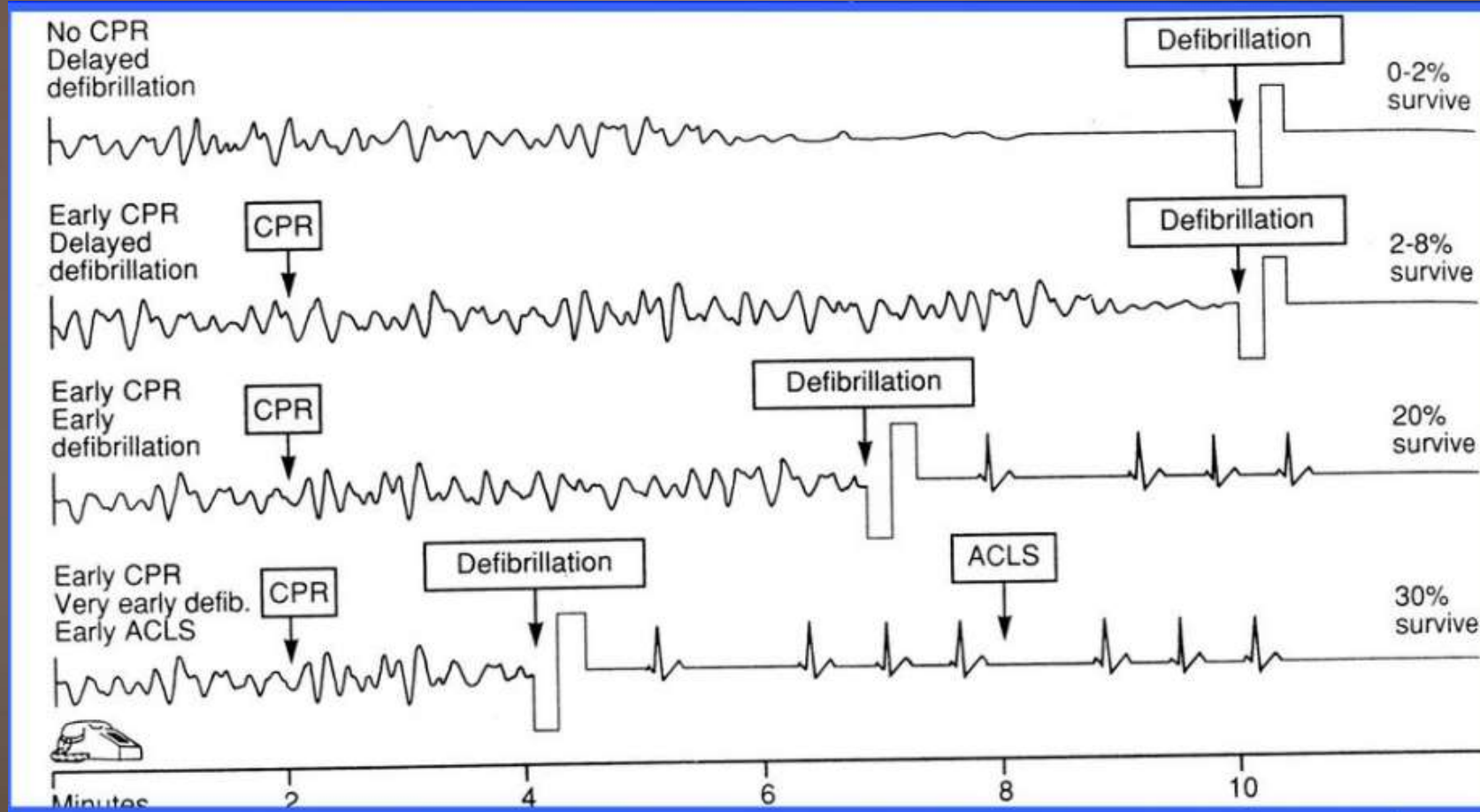
- ▶ **Mr. Dono, 53 years old, faint**  
in front of Primary Health  
Care  
while queue.

### Adult Basic Life Support Algorithm for Healthcare Providers



### BLS Termination of Resuscitation







### Adult Out-of-Hospital Chain of Survival



### Adult In-Hospital Chain of Survival



### Pediatric Out-of-Hospital Chain of Survival



### Pediatric In-Hospital Chain of Survival



### 0 Minutes

BREATHING STOPS; THE HEART WILL SOON STOP BEATING

### 4-6 Minutes

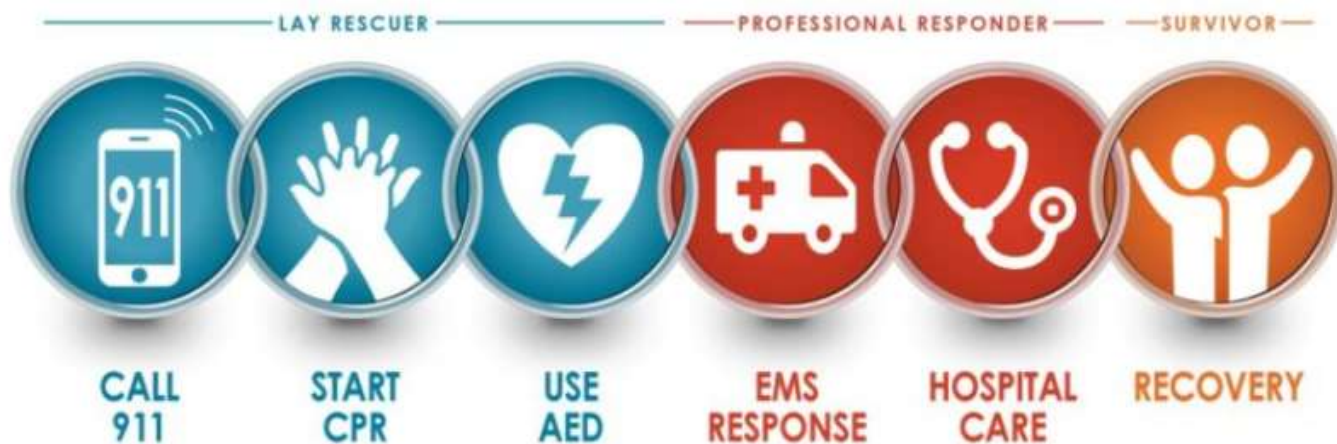
POSSIBILITY OF LONG-TERM BRAIN DAMAGE

### 6-10 Minutes

HIGH PROBABILITY OF LONG-TERM BRAIN DAMAGE

### Over 10-15 Minutes

CERTAIN IRREVERSIBLE BRAIN DAMAGE RESULTING IN DEATH



# The Criteria of High Quality CPR

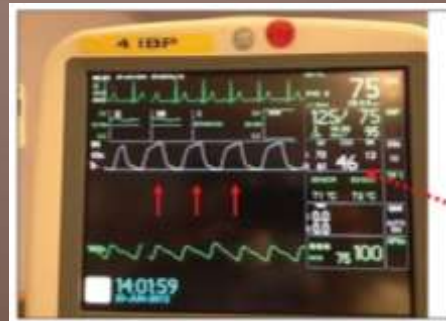
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- a. **Push hard** (at least 2 inches/5 cm) and **fast** (100-120x/mnt) and allow **complete chest recoil**



advanced airway in place give 1 breath every 6 seconds (10 breath/min) with continuous chest compressions.

- f. **Quantitative waveform capnography** (intubated patient) : if PetCO<sub>2</sub> (partial pressure of end tidal CO<sub>2</sub>) is low or decreasing (minimum 10 mmHg) reassess CPR quality





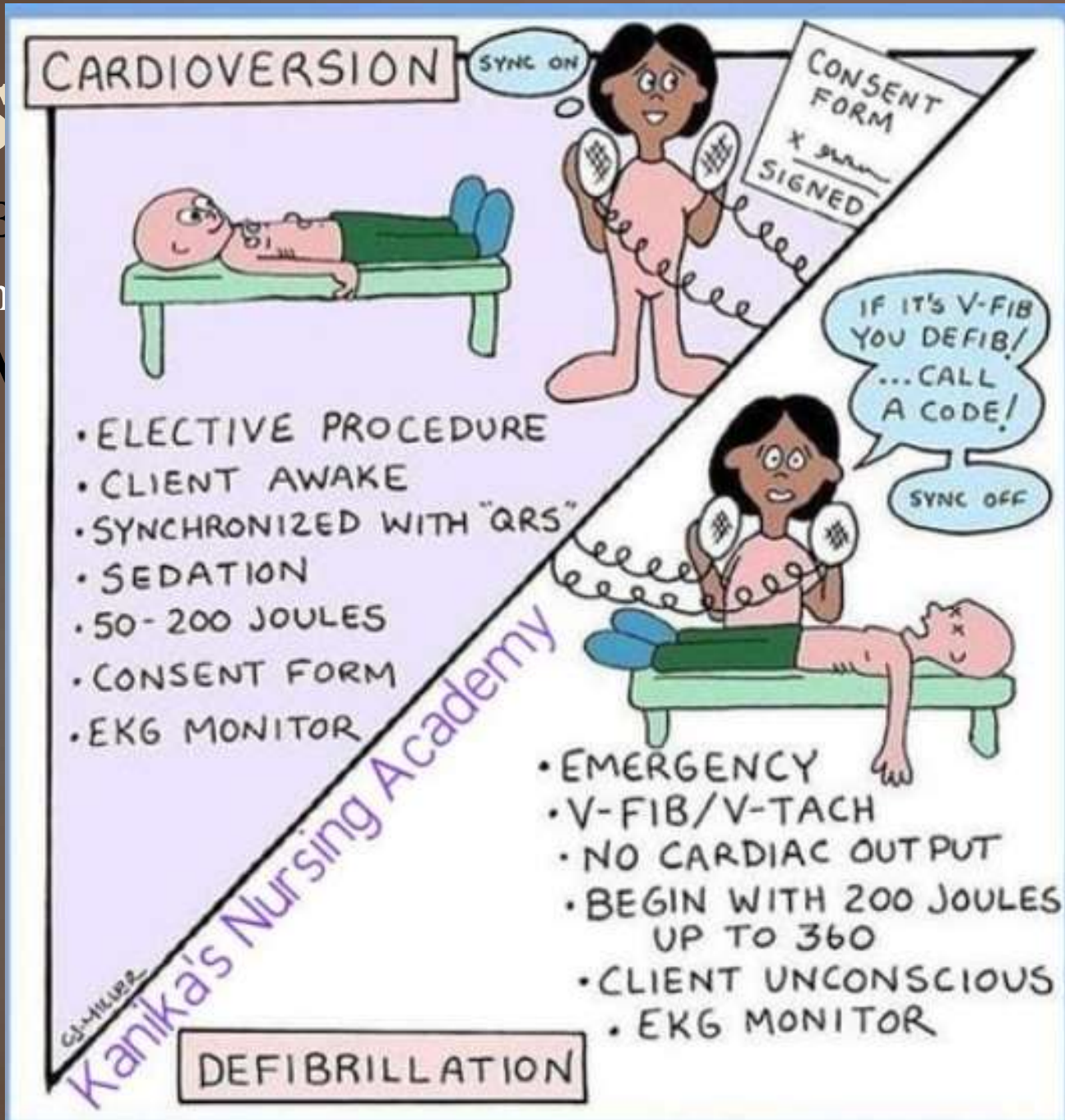
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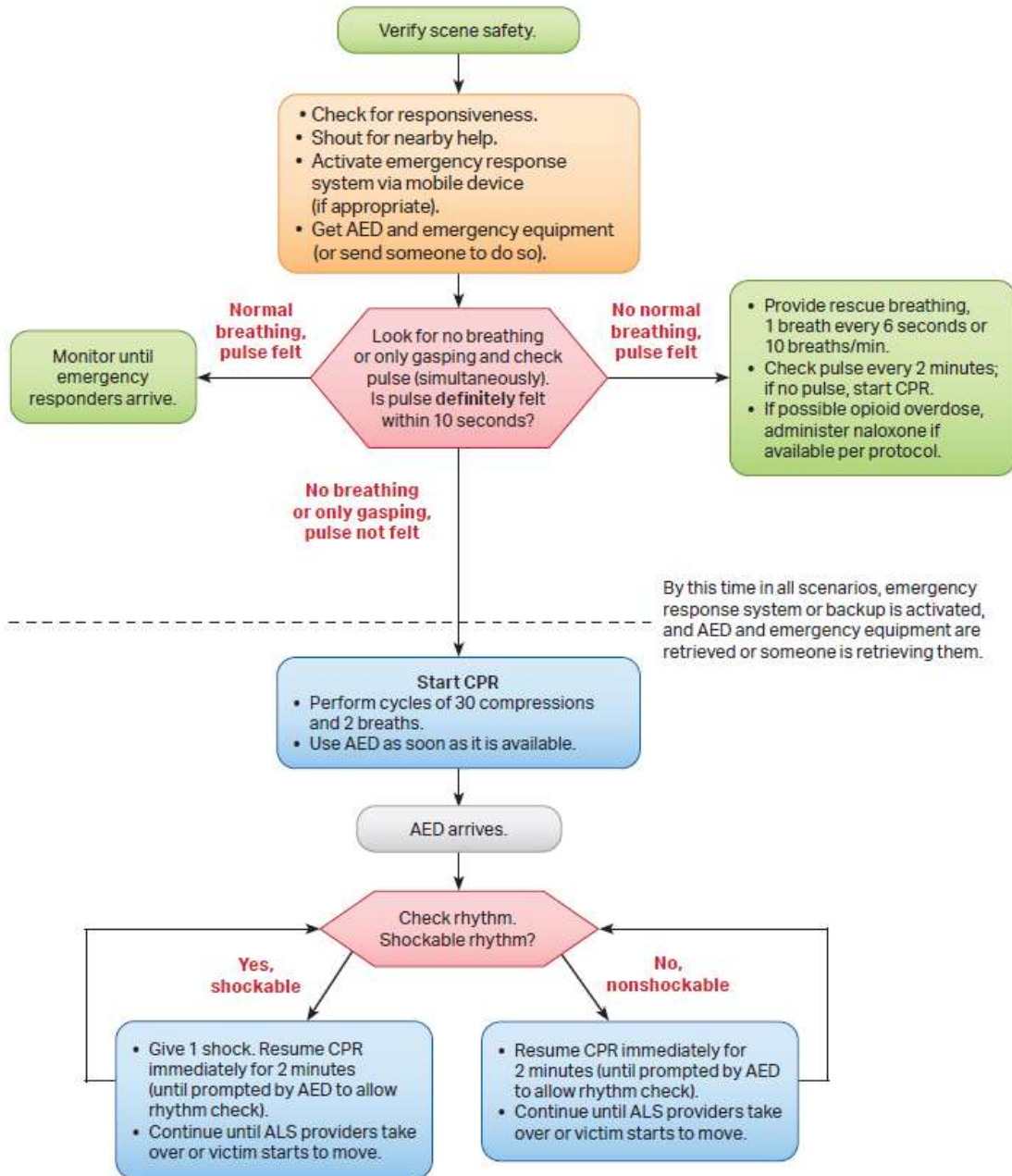
tion



## Return of Spontaneous Circulation (ROSC)

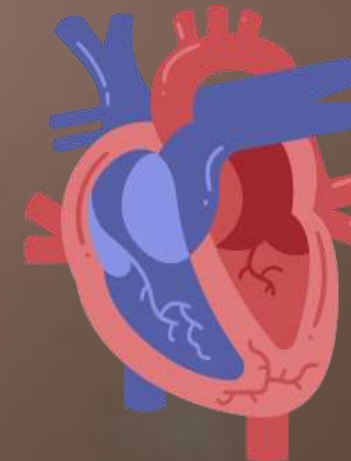
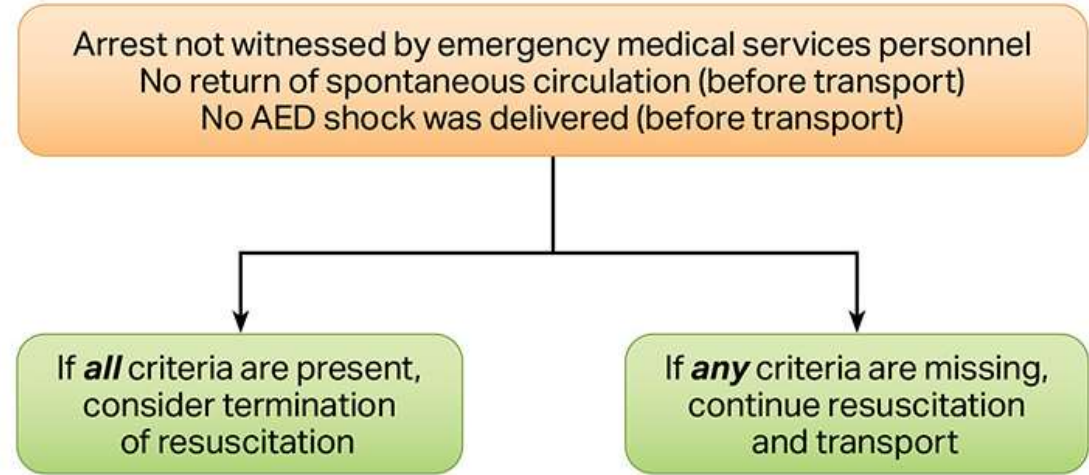
- a. **Pulse** and blood pressure
- b. **Abrupt sustained increase** at waveform capnography (typically  $\geq 40$  mmHg)
- c. **Spontaneous arterial pressure waves with intra arterial monitoring.** The information derived from the arterial pressure waveform :
  - Heart rate
  - Used for direct and continuous BP measurements
  - Systolic pressure
  - Diastolic pressure (coronary filling)
  - Mean arterial pressure (systemic perfusion)
  - Pulse pressure (high in AR, low in cardiac tamponade or cardiogenic shock)



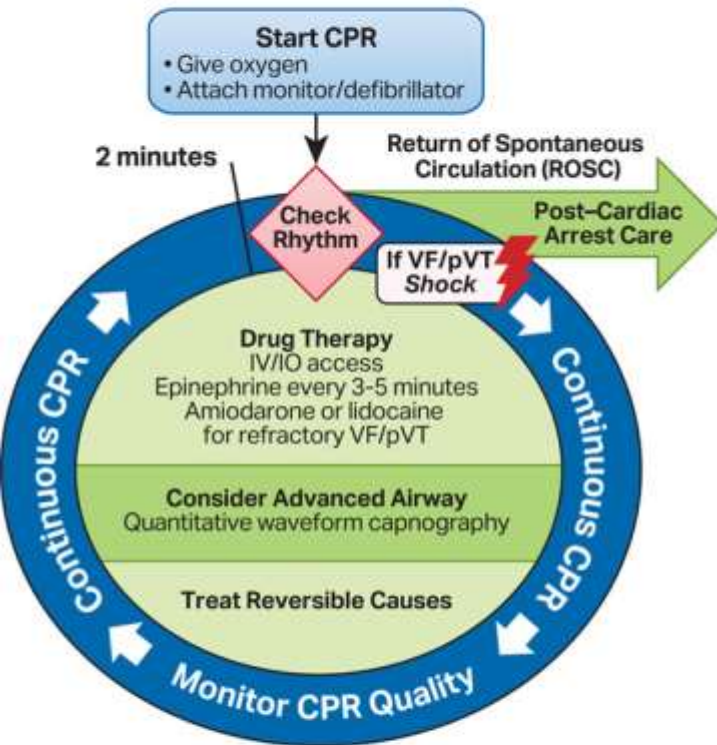


# Rescuer Adult BLS

## BLS Termination of Resuscitation



# cardiac arrest algorithm

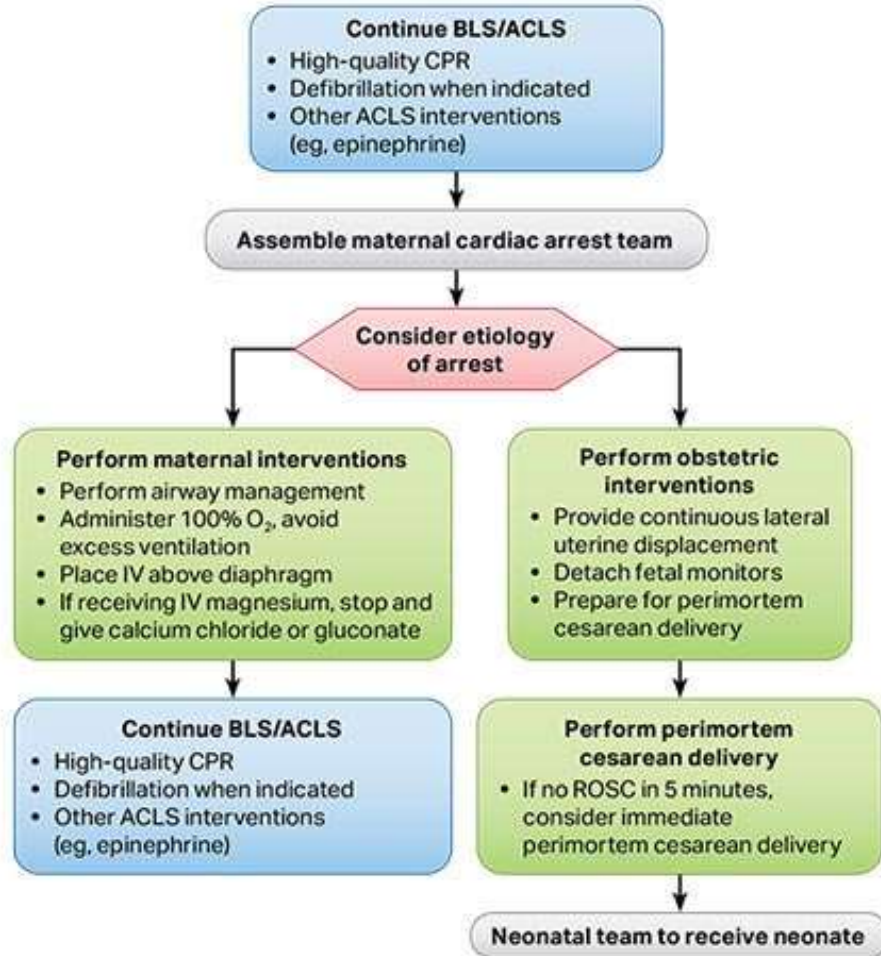


CPR Quality
<ul style="list-style-type: none"> <li>• Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil.</li> <li>• Minimize interruptions in compressions.</li> <li>• Avoid excessive ventilation.</li> <li>• Change compressor every 2 minutes, or sooner if fatigued.</li> <li>• If no advanced airway, 30:2 compression-ventilation ratio.</li> <li>• Quantitative waveform capnography                         <ul style="list-style-type: none"> <li>- If PETCO<sub>2</sub> is low or decreasing, reassess CPR quality.</li> </ul> </li> </ul>
Shock Energy for Defibrillation
<ul style="list-style-type: none"> <li>• <b>Biphasic:</b> 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.</li> <li>• <b>Monophasic:</b> 360 J</li> </ul>
Drug Therapy
<ul style="list-style-type: none"> <li>• <b>Epinephrine IV/IO dose:</b> 1 mg every 3-5 minutes</li> <li>• <b>Amiodarone IV/IO dose:</b> First dose: 300 mg bolus. Second dose: 150 mg.</li> <li>or</li> <li>• <b>Lidocaine IV/IO dose:</b> First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.</li> </ul>
Advanced Airway
<ul style="list-style-type: none"> <li>• Endotracheal intubation or supraglottic advanced airway</li> <li>• Waveform capnography or capnometry to confirm and monitor ET tube placement</li> <li>• Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions</li> </ul>
Return of Spontaneous Circulation (ROSC)
<ul style="list-style-type: none"> <li>• Pulse and blood pressure</li> <li>• Abrupt sustained increase in PETCO<sub>2</sub> (typically ≥40 mm Hg)</li> <li>• Spontaneous arterial pressure waves with intra-arterial monitoring</li> </ul>
Reversible Causes
<ul style="list-style-type: none"> <li>• Hypovolemia</li> <li>• Hypoxia</li> <li>• Hydrogen ion (acidosis)</li> <li>• Hypo-/hyperkalemia</li> <li>• Hypothermia</li> <li>• Tension pneumothorax</li> <li>• Tamponade, cardiac</li> <li>• Toxins</li> <li>• Thrombosis, pulmonary</li> <li>• Thrombosis, coronary</li> </ul>

H's of ACLS			T's of ACLS		
Causes	Signs	Treatment	Causes	Signs	Treatment
<b>Hypovolemia</b>	-Rapid heart rate -Narrow QRS -Blood loss	-Obtain IO/IV Access -Administer fluid/blood -Use fluid challenge	<b>Tamponade (Cardiac)</b>	-Rapid heart rate -Narrow QRS -JVD -No pulse -Muffled heart sounds	-Pericardiocentesis -Thoracotomy
<b>Hypoxia/Hypoxemia</b>	-Slow heart rate -Cyanosis	-Ensure airway is open -Ventilate -Ensure oxygen supply is adequate	<b>Toxins</b>	-Prolonged QT interval	-Based on overdose agent -Supportive care
<b>Hydrogen Ion Excess (Acidosis)</b>	-Low amplitude QRS complex	-Arterial blood gas -Provide adequate ventilations -Sodium bicarbonate (metabolic)	<b>Tension Pneumothorax</b>	-Slow heart rate -Narrow QRS -Unequal breathing JVD -Tracheal deviation	-Needle decompression -Insertion of a chest tube
<b>Hypokalemia/Hyperkalemia</b>	-Flattened T waves & a U wave (Hypokalemia) -Peaked T waves & a widened QRS (Hyperkalemia)	-Ventilate (respiratory) -Sodium bicarbonate (metabolic)	<b>Thrombosis (Pulmonary)</b>	-Rapid heart rate -Narrow QRS -Shortness of breath -Decreased oxygen -Chest pain	-Embolectomy -Fibrinolytic therapy -Anticoagulant therapy
<b>Hypothermia</b>	-Shivering -Previous exposure to cold temperatures	-Active warming measures -Temperature should be above 30°C	<b>Thrombosis (Coronary)</b>	-Abnormal ECG	-Angioplasty -Stent placement -Coronary bypass surgery



## Cardiac Arrest in Pregnancy In-Hospital ACLS Algorithm



### Maternal Cardiac Arrest

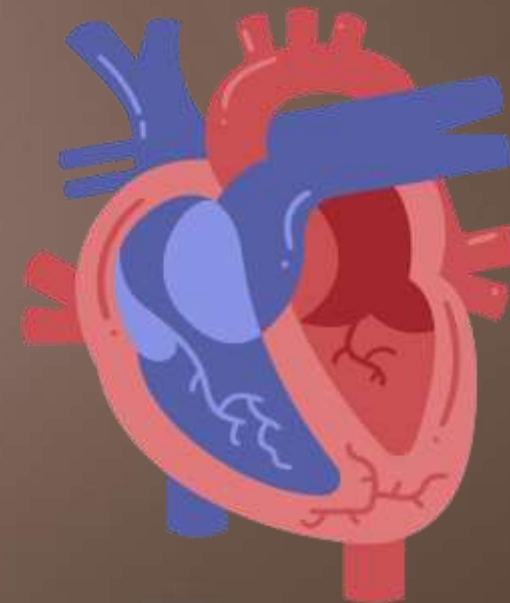
- Team planning should be done in collaboration with the obstetric, neonatal, emergency, anesthesiology, intensive care, and cardiac arrest services.
- Priorities for pregnant women in cardiac arrest should include provision of high-quality CPR and relief of aortocaval compression with lateral uterine 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

- 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.
- 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





# Recovery position (lateral recumbent or 3/4 prone position)

This position is used to maintain a patent airway in the unconscious person.

- place the patient close to a true lateral position with the head dependent to allow fluid to drain.
- Assure the position is stable.
- Avoid pressure of the chest that could impair breathing.
- Position patient in such a way that it allows turning them onto their back easily.
- Take precautions to stabilize the neck in case of cervical spine injury.
- Continue to assess and maintain access of airway.
- Avoid the recovery position if it will sustain injury to the patient.



# ROSC

Move the arm closest to you out of the way.



Use your hand nearest to their head to hold their other hand and put this onto the side of their cheek to support the head and neck as you turn them.



Use your other hand to lift up the outside of their knee and use this as a lever to pull them over. Pull the knee to the floor whilst supporting their head and neck with your other hand.



Pull their bent knee upwards into a running position to stabilise their body.



Ensure that they are over enough so that their tongue flops forward and any vomit can drain out.



If you are not worried about a possible spinal injury, tilt their head back slightly to ensure the airway is properly open. If you are worried they might have a neck injury, just ensure they are rolled over enough to drain.

→ **Keep checking that they are breathing** by feeling their breath on the back of your hand.

→ Get the emergency services on the way if they haven't already been called.

→ **NB:** A pregnant lady in the third trimester should be placed on their left hand side to prevent occlusion of the inferior vena cava.



## IHCA



Early Recognition and Prevention

Activation of Emergency Response

High-Quality CPR

Advanced Resuscitation

Post-Cardiac Arrest Care

Recovery

## OHCA



Prevention

Activation of Emergency Response

High-Quality CPR

Advanced Resuscitation

Post-Cardiac Arrest Care

Recovery



# Child BLS

## Pediatric BLS for Lay Rescuers

### 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.

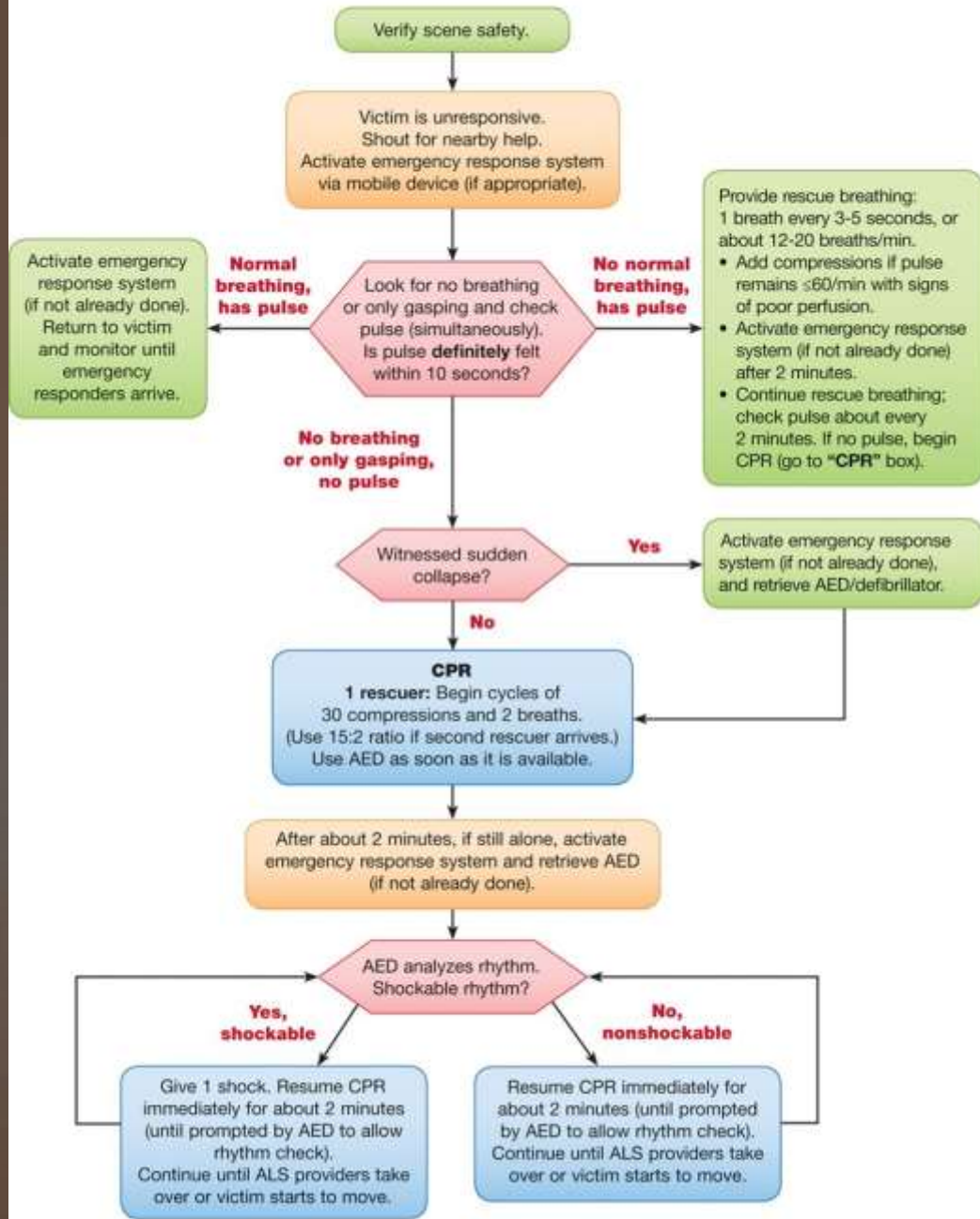


Use the AED as soon as it arrives.

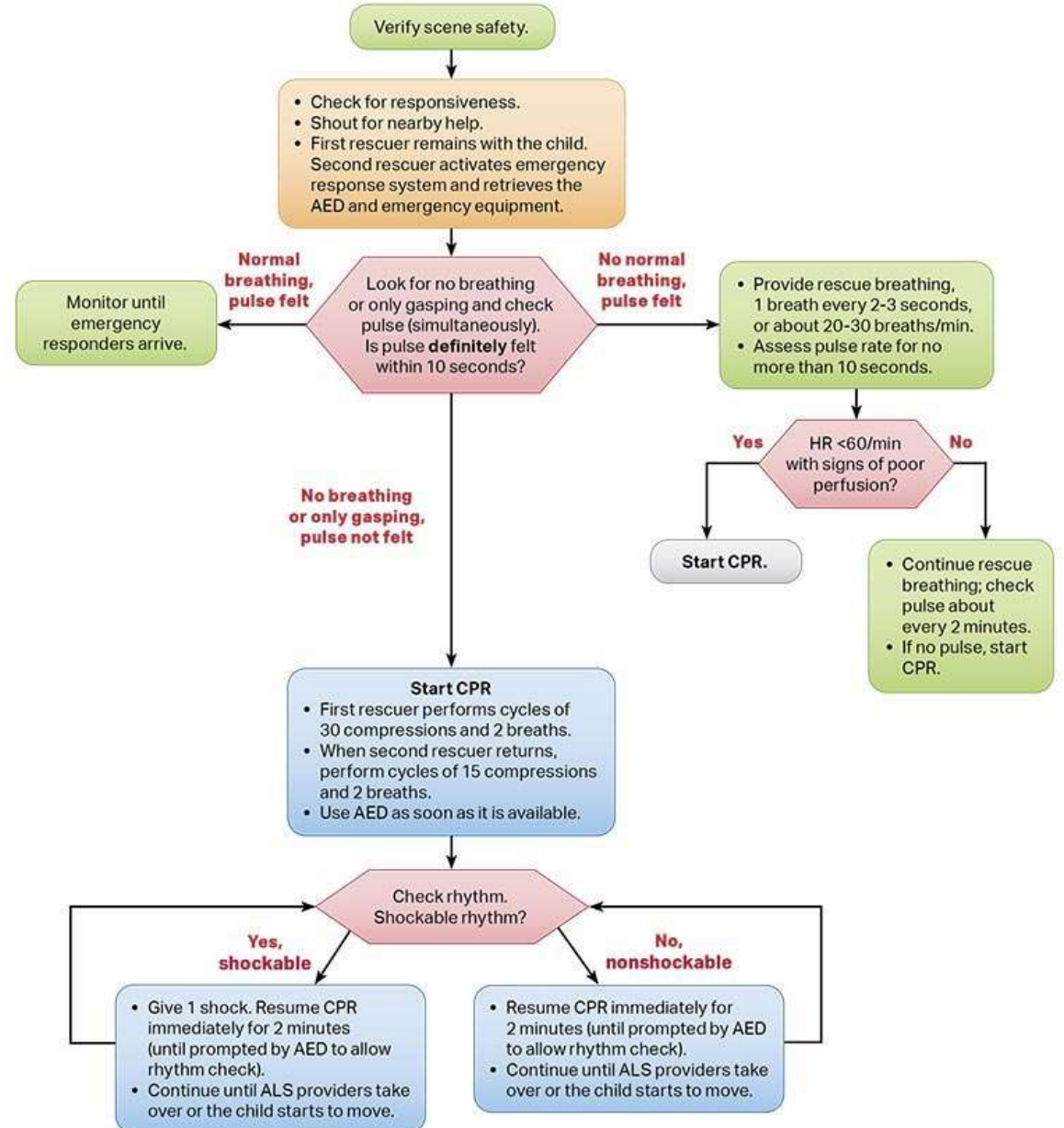
Continue CPR until EMS arrives.



**BLS Healthcare Provider  
Pediatric Cardiac Arrest Algorithm for the Single Rescuer—2015 Update**



**Pediatric Basic Life Support Algorithm for Healthcare Providers—2 or More Rescuers**





**Option 1:** Hold the baby in your arms, on their side, head lower than stomach. Put the back of your hand under their mouth and nose to keep checking that they are breathing. If you are unsure, wet the back of your hand as it makes it more sensitive. Call an ambulance.



**Option 2:** Roll them into the recovery position on a blanket or coat to insulate them from the ground and use a rolled-up jumper or something to keep them on their side. Keep checking that they're breathing. Call an ambulance.



*If the patient has a pulse and no CPR is required:*

- Provide 12-20 rescue breaths per minute.
- Recheck pulse every 2 minutes.

# Relief of Choking Adult

## Choking In Adults And Children

DEGREE OF OBSTRUCTION	PERSON'S RESPONSE	RESCUERS ACTION
Mild Obstruction	<ul style="list-style-type: none"> <li>Breathing but may also be wheezing</li> <li>Coughing and making noise</li> </ul>	<ul style="list-style-type: none"> <li>Stay with the person, try to keep them calm</li> <li>Encourage them to cough</li> <li>Call 911/EMS if the person seems to be getting worse</li> </ul>
Severe Obstruction	<ul style="list-style-type: none"> <li>Clutching the neck (universal sign of choking; <a href="#">Figure 15</a>).</li> <li>Weak or no cough</li> <li>Unable to make noise or talk; may make high-pitched noise</li> <li>Little or no breathing</li> <li>Appears cyanotic (blue around lips and fingertips)</li> </ul>	<ul style="list-style-type: none"> <li>Use abdominal thrusts to attempt to remove obstruction</li> <li>Call 911/EMS</li> <li>Begin BLS if the person becomes unresponsive</li> </ul>



Figure 16: Abdominal Thrusts

## Abdominal Thrusts

These steps should only be used when a person is responsive and older than one year of age.

To properly perform the abdominal thrusts, do the following:

1. Stand behind the responsive person. Wrap your arms around their waist under their ribcage.
2. Put the side of your fist above the person's navel in the middle of their belly. Do not press on the lower part of the sternum ([Figure 16a](#)).
3. With your other hand, hold the first fist and press forcefully into the person's abdomen and up toward their chest ([Figure 16b and 16c](#)).
4. Continue performing these thrusts until the obstruction is relieved or until the person becomes unresponsive.

***If you can see a foreign object in the individual's mouth and can easily remove it, then do it. Watch and feel for breathing to begin. If the individual does not begin breathing, continue to provide CPR and rescue breaths until help arrives.***



## Choking In Infants

DEGREE OF OBSTRUCTION	INFANTS'S RESPONSE	RESCUERS ACTION
Mild Obstruction	<ul style="list-style-type: none"> <li>Breathing but may also be wheezing</li> <li>May be coughing and making noise</li> </ul>	<ul style="list-style-type: none"> <li>Stay with the infant, try to keep them calm</li> <li>Do not do a blind finger sweep</li> <li>Call 911/EMS if infant does not quickly clear the obstruction</li> </ul>
Severe Obstruction	<ul style="list-style-type: none"> <li>Weak or no cough</li> <li>Unable to make noise; may make high-pitched noise</li> <li>Little or no breathing</li> <li>Appears cyanotic (blue around lips and fingertips)</li> </ul>	<ul style="list-style-type: none"> <li>Use back blows/chest thrusts to attempt to remove obstruction</li> <li>Call 911/EMS</li> <li>Begin BLS if the infant becomes unresponsive</li> <li>Assess if obstruction is visible; if so, remove it</li> </ul>



Figure 17

### For chest compressions, do the following:

In a choking but responsive infant less than one-year-old, back blows and chest thrusts are used instead of abdominal thrusts. See *Table 4* for rescue actions for choking in infants. To provide back blows and chest thrusts, do the following:

1. Hold the infant in your lap.
2. Put the infant with their face down and their head lower than their chest; they should be resting on your forearm. Put your forearm on your thigh (*Figure 17a*).
3. Support the infant's head and neck with your hand and be sure to avoid putting pressure on their throat.
4. Using the heel of your free hand, deliver five back blows between the infant's shoulder blades (*Figure 17b*).
5. Using both hands and arms, turn the infant face up so they are now resting on your other arm; this arm should now be resting on your thigh (*Figure 17c*).
6. Make sure the infant's head is lower than their chest.
7. Using the fingers of your free hand, provide up to five quick downward chest thrusts over the lower half of the breastbone (*Figure 17d*). Perform one thrust every second.
8. If the obstruction is not relieved, turn the infant face down on your other forearm and repeat the process (*Figure 17b*).
9. Continue doing these steps until the infant begins to breathe or becomes unresponsive.

# Relief of Choking Infant



# Lets warming up..

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# The ABCDE's

## Airway



### ASSESSMENT

Can the patient talk normally? If YES, the airway is open.

If the patient cannot talk normally:

- look to see if the chest wall is moving and listen to see if there is air movement from the mouth or nose.
- listen for abnormal sounds (such as stridor, grunting, or snoring) or a hoarse or raspy voice that indicates a partially obstructed airway.
  - Stridor plus swelling and/or hives suggest a severe allergic reaction (anaphylaxis).
- Look and listen for fluid (such as blood, vomit) in the airway.
- Look for foreign body or abnormal swelling around the airway, and altered mental status.
- Check if the patient is able to swallow saliva or is drooling.

### IMMEDIATE MANAGEMENT

- If the patient is unconscious and not breathing normally and:
  - NO TRAUMA: open the airway using the **head-tilt and chin-lift** manoeuvre. [See SKILLS]
  - CONCERN FOR TRAUMA: maintain cervical spine immobilization and open the airway using the **jaw thrust** manoeuvre. [See SKILLS]
  - Place an **oropharyngeal or nasopharyngeal airway** to maintain the airway. [See SKILLS]
- If a foreign body is suspected:
  - If the object is visible, remove it – be careful not to push the object any deeper.
  - If the patient is able to cough or make noises, keep the patient calm and encourage coughing.
  - If the patient is choking (unable to cough, not making sounds) use age-appropriate **chest thrusts/abdominal thrusts/back blows**. [See SKILLS]
  - If the patient becomes unconscious while choking, follow relevant **CPR** protocols.
- If secretions or vomit are present, **suction** when available, or wipe clean. Consider placing patient in the recovery position if the rest of the ABCDE is normal and no trauma is suspected. [See SKILLS]
- If the patient has swelling, hives or stridor, consider severe allergic reaction (anaphylaxis), and give **Intramuscular adrenaline**. [See SKILLS]
- Allow the patient to stay in a position of comfort and prepare for rapid **handover/transfer** to a centre capable of advanced airway management, if needed.

If the airway is open, move onto “Breathing”.



## Breathing



### ASSESSMENT

- Look, listen, and feel to see if the patient is breathing.
- Assess if breathing is very fast, very slow, or very shallow.
- Look for signs of increased work of breathing (such as accessory muscle use, chest indrawing/retractions, nasal flaring) or abnormal chest wall movement.
- Listen for abnormal breath sounds such as wheezing or crackles. [See DIFFICULTY IN BREATHING]
- With severe wheezing, there may be limited/no breath sounds on examination because narrowing of the airways may be so severe that breathing cannot be heard.
- Listen to see if breath sounds are equal on both sides.
- Check for the absence of breath sounds and dull sounds with percussion on one side (large pleural effusion or haemothorax). [See SKILLS]
- If there are no breath sounds on one side, and hypotension, check for distended neck veins or a shifted trachea (tension pneumothorax).
- Check oxygen saturation with a pulse oximeter when available.

### IMMEDIATE MANAGEMENT

- If unconscious with abnormal breathing, start **bag-valve-mask ventilation** and follow relevant **CPR** protocols.
- If not breathing adequately (too slow for age or too shallow), begin **bag-valve-mask ventilation with oxygen** [See SKILLS]. If oxygen not immediately available, **DO NOT DELAY** ventilation. Start ventilation while oxygen is being prepared. Plan for rapid handover/transfer.
- If breathing fast or hypoxic, give **oxygen** [See SKILLS]
- If wheezing, give **salbutamol**. [See SKILLS] Repeat salbutamol as needed.
- If concern for severe allergic reaction (anaphylaxis), give intramuscular adrenaline. [See SKILLS]
- If concern for tension pneumothorax, perform needle decompression immediately and give IV fluids and oxygen. [See SKILLS] Plan for rapid handover/transfer.
- If concern for large pleural effusion or haemothorax, give oxygen and plan for rapid handover/transfer.
- **If cause unknown, remember the possibility of trauma** [See TRAUMA]

If breathing is adequate, move onto "Circulation".

## Circulation



- Look and feel for signs of poor perfusion (cool, moist extremities, delayed capillary refill greater than 3 seconds, low blood pressure, tachypnoea, tachycardia, absent pulses).
- Look for both external AND internal bleeding, including bleeding:
  - into chest;
  - into abdomen;
  - from stomach or intestine;
  - from pelvic or femur fracture;
  - from wounds.
- Look for hypotension, distended neck veins and muffled heart sounds that might indicate pericardial tamponade.
- For cardiopulmonary arrest, follow relevant CPR protocols.
- If signs of poor perfusion, give IV fluids and oxygen [See SKILLS] and:
  - For external bleeding, apply direct pressure or use other technique to control. [See SKILLS]
  - If internal bleeding or pericardial tamponade are suspected, refer rapidly to a centre with surgical capabilities.

***If cause unknown, remember the possibility of trauma:*** Bind pelvic fractures and splint femur fractures, or any fracture with compromised blood flow. [See TRAUMA and SKILLS]

**If circulation is adequate, move onto “Disability”.**



## Disability



- Assess level of consciousness with the AVPU scale (Alert, Voice, Pain, Unresponsive) or in trauma cases, the Glasgow Coma Scale (GCS). [See SKILLS]
- Always check glucose level in the confused or unconscious patient.
- Check for pupil size, whether the pupils are equal, and if pupils are reactive to light.



- Check movement and sensation in all four limbs.
- Look for abnormal repetitive movements or shaking on one or both sides of the body (seizure/convulsion).

- If altered mental status and no evidence of trauma, place in recovery position. [See SKILLS]
- If glucose low (<3.5 mmol/L) or glucose test not available and patient has altered mental status, give glucose. [See SKILLS]
- For active seizures, give a benzodiazepine. [See SKILLS]
- If pregnant and having seizures, give magnesium sulphate. [See SKILLS]
- If pupils are small and breathing slow, consider opioid overdose and give naloxone. [See SKILLS]
- If pupils are not equal, consider increased pressure on the brain and raise head of bed 30 degrees if no concern for spinal injury. Plan for rapid transfer to an advanced provider or facility with neurosurgical care.

***If cause unknown, remember possibility of trauma:*** Immobilize the cervical spine if concern for trauma. [See TRAUMA and SKILLS]

## Exposure



- Examine the entire body for hidden injuries, rashes, bites or other lesions.
- Rashes, such as hives, can indicate allergic reaction, and other rashes can indicate serious infection.
- If snake bite is suspected, immobilize the limb. [See SKILLS] Take a picture of the snake if possible from a distance and send with patient. Do not risk additional bites to catch/kill snake.
- Remove constricting clothing and all jewelry.
- Cover the patient as soon as possible to prevent hypothermia. Acutely ill patients have difficulty regulating body temperature.
- Remove any wet clothes and dry patient thoroughly.
- Respect the patient and protect modesty during exposure.

***If cause unknown, remember the possibility of trauma:*** Log roll if suspected spinal injury [See TRAUMA and SKILLS]





Airway Problem



Conditions?

## AIRWAY conditions



CONDITION	SIGNS AND SYMPTOMS	IN-DEPTH DESCRIPTION AND MANAGEMENT
<b>Obstruction due to foreign body</b>	<ul style="list-style-type: none"> <li>• Visible secretions, vomit or foreign bodies in the airway</li> <li>• Abnormal sounds from the airway (such as stridor, snoring, gurgling)</li> <li>• Mental status changes leading to airway obstruction from the tongue</li> <li>• Poor chest rise</li> </ul>	<p>The airway can become obstructed by secretions, vomit or foreign bodies.</p> <ul style="list-style-type: none"> <li>• Remove the foreign body if possible and suction fluid. Be careful not to push a foreign body further into the airway. Do not try to remove a foreign body unless clearly visible.</li> <li>• Use age-appropriate chest thrusts/abdominal thrusts/back blows if the airway is completely obstructed. [See SKILLS]</li> <li>• The tongue may obstruct the airway in patients with a decreased level of consciousness. <ul style="list-style-type: none"> <li>– Open the airway using a head-tilt and chin-lift manoeuvre, or use jaw thrust (if there is concern for trauma); and place an oral or nasopharyngeal airway as needed. [See SKILLS]</li> <li>– These patients may also not be able to protect their airway and need to be watched for vomiting and aspiration.</li> </ul> </li> <li>• Plan for rapid handover/transfer to advanced provider capable of advanced airway management if the obstruction cannot be removed.</li> </ul>
<b>Obstruction due to burns</b>	<ul style="list-style-type: none"> <li>• Burns to head and neck</li> <li>• Burned nasal hairs or soot around the nose or mouth</li> <li>• Abnormal sounds from the airway (such as stridor)</li> <li>• Change in voice</li> <li>• Poor chest rise</li> </ul>	<p>Burns can cause airway swelling due to inhalational injuries.</p> <ul style="list-style-type: none"> <li>• Give oxygen to ALL patients with suspected airway burn even if they do not show signs of hypoxia. [See SKILLS]</li> <li>• Open the airway using appropriate manoeuvre and place an oral or nasopharyngeal airway as needed. [See SKILLS]</li> <li>• Maintain cervical spine immobilization if there is evidence of trauma. [See SKILLS]</li> <li>• The airway can swell and close off very quickly in burn patients. Plan for rapid handover/transfer to a provider capable of advanced airway management</li> </ul>

CONDITION	SIGNS AND SYMPTOMS	IN-DEPTH DESCRIPTION AND MANAGEMENT
<b>Obstruction due to severe allergic reaction (anaphylaxis)</b>	<ul style="list-style-type: none"> <li>• Mouth, lip, and tongue swelling</li> <li>• Difficulty breathing with stridor and/or wheezing</li> <li>• Rash or hives (patches of pale or red, itchy, warm, swollen skin)</li> <li>• Tachycardia and hypotension</li> <li>• Abnormal sounds from the airway (such as stridor, snoring, gurgling)</li> <li>• Poor chest rise</li> </ul>	<p>Severe allergic reactions can cause swelling of the airway that can lead to obstruction.</p> <ul style="list-style-type: none"> <li>• Give intramuscular adrenaline for airway obstruction, severe wheezing or shock. [See SKILLS] <ul style="list-style-type: none"> <li>– Adrenaline can wear off in minutes so be prepared to give additional doses.</li> </ul> </li> <li>• Place an IV and give IV fluids. [See SKILLS]</li> <li>• Reposition airway as needed (sit patient upright if no trauma) and give oxygen. [See SKILLS]</li> <li>• If severe or not improving, prepare for rapid handover/transfer for advanced airway management.</li> </ul>
<b>Obstruction due to trauma</b>	<ul style="list-style-type: none"> <li>• Neck haematoma or injuries to head and neck</li> <li>• Abnormal sounds from the airway (such as stridor, snoring, gurgling)</li> <li>• Change in voice</li> <li>• Poor chest rise</li> </ul>	<p>Airway obstruction may result from injuries to the head or neck. Blood, bone or damaged tissue may block the airway. Penetrating wounds to the neck may also cause obstruction due to swelling or expanding haematoma.</p> <ul style="list-style-type: none"> <li>• Suction to remove any blood that might block the airway.</li> <li>• Open the airway using jaw thrust only (do not use head-tilt/chin-lift); and place an oral airway as needed (do not use nasopharyngeal airways if there is facial trauma). [See SKILLS]</li> <li>• Maintain cervical spine immobilization if there is evidence of trauma. [See SKILLS]</li> <li>• Plan for rapid handover/transfer to advanced provider capable of advanced airway management or surgical intervention.</li> </ul>

For any abnormal airway sounds, re-assess airway frequently as partial obstruction may worsen rapidly and block airway.

## AIRWAY conditions







Breathing Problem



Conditions?

## BREATHING conditions



CONDITION	SIGNS AND SYMPTOMS	IN-DEPTH DESCRIPTION AND MANAGEMENT
<b>Tension pneumothorax</b>	<p>Hypotension WITH difficulty in breathing AND any of the following:</p> <ul style="list-style-type: none"> <li>• distended neck veins</li> <li>• absent breath sounds on affected side</li> <li>• hyperresonance with percussion on affected side [See SKILLS]</li> <li>• tracheal shift away from affected side</li> </ul>	<p>Any pneumothorax can become a tension pneumothorax. Air in the cavity between the lungs and the chest wall can collapse the lung (simple pneumothorax). Building pressure (tension) from a large pneumothorax can displace and block flow from the main vessels back to the heart, causing shock (tension pneumothorax).</p> <ul style="list-style-type: none"> <li>• If tension pneumothorax is suspected, perform emergency needle decompression. [See SKILLS]</li> <li>• Give oxygen. [See SKILLS]</li> <li>• Give IV fluids. [See SKILLS]</li> <li>• Arrange for rapid handover/transfer to an advanced provider capable of placing a chest tube.</li> </ul>
<b>Suspected opioid overdose</b>	<ul style="list-style-type: none"> <li>• Slow respiratory rate</li> <li>• Hypoxia</li> <li>• Very small pupils</li> </ul>	<p>Opioid medications (such as morphine, pethidine, and heroin) can decrease the body's drive to breathe.</p> <ul style="list-style-type: none"> <li>• Give naloxone to reverse the effects of opioids. [See SKILLS]               <ul style="list-style-type: none"> <li>– Monitor closely as naloxone will wear off and additional doses may be needed.</li> </ul> </li> <li>• Give oxygen. [See SKILLS]</li> </ul>
<b>Asthma/ COPD (chronic obstructive pulmonary disease)</b>	<ul style="list-style-type: none"> <li>• Wheezing</li> <li>• Cough</li> <li>• Accessory muscle use</li> <li>• May have history of asthma/COPD diagnosis, allergies or smoking</li> </ul>	<p>Asthma and COPD are conditions causing spasm in the lower airways, resulting in narrowing that causes difficulty in breathing and wheezing.</p> <ul style="list-style-type: none"> <li>• Administer salbutamol as soon as possible. (Salbutamol helps to relieve the spasm in the air passages) [See SKILLS]</li> <li>• Give oxygen if indicated. [See SKILLS]</li> </ul>
<b>Large pleural effusion/ haemothorax</b>	<ul style="list-style-type: none"> <li>• Decreased breath sounds on affected side</li> <li>• Dull sounds with percussion on affected side [See SKILLS]</li> <li>• If there is a large amount of fluid, may have shock</li> </ul>	<p>Pleural effusion occurs when fluid builds up in the space between the lung and the chest wall or diaphragm. As the fluid builds up, it limits expansion of the lungs.</p> <ul style="list-style-type: none"> <li>• Give oxygen. [See SKILLS]</li> <li>• Arrange for handover/transfer immediately (many of these patients will need a procedure to drain fluid).</li> </ul>
<b>If cause unknown, remember the possibility of trauma [See TRAUMA]</b>		



Circulation Problem



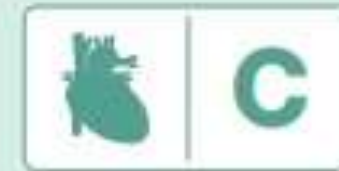
Conditions?



CONDITION	SIGNS AND SYMPTOMS	IN-DEPTH DESCRIPTION AND MANAGEMENT
<b>Pulselessness</b>	<ul style="list-style-type: none"> <li>• No pulse</li> <li>• Unconscious</li> <li>• Not breathing</li> </ul>	Follow relevant cardiopulmonary resuscitation (CPR) protocols.
<b>Shock</b>	<ul style="list-style-type: none"> <li>• Rapid heart rate (tachycardia)</li> <li>• Rapid breathing (tachypnoea)</li> <li>• Pale and cool skin</li> <li>• Capillary refill &gt; 3 seconds</li> <li>• Sweating (diaphoresis)</li> <li>• May have dizziness, confusion, altered mental status</li> <li>• May have hypotension</li> </ul>	<p>Poor perfusion is the failure to deliver enough oxygen-carrying blood to the vital organs. When poor perfusion continues until organ function is affected, this is called shock and can lead rapidly to death.</p> <ul style="list-style-type: none"> <li>• Initial treatment for shock includes laying the patient flat (if tolerated).</li> <li>• Give oxygen. [See SKILLS]</li> <li>• Control bleeding. [See SKILLS]</li> <li>• Start an IV and give IV fluids. [See SKILLS]</li> <li>• If there are signs of infection, give antibiotics if available.</li> <li>• Prepare for rapid handover/transfer.</li> </ul>
<b>Severe bleeding (haemorrhage)</b>	<ul style="list-style-type: none"> <li>• Bleeding wounds</li> <li>• Bruising around the umbilicus (belly button) or over the flanks can be a sign of internal bleeding</li> <li>• Bleeding from the rectum or vagina or in vomit</li> <li>• Pelvic fracture</li> <li>• Femur fracture</li> <li>• Decreased breath sounds on one side of the chest (haemothorax)</li> <li>• Signs of poor perfusion (such as hypotension, tachycardia, pale skin, diaphoresis)</li> </ul>	<p>External bleeding that is not controlled can lead quickly to shock. A large quantity of blood can also be lost into the chest, pelvis, thigh and abdomen before the bleeding is recognized.</p> <ul style="list-style-type: none"> <li>• Stop the bleeding. Depending on the source, use: <ul style="list-style-type: none"> <li>– direct pressure [See SKILLS]</li> <li>– deep wound packing [See SKILLS]</li> <li>– a tourniquet [See SKILLS]</li> <li>– pelvic binder or femur splint. [See SKILLS]</li> </ul> </li> <li>• Give IV fluids. [See SKILLS]</li> <li>• Refer for blood transfusion and ongoing surgical management if needed.</li> </ul> <p>A tourniquet should be used only for life-threatening bleeding.</p>
<b>Pericardial tamponade</b>	<ul style="list-style-type: none"> <li>• Signs of poor perfusion (tachycardia, tachypnoea, hypotension, pale and cool skin, cold extremities, capillary refill &gt; 3 seconds)</li> <li>• Distended neck veins</li> <li>• Muffled heart sounds</li> <li>• May have dizziness, confusion, altered mental status</li> </ul>	<p>Pericardial tamponade occurs when fluid builds up in the sac around the heart. The pressure from this fluid can collapse the chambers of the heart and keep them from filling properly, limiting blood flow to the tissues and causing shock. Treatment is drainage by pericardiocentesis.</p> <ul style="list-style-type: none"> <li>• In order to keep the patient alive until the fluid around the heart can be drained, give IV fluids to ensure that as much volume as possible enters the heart. [See SKILLS]</li> <li>• Refer rapidly for surgical management.</li> </ul>

If cause unknown, remember the possibility of trauma [See TRAUMA]

## CIRCULATION conditions





Disability Problem



Conditions?

CONDITION	SIGNS AND SYMPTOMS	IN-DEPTH DESCRIPTION AND MANAGEMENT
<b>Hypoglycaemia</b>	<ul style="list-style-type: none"> <li>• Sweating (diaphoresis)</li> <li>• Altered mental status (ranging from confusion to unconsciousness)</li> <li>• Seizures/convulsions</li> <li>• Blood glucose &lt;3.5 mmol/L</li> <li>• History of diabetes, malaria or severe infection</li> <li>• Responds quickly to glucose</li> </ul>	<p>Patients with hypoglycaemia (low blood sugar) need glucose immediately. [See SKILLS]</p> <ul style="list-style-type: none"> <li>• If the person can speak and swallow, give oral glucose.</li> <li>• If the person cannot speak or is unconscious, give IV glucose if possible.</li> <li>• If IV glucose is not possible or available, give buccal (inside of the cheek) glucose. [See SKILLS]</li> </ul>
<b>Increased pressure on the brain</b>	<ul style="list-style-type: none"> <li>• Headache</li> <li>• Seizures/convulsions</li> <li>• Nausea, vomiting</li> <li>• Altered mental status</li> <li>• Unequal pupils</li> <li>• Weakness on one side of the body</li> </ul>	<p>Increased pressure on the brain can occur from trauma, tumours, increased fluid, bleeding or infections. Because the skull is rigid, any swelling, fluid, or mass increases the pressure around the brain, limiting blood flow and possibly displacing brain tissue, causing death.</p> <ul style="list-style-type: none"> <li>• Raise the head of the bed to 30 degrees if there is no concern for trauma and there is no hypotension.</li> <li>• Check glucose. [See SKILLS]</li> <li>• If there are seizures/convulsions, give a benzodiazepine. [See SKILLS]</li> <li>• The pressure must be reduced as quickly as possible. Arrange for rapid handover/transfer to a surgical centre.</li> </ul>
<b>Seizure/convulsion</b>	<p>Signs and symptoms of active seizure:</p> <ul style="list-style-type: none"> <li>• Repetitive movements, gaze fixed to one side or alternating rhythmically and not responsive.</li> </ul> <p>Sign and symptoms of recent seizure:</p> <ul style="list-style-type: none"> <li>• Bitten tongue</li> <li>• Urinated on self</li> <li>• Known history of seizures/convulsions</li> <li>• Confusion that gradually improves over minutes to hours</li> </ul>	<p>The goal in managing seizures/convulsions is to prevent hypoxia and injury.</p> <ul style="list-style-type: none"> <li>• Protect the seizing person from falls and from any hard or sharp objects nearby.</li> <li>• Do not place anything in the mouth of a person with active seizure except to suction airway. [See SKILLS]</li> <li>• Give oxygen. [See SKILLS]</li> <li>• Check blood glucose. Give glucose if &lt;3.5 mmol/L. [See SKILLS]</li> <li>• Treat with a benzodiazepine [See SKILLS] and monitor closely for slowing or difficult breathing.</li> <li>• Place patient in recovery position if there is no trauma suspected. [See SKILLS]</li> <li>• If the patient is pregnant, or recently gave birth, give magnesium sulphate. [See SKILLS]</li> </ul>

If cause unknown, remember the possibility of trauma [See TRAUMA]

## DISABILITY conditions







Exposure Problem



Conditions?

## EXPOSURE conditions



CONDITION	SIGNS AND SYMPTOMS	IN-DEPTH DESCRIPTION AND MANAGEMENT
Snake bite	<ul style="list-style-type: none"><li>• History of snake bite</li><li>• Bite marks may be seen</li><li>• Oedema</li><li>• Blistering of the skin</li><li>• Bruising</li><li>• Hypotension</li><li>• Paralysis</li><li>• Seizures</li><li>• Bleeding from wounds</li></ul>	<p>The goal of managing snake bites is to limit the spread of the venom and the effects of venom on the body.</p> <ul style="list-style-type: none"><li>• Immobilize the extremity. [See SKILLS]</li><li>• Take a picture of the snake when possible and send with the patient (for example, with the patient's mobile phone).</li><li>• Give IV fluids if evidence of shock. [See SKILLS]</li><li>• These patients may have delayed shock or airway problems. Monitor closely and plan early for rapid handover/transfer.</li></ul>

### **Vital signs should be checked at the end of the ABCDE**

A full set of vital signs (blood pressure, heart rate, respiratory rate, and oxygen saturation if available) should be performed after the ABCDE approach. Do not delay ABCDE interventions for vital signs.

### **ABCDE SHOULD BE REPEATED FREQUENTLY**

The ABCDE approach is designed to quickly identify reversible life-threatening conditions. Ideally, the ABCDE approach should be repeated at least every 15 minutes or with any change in condition.



# Pediatric Condition



Airway Problem



Conditions?

Excessive drooling, stridor, airway swelling and unwillingness to move the neck are all high-risk signs in children. Look carefully in the airway for foreign bodies, burns or obstruction. Allow the child to remain in a position of comfort. Position airway as needed below.

**Compared to adults, children have:**

**So you must do this:**

Bigger tongues.

- Place the child in the "sniffing" position (modified head-tilt, chin-lift – like the slight upward and forward tilt of the head when sniffing a flower).

Shorter necks with airways that are softer and more easily blocked.

- Avoid over-extending or flexing the neck.

A larger head compared to the rest of the body.

- Watch closely for airway obstruction.
- Use the jaw thrust if airway is not open. [See SKILLS]
- Position head (using padding under shoulders for very small children) to open airway if no trauma. [See SKILLS]



**Paediatric considerations**

**Pediatric airway conditions**



For choking, use age-appropriate chest thrusts/abdominal thrusts/back blows. [See SKILLS]



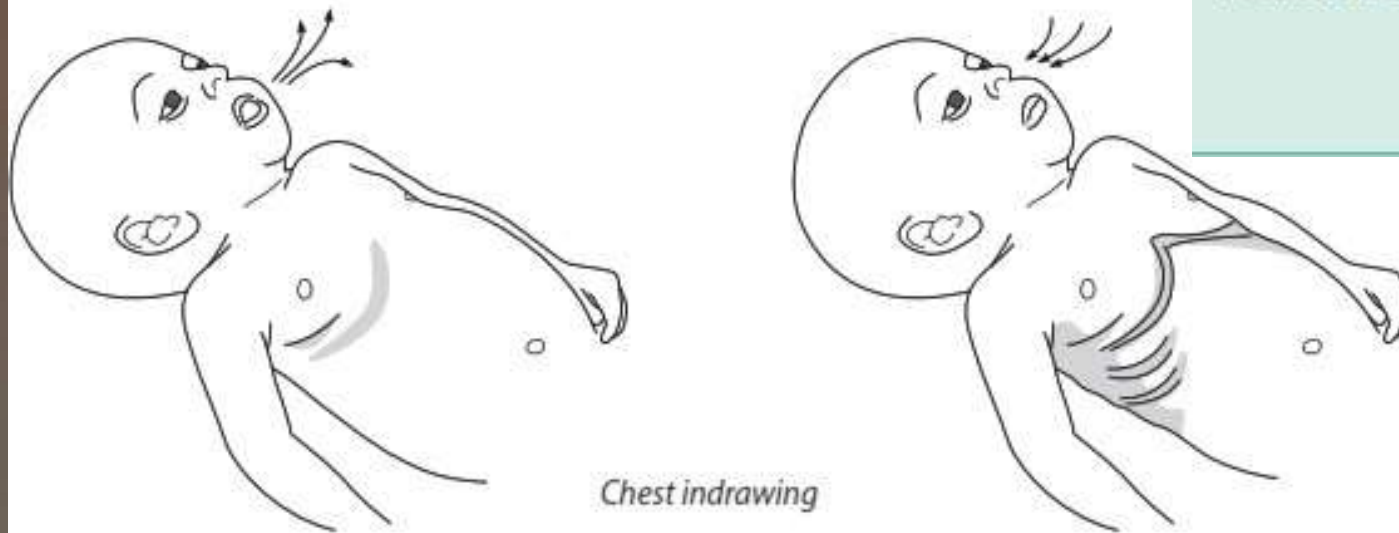


Breathing Problem



Conditions?

- **Nasal flaring, head bobbing, grunting and chest indrawing OR retractions**, are signs of respiratory distress in children.
- **CYANOSIS** – a blue/grey discoloration around the lips, mouth or fingertips – is the result of a lack of oxygen and is a danger sign.
- **CHEST INDRAWING** is a common presentation of paediatric accessory muscle use.
  - Look at the lower chest wall (lower ribs). The child has chest indrawing if the lower chest wall goes IN when the child breathes IN.
  - In normal breathing, the whole chest wall (upper and lower) and the abdomen move OUT when the child breathes IN.



## Pediatric breathing conditions



- A **SILENT CHEST** (no breath sounds when you listen to the chest) is a sign of severe respiratory distress in a child. With severe spasm and narrowing of the airways, there may be limited air movement and few breath sounds on exam. Give salbutamol and oxygen and re-assess frequently. [See SKILLS]
- **STRIDOR** signals severe airway compromise, and there are many possible causes. Children with stridor should be allowed to stay in a position of comfort and transferred immediately to an advanced provider. Further treatment will often include nebulized adrenaline. If immediate transfer is not possible, consider intramuscular adrenaline as per severe allergic reaction treatment. [See SKILLS]



Circulation Problem



Conditions?



## Pediatric circulation conditions



- **MANAGEMENT OF POOR PERFUSION IN CHILDREN MAY CHANGE** based on the **cause** and on the **condition** of the child. [See SHOCK and SKILLS modules]
- **LOW BLOOD PRESSURE IN A CHILD IS A SIGN OF SEVERE SHOCK.** Children are able to maintain normal blood pressure for longer than adults when in shock. Closely monitor other signs of poor perfusion, such as **decreased urine output** and **altered mental status**.
- **THE AMOUNT OF INTRAVENOUS FLUID GIVEN TO CHILDREN IS DIFFERENT FROM ADULTS.** [See SKILLS]
- **IN MALNOURISHED CHILDREN,** both the rate of fluid administration and the type of fluid are different. [See SKILLS]
- **SEVERE SIGNS:** Sunken fontanelle, poor skin pinch [See SKILLS], lethargy, altered mental status.



Disability - Exposure  
Problem



Conditions?

## Pediatric disability conditions



- **LOW BLOOD GLUCOSE** is a very common cause of altered mental status in sick children.
  - If possible, check blood glucose in children with altered mental status.
  - When it is not possible to check the blood glucose level, administer glucose.
- Always check for seizure/convulsions.
- It is sometimes difficult to determine if infants are acting normally. Always ask the person caring for the child.

## Pediatric exposure conditions



- **INFANTS AND CHILDREN HAVE DIFFICULTY MAINTAINING TEMPERATURE** and can very quickly become hypothermic (low body temperature) or hyperthermic (high body temperature).
  - Remove wet clothing and dry skin thoroughly. Place infants skin-to-skin when possible.
  - For hypothermia, be sure to cover infants' heads (but do not obstruct face).
  - For hyperthermia, unbundle tightly wrapped infants.



## PAEDIATRIC DANGER SIGNS IN ABCDE

In addition to performing a thorough ABCDE approach, all paediatric patients should be evaluated for the presence of danger signs. Children with danger signs need URGENT attention and referral/handover to a provider able to provide advanced paediatric care.

### **Paediatric danger signs include:**

- Signs of airway obstruction (stridor or drooling/unable to swallow saliva)
- Increased breathing effort (fast breathing, nasal flaring, grunting, chest indrawing or retractions)
- Cyanosis (blue colour of the skin, especially at the lips and fingertips)
- Altered mental status (including lethargy or unusual sleepiness, confusion, disorientation)
- Moves only when stimulated or no movement at all (AVPU other than "A")
- Not feeding well or cannot drink or breastfeed
- Vomiting everything
- Seizures/convulsions
- Low body temperature (hypothermia)

# Elements of the SAMPLE history

- **S: Signs and symptoms**  
The patient/family's report of signs and symptoms is essential to assessment and management.
- **A: Allergies**  
It is important to be aware of medication allergies so that treatments do not cause harm. Allergies may also suggest anaphylaxis as the cause of acute symptoms.
- **M: Medications**  
Obtain a full list of medications that the person currently takes and ask about recent medication or dose changes. These may affect treatment decisions and are important to understanding the person's chronic conditions.
- **P: Past medical history**  
Knowing prior medical conditions may help in understanding the current illness and may change management choices.
- **L: Last oral intake**  
Record the time of last oral intake and whether solid or liquid. A full stomach increases the risk of vomiting and subsequent choking, especially with sedation or intubation that might be required for surgical procedures.
- **E: Events surrounding the injury or illness**  
Knowing the circumstances around the injury or illness may be helpful in understanding the cause, progression and severity.



Normal Vital Sign..?



## ***NORMAL ADULT VITAL SIGNS***

- Pulse rate: 60–100 beats per minute
- Respiratory rate: 10–20 breaths per minute
  - A respiratory rate of less than eight breaths per minute is a danger sign and may require intervention.
- Systolic blood pressure >90 mmHg
- Oxygen saturation >92%
- If you cannot take a blood pressure reading, you can use the pulse to estimate systolic blood pressure. Feeling for a pulse at the locations below can provide an estimate of systolic blood pressure in an adult (although this method may not work well in the elderly):
  - Carotid (neck) pulse  $\geq$  60 mmHg
  - Femoral (groin) pulse  $\geq$  70 mmHg
  - Radial (wrist) pulse  $\geq$  80 mmHg

## NORMAL PAEDIATRIC VITAL SIGNS

Vital signs are age-dependent in children. Normal heart rate and respiratory rate are higher in younger children, and normal blood pressures are lower. The brachial (middle of the upper arm) artery should be used to check the pulse in infants and small children.

### Normal paediatric vital signs

AGE (in years)	NORMAL HEART RATE (beats per minute)
≤1	100–160
1–3	90–150
4–5	80–140

AGE	RESPIRATORY RATE (breaths per minute)
≤2 months	40–60
2–12 months	25–50
1–5 years	20–40



*Location of brachial pulse in a child*

\* To estimate a child's (1–10 years old) weight in kilograms use the formula:

$$[\text{age in years} + 4] \times 2$$

or use weight-estimation tools such as PAWPER, Mercy TAPE, or Broselow tape.

- Children are able to maintain normal blood pressure for longer than adults when they are in shock. You must check closely for signs of poor perfusion.
- The amount of IV fluid appropriate for children is different from that for adults. [See SKILLS]

# TRAUMA SCENE ABCDE – PRIMARY SURVEY

- Airway → Primary Survey



Look for:

Listen for :

- Conditions



## Airway with cervical spine immobilization



### ASSESSMENT

#### Look for:

- blood, vomit, tongue or objects obstructing the airway
- burned nasal hairs or soot around the nose or mouth
- head or neck trauma
- neck haematoma (bleeding under the skin)
- altered mental status, as this can affect the ability to protect the airway

**Listen for** abnormal airway sounds (such as gurgling, snoring, stridor, noisy breathing).

### IMMEDIATE MANAGEMENT

- Stabilize the cervical spine. [See SKILLS]
- Open airway using jaw thrust, NOT head-tilt chin-lift if suspected spine injury. [See SKILLS]
- Suction airway secretions, blood and/or vomit. Remove any visible foreign objects from the airway. [See SKILLS]
- Place oral airway (avoid nasal airway if facial trauma). [See SKILLS]
- If the patient has an expanding neck haematoma or evidence of airway burns or trauma, plan for rapid handover/transfer to a provider capable of advanced airway management.

If the airway is open, move onto "Breathing".

CONDITION	SIGNS AND SYMPTOMS	IN-DEPTH MANAGEMENT
<b>Airway obstruction</b>	<ul style="list-style-type: none"> <li>• Visible blood, secretions, vomit, tongue or foreign bodies in the airway</li> <li>• Changes in voice</li> <li>• Abnormal sounds from the airway (such as stridor, snoring, gurgling)</li> <li>• Neck haematoma or burns to head and neck</li> <li>• Mental status changes leading to airway obstruction</li> <li>• Poor chest rise</li> <li>• Injury causing swelling of the airway (such as anaphylaxis or airway</li> </ul>	<p>Head and neck injuries may result in obstruction of the airway by blood, secretions, vomit, foreign bodies, or swelling. Penetrating wounds to the neck can cause expanding haematomas. Inhalational injuries due to burns can cause swelling.</p> <ul style="list-style-type: none"> <li>• Patients with a decreased level of consciousness may not be able to protect their airways and need to be watched for vomiting and aspiration <ul style="list-style-type: none"> <li>– Suction the airway and remove foreign bodies</li> <li>– Open the airway using a jaw thrust manoeuvre (NOT head-tilt/chin-lift) and place an oral airway as needed. [See: SKILLS]</li> </ul> </li> <li>• Maintain cervical spine immobilization throughout, if needed.</li> <li>• Plan for rapid handover/transfer to a provider capable of advanced airway management.</li> </ul>

- Breathing Problem → Primary Survey



Look for:  
Listen for  
Feel for

- Conditions



## Breathing



### Look for:

- increased work of breathing
- abnormal chest wall movement which may indicate flail chest
- tracheal shift
- sucking chest wound
- cyanosis (blue-grey color of the skin) around the lips and fingertips
- abrasion, bruising or other signs of injury to chest
- circumferential burns (burns that go all the way around a body part) to chest or abdomen
- absent or decreased breath sounds

**Listen for** dull sounds or hyperresonance with percussion.

**Feel for** crepitus (cracking and popping when pressing on the skin).

- Give oxygen. [See SKILLS]
- Perform needle decompression immediately and give oxygen and IV fluids for tension pneumothorax. [See SKILLS]
- Place three-sided dressing for sucking chest wound. [See SKILLS]
- If breathing not adequate or patient remains hypoxic on oxygen, assist breathing with bag-valve-mask ventilation. [See SKILLS]
- For chest or abdominal burns that restrict breathing, handover for escharotomy (a surgical procedure to cut and release burned tissue that may restrict breathing or blood supply to a limb).

If breathing is adequate, move onto "Circulation".

CONDITION	SIGNS AND SYMPTOMS	IN-DEPTH MANAGEMENT
<b>Tension pneumothorax</b>	<ul style="list-style-type: none"> <li>• Hypotension WITH:               <ul style="list-style-type: none"> <li>– difficulty breathing</li> <li>– distended neck veins</li> <li>– absent breath sounds on affected side</li> <li>– hyperresonance with percussion on affected side</li> <li>– may have tracheal shift away from affected side</li> </ul> </li> </ul>	<p>Any pneumothorax can become a tension pneumothorax. Air in the cavity between the lungs and the chest wall can collapse the lung (simple pneumothorax). Building pressure (tension) from a large pneumothorax can displace and block flow from the great vessels to the heart, causing shock as the heart cannot receive and pump enough blood to the rest of the body (tension pneumothorax). In tension pneumothorax, perfusion is compromised.</p> <ul style="list-style-type: none"> <li>• Treat tension pneumothorax immediately with needle depression. [See: SKILLS]</li> <li>• Give oxygen and IV fluids. [See: SKILLS]</li> <li>• Plan for rapid handover/transfer to an advanced provider capable of placing a chest tube.</li> </ul>



CONDITION	SIGNS AND SYMPTOMS	IN-DEPTH MANAGEMENT
<b>Sucking chest wound (open pneumothorax)</b>	<ul style="list-style-type: none"> <li>• Open wound in the chest wall with air passing through causing bubbling or “sucking” noises</li> <li>• Difficulty in breathing</li> <li>• Chest pain</li> </ul>	<p>Sucking chest wounds are important to recognize because they can rapidly cause a tension pneumothorax. Air enters the chest cavity (into the space between the chest wall and the lungs) through the wound in the chest wall when the patient takes a breath. Pressure on the lung builds if the air cannot escape.</p> <ul style="list-style-type: none"> <li>• Give oxygen. [See SKILLS]</li> <li>• Place a three-sided dressing that allows air to leave with exhalation but prevents air from entering when the person inhales. [See SKILLS] <ul style="list-style-type: none"> <li>– There is a danger of the dressing becoming stuck to the chest wall with clotted blood and causing a tension pneumothorax.</li> <li>– After applying a three-sided dressing the patient should be observed continuously.</li> <li>– Remove the dressing if worsening respiratory status or evidence of worsening perfusion.</li> </ul> </li> </ul> <p>Plan for rapid handover/transfer to an advanced provider capable of placing a chest tube.</p>
<b>Flail chest</b>	<ul style="list-style-type: none"> <li>• Difficulty in breathing</li> <li>• Chest pain</li> <li>• Part of chest wall moving in the opposite direction of the rest of the chest when breathing</li> </ul>	<p>Flail chest segments occur when ribs are broken in multiple places, freeing an entire section of ribs from the chest wall. Without the connection to the chest wall, this section will move abnormally with breathing and prevent part of the lung from expanding. Flail chest is also usually associated with damage to underlying lung tissue.</p> <ul style="list-style-type: none"> <li>• Give oxygen and pain control. [See SKILLS]</li> <li>• There is a very high risk of developing difficulty in breathing and hypoxia.</li> <li>• Plan for rapid handover/transfer to a provider capable of chest tube placement, advanced airway placement and ventilation.</li> </ul>
<b>Haemothorax</b>	<ul style="list-style-type: none"> <li>• Difficulty in breathing</li> <li>• Decreased breath sounds on affected side</li> <li>• Dull sounds with percussion on affected side</li> <li>• Large haemothorax may cause shock</li> </ul>	<p>Haemothorax (blood in the space between the lungs and the chest wall) can present with decreased or absent breath sounds and dull sounds with percussion on the affected side.</p> <ul style="list-style-type: none"> <li>• Give oxygen and IV fluids.</li> <li>• Plan for rapid handover/transfer to a centre with surgical capacity.</li> </ul>



- CIRCULATION Problem → Primary Survey



Look for:

Listen for :

- Conditions

## ASSESSMENT

### Circulation



#### Look for:

- capillary refill longer than 3 seconds
- pale extremities
- distended neck veins
- external AND internal bleeding

Common sources of serious bleeding are:

- chest injuries
- abdominal injuries
- pelvic fractures
- femur fractures
- amputations or large external wounds
- burns, noting size and depth

#### Feel for:

- cold extremities
- weak pulse or tachycardia

## IMMEDIATE MANAGEMENT

- Apply direct pressure to control active bleeding, or deep wound packing if large or gaping. [See SKILLS]
- If amputated limbs or any other source of uncontrolled bleeding are present, apply tourniquet (document time of application), start IV fluids and plan for urgent transfer to a surgical unit. [See SKILLS]
- If ongoing blood loss or evidence of poor perfusion, place two large bore IVs, give IV fluids and re-assess. [See SKILLS]
- If burn injury, start IV fluids according to burn size.
- Splint suspected femur fracture. [See SKILLS]
- Bind pelvic fracture. [See SKILLS]
- Leave any penetrating objects in place and stabilize object for transfer to a surgical team.
- Position pregnant patients on their left side while maintaining spinal immobilization.

If circulation is adequate, move onto "Disability".

CONDITION	SIGNS AND SYMPTOMS	IN-DEPTH MANAGEMENT
<b>Hypovolaemic shock</b>	<ul style="list-style-type: none"> <li>• Tachycardia, tachypnoea, pale skin, cold extremities, slow capillary refill</li> <li>• May have dizziness, confusion or altered mental status</li> <li>• May have hypotension</li> <li>• External bleeding or internal bleeding (chest, abdomen, pelvis, femur, blood vessels)</li> </ul>	<p>Hypovolaemic shock can result from rapid loss of blood (haemorrhagic shock) or from the fluid loss associated with burns. An adult patient in shock may have only tachycardia (elevated heart rate) and/or tachypnoea (high respiratory rate) and may not have low blood pressure until the condition is immediately life-threatening. Even with a systolic blood pressure greater than 90 mmHg, suspect hypovolaemic shock if there is severe bleeding or any sign of poor perfusion (such as cool, moist, or pale skin, slow capillary refill, fast breathing, confusion, restlessness, anxiety).</p> <ul style="list-style-type: none"> <li>• Stop bleeding with direct pressure, deep wound packing if wound is gaping, a tourniquet, splinting of fractures and binding the pelvis as needed. [See SKILLS]</li> <li>• Start two large-bore IV lines and give IV fluids. [See SKILLS]</li> <li>• Patients with suspected large haemothorax or other internal haemorrhage will need rapid handover/transfer to a unit with surgical care and blood transfusion capabilities.</li> </ul>
<p><b>REMEMBER...</b> Children and young people are able to maintain a normal blood pressure until they have lost up to a quarter of their blood. Always check for other signs of shock. [See “Special considerations in children” section]</p>		
<b>Pericardial tamponade</b>	<ul style="list-style-type: none"> <li>• Signs of poor perfusion (such as tachycardia, tachypnoea, hypotension, pale skin, cold extremities, capillary refill greater than 3 seconds)</li> <li>• Distended neck veins</li> <li>• Muffled heart sounds</li> <li>• May have dizziness, confusion, altered mental status</li> </ul>	<p>Pericardial tamponade occurs when fluid builds up in the sac around the heart. The pressure from this fluid can collapse the chambers of the heart and prevent them from filling, limiting the amount of blood the heart can pump.</p> <ul style="list-style-type: none"> <li>• Give IV fluid to improve heart filling. [See SKILLS]</li> <li>• Patients need immediate handover/transfer to an advanced provider for drainage of the fluid.</li> </ul>



- DISABILITY Problem → Primary Survey



Look for:

Check for :

- Conditions

# Disability



## Look for:

- confusion, lethargy or agitation
- seizures/convulsions
- unequal or poorly reactive pupils
- deformities of skull
- blood or fluid from ear or nose

## Check:

- AVPU or GCS
- movement and sensation in all extremities
- blood glucose level if confused or unconscious

- If GCS <9 (or for children, AVPU score of P or U), plan for rapid handover/transfer to a provider capable of advanced airway management.
- If patient is lethargic or unconscious, re-assess the airway frequently as above.
- Suspect spine injury or closed head injury with any trauma and altered mental status.
- Give oxygen if concern for hypoxia as a cause of altered mental status. [See SKILLS]
- Give glucose if altered mental status and: measured low blood glucose, unable to check blood glucose, or history of diabetes. [See SKILLS]
- If seizing, give a benzodiazepine. [See SKILLS]

CONDITION	SIGNS AND SYMPTOMS	IN-DEPTH MANAGEMENT
<b>Severe head injury</b>	<ul style="list-style-type: none"> <li>• Visual changes, loss of memory, seizures/convulsions, vomiting, headache</li> <li>• Altered mental status or other neurologic deficit</li> <li>• Scalp wound and/or skull deformity</li> <li>• Bruising to head (particularly around eyes or behind ears)</li> <li>• Blood or fluid from the ears or nose</li> <li>• Unequal pupils</li> <li>• Weakness on one side of the body</li> </ul>	<p>Brain injuries can range from mild bruising to severe bleeding in or around the brain. Because the skull is rigid, the bleeding cannot expand and causes increased pressure on the brain. If the pressure becomes too high, it will prevent blood from entering into the skull and perfusing the brain, and can squeeze part of the brain through the base of the skull, causing death. Any trauma to the brain can cause significant impact on function.</p> <ul style="list-style-type: none"> <li>• Always remember that head injuries can be associated with spinal injuries. Immobilize the spine and use the log-roll technique to examine the back of the body.</li> <li>• Use the Glasgow Coma Scale (or AVPU in children) to assess and monitor patients with head injury.</li> <li>• Be sure to frequently re-assess ABCDE.</li> <li>• If concern for open skull fracture, give IV antibiotics as per local protocol.</li> <li>• Always check glucose and administer as needed.</li> <li>• Do not give food or drink by mouth.</li> <li>• Plan for early handover/transfer to a facility with specialist care.</li> </ul>



**REMEMBER...** People who initially appear well may have hidden life-threatening injuries, such as internal bleeding. It is very important to re-assess trauma patients frequently using the primary survey. Once you find a primary survey problem and manage it, go back and repeat the primary survey to identify any new problems and make sure that the management worked. Ideally, the ABCDE approach should be rechecked every 15 minutes and with any change in condition.

**Vital signs should be checked at the end of the primary survey**

A full set of vital signs (blood pressure, heart rate, respiratory rate and oxygen saturation if available) should be performed after the primary survey. Do not delay primary survey interventions for vital signs.

- EXPOSURE Problem → Primary Survey



Look for ..

- Conditions

## Exposure



### ASSESSMENT

Remove all clothing.

Examine entire body for evidence of injury (including the back, spine, groin and underarms) using the log-roll manoeuvre.

### IMMEDIATE MANAGEMENT

- If spinal injury is suspected, perform log-roll manoeuvre to examine the back. [See SKILLS]
- Remove restrictive clothing and all jewellery.
- Remove any wet clothes and dry patient thoroughly.
- Cover the patient as soon as possible to prevent hypothermia. Acutely injured patients have difficulty regulating body temperature.
- Respect the patient and protect modesty during exposure.



## Airway



### ASSESSMENT

Can the patient talk normally? If YES, the airway is open.

If the patient cannot talk normally:

- look to see if the chest wall is moving and listen to see if there is air movement from the mouth or nose.
- listen for abnormal sounds (such as stridor, grunting, or snoring) or a hoarse or raspy voice that indicates a partially obstructed airway.
  - Stridor plus swelling and/or hives suggest a severe allergic reaction (anaphylaxis).
- Look and listen for fluid (such as blood, vomit) in the airway.
- Look for foreign body or abnormal swelling around the airway, and altered mental status.
- Check if the patient is able to swallow saliva or is drooling.

### IMMEDIATE MANAGEMENT

- If the patient is unconscious and not breathing normally and:
  - NO TRAUMA: open the airway using the **head-tilt and chin-lift** manoeuvre. [See SKILLS]
  - CONCERN FOR TRAUMA: maintain cervical spine immobilization and open the airway using the **Jaw thrust** manoeuvre. [See SKILLS]
  - Place an **oropharyngeal or nasopharyngeal airway** to maintain the airway. [See SKILLS]
- If a foreign body is suspected:
  - If the object is visible, remove it – be careful not to push the object any deeper.
  - If the patient is able to cough or make noises, keep the patient calm and encourage coughing.
  - If the patient is choking (unable to cough, not making sounds) use age-appropriate **chest thrusts/abdominal thrusts/back blows**. [See SKILLS]
  - If the patient becomes unconscious while choking, follow relevant **CPR** protocols.
- If secretions or vomit are present, **suction** when available, or wipe clean. Consider placing patient in the recovery position if the rest of the ABCDE is normal and no trauma is suspected. [See SKILLS]
- If the patient has swelling, hives or stridor, consider severe allergic reaction (anaphylaxis), and give **Intramuscular adrenaline**. [See SKILLS]
- Allow the patient to stay in a position of comfort and prepare for rapid **handover/transfer** to a centre capable of advanced airway management, if needed.

If the airway is open, move onto “Breathing”.

# The Cases...

**Angela Puspita**  
*Lecturer & Emergency Medicine Specialist*

**Faculty of Medicine – Hang Tuah University**  
**Mohammad Soewandhie General Hospital Surabaya**

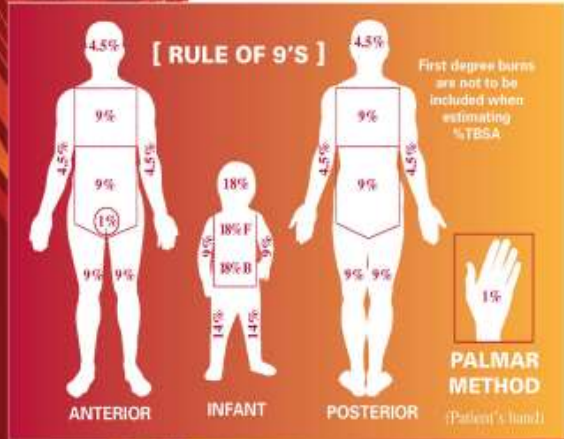




# EMERGENCY GUIDELINES

# -BURN-

For consultation or 24 hour transfer, contact The Burn Center at Saint Barnabas at 973.322.5920



### AMERICAN BURN ASSOCIATION GUIDELINES FOR TRANSFER

- Partial thickness (2°) burns > 10% TBSA
- Full thickness (3°) burns in any age group
- Burns to the face, hands, feet, genitalia or major joints
- Electrical Burns, Chemical Burns or Smoke Inhalation
- Patients with pre-existing serious medical history compromising outcome
- Patients with burns and concomitant trauma. Follow regional medical control and transfer/triage protocols
- Patients requiring extensive social, emotional or long-term rehabilitation support
- Pediatric burns without qualified personnel or equipment

### STOP THE BURNING PROCESS:

- Remove clothing and jewelry. Briefly flush all burns with tepid water no more than five minutes. Cover with a clean, dry sheet. Do not transport in wet dressings.
- Keep blisters intact. Do not apply ointments.
- Chemical Burns: Brush away dry powders first, irrigate profusely with running water, away from intact skin, for 20 minutes. Monitor for hypothermia while irrigating. Isolate and send victim's clothing for analysis.

### AIRWAY MANAGEMENT:

- Symptoms of smoke exposure may have a delayed onset. Beware of imminent respiratory distress.
- Administer 100% (humidified) oxygen by non-rebreather mask. Consider Albuterol or Racemic Epinephrine respiratory treatments.
- Obtain carboxyhemoglobin level with arterial blood gases.
- Consider orotracheal intubation with any respiratory symptoms. Check position of tubing with a chest x-ray. Take precautionary measures to prevent self-extubation. Be sure the ET tube is secure and in good position.

### INTRAVENOUS FLUID RESUSCITATION:

- Insert TWO large-bore I.V. lines. Secure with sutures if necessary.
- Infuse Lactated Ringer's solution (without dextrose).
- Calculate hourly infusion rate from time of injury: %TBSA x Kg body w + 4 Parkland Formula.
- Insert Foley Catheter.
- Adjust I.V. rate in order to maintain urine output between 1/2 to 1 ml/Kg/hr.

### ASSESSMENT AND PREPARATION:

- Take and document a complete history and physical.
- Associated injuries take priority over burns.
- Keep patient NPO. Consider nasogastric tube placement for burns >20%.
- Keep patient warm. Cover with dry blankets.
- Administer analgesia; I.V. Morphine Sulphate (1mg/10kg).
- Infection prophylaxis: tetanus immunization. Defer antibiotics if for burns only.

### SPECIAL CONSIDERATIONS:

- **THIRD DEGREE CIRCUMFERENTIAL BURNS:** assess distal circulation, remove jewelry. Evaluate for escharotomies as necessary. Contact The Burn Center.
- **HIGH VOLTAGE ELECTRICAL INJURIES:** suspect myoglobinuria or hemoglobinuria. Keep urine output at 100ml/hr and urine alkaline. Place on cardiac monitor. Record EKG. Beware compartment syndrome, consider fasciotomies. Contact The Burn Center.
- **FROSTBITE:** do not use heat. Warm gradually to room temperature.



The Burn Center at Saint Barnabas  
**973.322.5920**

## Managing Burns

- ### Things to consider when assess patients with burns.
- Airway (cervical spine!)
  - Breathing (Inhalation injury!)
  - Circulation
  - Disability & Neurological Status
  - Exposure
  - Fluid resuscitation



Keep the burn cool and the patient warm!



History may suggest other injuries!

- Road Traffic Accident
- Electrocution
- Jump or Fall
- Explosion



Peri-oral Burn? Need intubation? Inhalation Injury? Soot around mouth? Singed nasal hairs?

Don't be distracted by the burn. Look for OTHER LIFE THREATENING INJURIES!



Oxygen

Naso-gastric Tube

Carbon Monoxide Poisoning? Do an ABG

Fluids Follow parkland formula



? Lung Injury

? Circumferential Burns can lead to distal limb ischaemia!



X-rays

C-spine

Chest

Pelvis

Analgesia ? Morphine!

Remove Clothing & Jewellery

Catheter

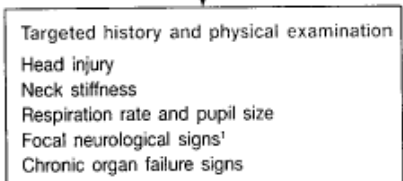
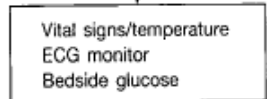
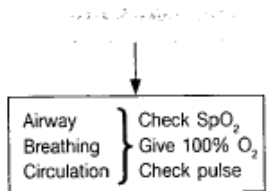


FIGURE 1 Approach to differential diagnosis of altered mental state

# -Altered Mental State-

**AMS cocktail:** consider its use in part or whole.

1. D<sub>50</sub>W 40 ml IV if patient is hypoglycaemic, followed by **infusion** of D<sub>10</sub>W over 3–4 hours.
2. Naloxone (Narcan®) 0.8–2.0 mg IV bolus.
3. Thiamine 100 mg IV bolus in alcoholics or malnourished patients.
4. Flumazenil (Anexate®) 0.5 mg IV bolus.
  - a. Can be repeated within 5 minutes if necessary.
  - b. Do not use empirically unless the history is **strongly against a mixed OD**. If the patient has been taking cyclic antidepressants or is taking chronic benzodiazepines for fits, unnecessary use of flumazenil may produce intractable fits.
5. **X-ray cross-table lateral film of C-spine** if trauma cannot be excluded.



**Structural causes**

**Toxic/metabolic causes**

Head trauma  
Intracranial haemorrhage

Non-head trauma  
Intracranial haemorrhage  
Subarachnoid haemorrhage<sup>2</sup>  
Brainstem stroke  
Cerebellar stroke  
Cerebral tumour

Febrile  
Cerebral abscess  
Meningitis  
Encephalitis  
Cerebral malaria  
Bacteraemia  
Septicaemia  
UTI in elderly  
Heat stroke  
Thyroid crisis

Afebrile  
*Poisons*  
Drug overdose:  
Opioids, BZD, barbiturate, TCA, ketamine, ecstasy  
Alcohol intoxication  
Wernicke's encephalopathy  
Carbon monoxide  
*Metabolic*  
Hypoglycaemia, cerebral hypoperfusion, hypercarbia, diabetic coma, myxoedema coma, hypothermia, dehydration, electrolyte and acid-base abnormalities  
*Organ failure*  
Uraemia, hepatic, respiratory, cardiac  
*Psychogenic*  
Psychogenic stupor<sup>3</sup>, dementia

**Notes:**

- <sup>1</sup> Structural causes usually have focal neurological signs whereas the toxic and metabolic causes do not.
- <sup>2</sup> Subarachnoid haemorrhage (SAH) usually does not have focal neurological signs. SAH and some of the toxic and metabolic causes may be accompanied by fever.
- <sup>3</sup> Psychogenic stupor is a dissociative state in which the patient is apparently fully conscious but makes no spontaneous movement and shows little response to external stimuli. It is usually related to major stressful events and the onset is sudden. Patient often has 'flickering' of eyelids. It is a diagnosis of exclusion.

# -Type of Shock-



## HYPOVOLEMIC

low circulating volume

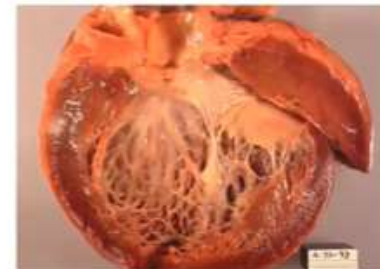


- Intravascular vol loss
- hemorrhagic
- fluid loss



## CARDIOGENIC

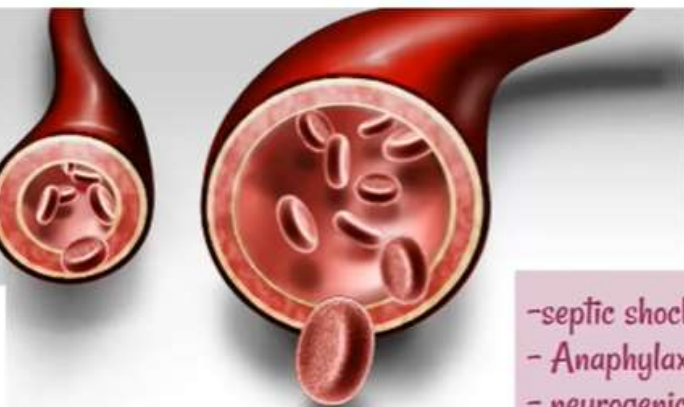
poor pump function



- Arrhythmia
- AMI, valve failure
- cardiomyopathy
- pericarditis/PE

## DISTRIBUTIVE

Vasodilatory- $\downarrow\downarrow$  SVR



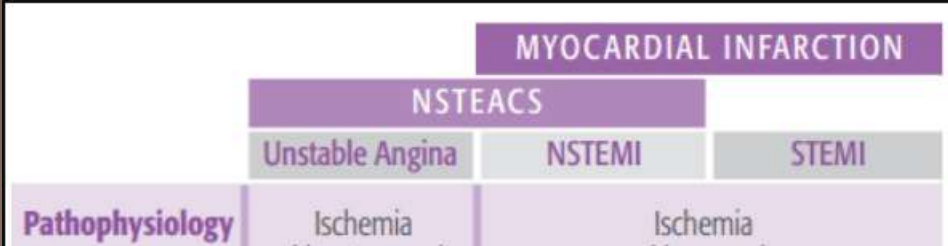
- septic shock/SIRS/TSS
- Anaphylaxis
- neurogenic shock



## OBSTRUCTIVE

extracardiac obstruction  
to blood flow

-A



**ACUTE CORONARY SYNDROME**

**ECG**

**TROPONINS**

	1 STABLE ANGINA	2 UNSTABLE ANGINA	3 NSTEMI	4 STEMI
	<p>Angina pain develops when there is increased demand in the setting of a stable atherosclerotic plaque. The vessel is unable to dilate enough to allow adequate blood flow to meet the myocardial demand.</p> <p>Demand ischemia, no infarct</p>	<p>The plaque ruptures and a thrombus forms around the ruptured plaque, causing partial occlusion of the vessel. Angina pain occurs at rest or progresses rapidly over a short period of time.</p> <p>Supply ischemia, no infarct</p>	<p>During an NSTEMI, the plaque rupture and thrombus formation causes partial occlusion to the vessel that results in injury and infarct to the subendocardial myocardium.</p> <p>Subendocardial infarct</p>	<p>A STEMI is characterized by complete occlusion of the blood vessel lumen, resulting in transmural injury and infarct to the myocardium, which is reflected by ECG changes and a rise in troponins.</p> <p>Transmural infarct</p>
	Normal	Normal, Inverted T waves, or ST depression	Normal, Inverted T waves, or ST depression	Hyperacute T waves or ST elevation
	Normal	Normal	Elevated	Elevated

- education can improve mortality outcomes.
- Exercise training
  - Eating healthily
  - Quitting smoking
  - Losing weight

- secondary prevention
- Aspirin
  - Statins
  - ACE-Is
  - P2Y12 receptor antagonist
  - β blockers
  - Angiotensin receptor blockers

- ICD
- defibrillator may be required if
  - Ventricular tachycardia / Ventricular fibrillation 24 hours or more after admission
  - or
  - Ejection fraction less than 35% 6–12 weeks after ACS

• Observation or dynamic troponins is more informative (repeat or continuous monitoring).  
 • \*\* Useful for confirmation, but availability of cTn test result should not delay therapeutic intervention.

- tirofiban (Aggrastat)
- roxifiban.
- orbofiban.



**AV Conduction Defects**

**1° AV Block**  
Consistent delay in conduction, PR interval > 0.20 s.

**2° AV Block Mobitz Type I**  
Intermittent conduction failure with missing QRS complexes, progressive prolongation of PR interval until a P wave is blocked.

**2° AV Block Mobitz Type II**  
Intermittent failure of the AV conduction, the PR interval remains within normal limits.

**3° AV Block (Total Block)**  
Complete conduction block of all electrical impulses between atria and ventricles, atria and ventricles beat independently.

**Right Atrial Enlargement**  
Elevated, peaked P wave > 0.2 mV, particularly in II, III and aVF.

**Right Ventric. Hypertrophy**  
Sokolow index:  $R_{V2} + S_{V3} > 1.05$  mV; right axis deviation, sometimes RBBB-like ECG.

**Left Ventric. Hypertrophy**  
Sokolow index:  $S_{V2} + R_{V5} > 3.5$  mV; left axis deviation.

**Carditis, Cardiomyopathy**

**Acute Pericarditis**  
Simultaneous ST elevations on the anterior and posterior wall, typically originating from the S wave, can be misinterpreted as myocardial infarction.

**Hypertrophic (Obstructive) Cardiomyopathy**  
Signs of left ventricular hypertrophy (Sokolow index), varying ST segment changes without classic localization and deep inverted T waves.

**Dilated Cardiomyopathy**  
Nonspecific repolarization disturbances.

**Electrolyte Disturb., Drugs**

**Hypokalemia**  
Repol. disorder, ST depression, prominent U, may merge into TU waves.

**Hyperkalemia**  
Tall, peaked T waves that later flatten, broad QRS complex. Finally, tachycardic arrhythmias can occur resulting in bradycardia and asystole.

**Hypocalcemia**  
Prolongation of the QT interval.

**Hypercalcemia**  
Shortening of the corrected QT interval (QTc).

**ECG Changes Ind. by Digitalis**  
Shallow ST depressions, AV blocks possible.

**Long QT Syndrome**  
Abnormal prolongation of the corrected QT interval.

**Myocardial Ischemia**

**Angina**  
Horizontal or descending ST depression in the reflecting leads.

**Forms of ST Depression and J point**

1) upward sloping  
2) horizontal  
3) downward sloping

1) normal finding (strong physical activity)  
2) +3) typical for myocardial ischemia

**Stages of Myocardial Infarction**

Stage	Age	ECG	Criteria
Early Stage	A few minutes		Tall T waves
Stage I	Up to 6 hours		ST elevation R waves Minimal Q wave
Intermediate Stage	> 6 hours		ST elevation with T wave inversion Loss of R wave, infarct Q
Stage II	Days		Infarct Q T wave inversion ST normalization
Stage III	Residual		Persistent Q Loss of R wave T normalization

**Reflecting and Reciprocal Leads**

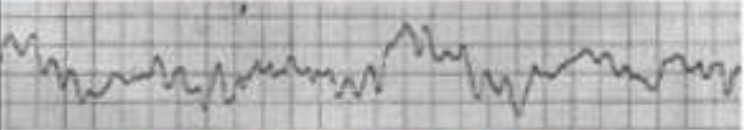
anterior wall  $V_1-V_4$       inferior wall II, III, aVF  
Anterior Wall Infarction      Inferior Wall Infarction

**Infarct Localisation**

	I	II	III	aVL	aVF	V1	V2	V3	V4	V5	V6
Apical	•	•	•	•	•	•	•	•	•	•	•
Anteroseptal	•	•	•	•	•	•	•	•	•	•	•
Anterolateral	•	•	•	•	•	•	•	•	•	•	•
Posterolateral	•	•	•	•	•	•	•	•	•	•	•
Inferior	•	•	•	•	•	•	•	•	•	•	•
Right ventr.	•	•	•	•	•	•	•	•	•	•	•

**Non-Q-Wave Myocardial Infarction**  
Subendocardial infarction of the anterior wall with T wave inversion over anterior precordial leads, no ST elevations, no R loss, no Q waves.

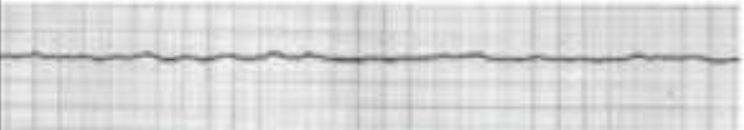
## Cardiac Arrest Rhythms



**Coarse Ventricular Fibrillation**  
(Note the chaotic, irregular electrical activity)



Shock



**Fine Ventricular Fibrillation**  
(Note the low-amplitude, irregular electrical activity)



Shock



**Ventricular Tachycardia**  
(Note the rapid, wide complexes)



Shock if no pulse



**Asystole**  
(Note the absence of electrical activity)



CPR

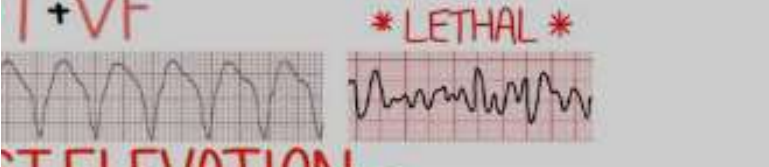
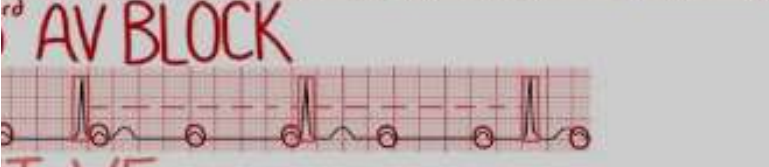
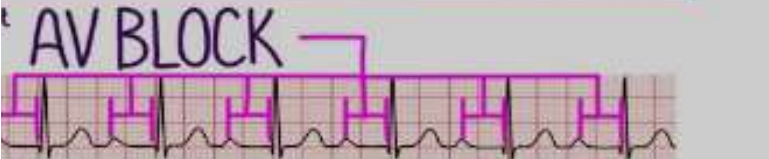


**Pulseless Electrical Activity (PEA)**  
(Any organized ECG rhythm with no pulse)



CPR

## ECG RHYTHMS



Reference level for measuring ST segment deviation (depression, elevation) is the R segment, which is the baseline (isoelectric line) of the ECG.

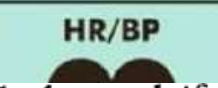
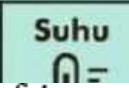
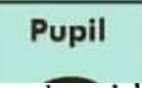

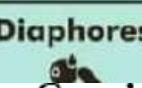
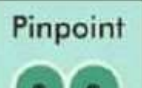





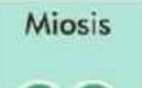
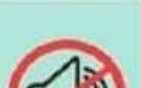





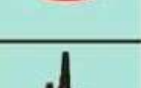



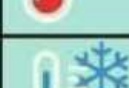

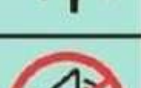
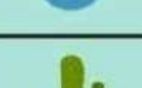


Toxin Causing Intoxication	Antidote
Gold	Dimercaprol
Anticoagulants	Vitamin K, Fresh Frozen Plasma
Anticholinergic drugs	Physostigmine
Antimony compounds	Dimercaprol
Arsenic	Dimercaprol, Penicillamine
Copper	Dimercaprol, Penicillamine
Benzodiazepines	Flumazenil
Betablockers	Glucagon
Bismuth	Dimercaprol
Mercury	Dimercaprol, Penicillamine
Zinc	Dimercaprol
Iron	Desferrioxamine
Digoxin	Digoxin Binding Antibody
Ethylene Glycol	Ethanol
Heparin	Protamine
Hydrochloric Acid	Calcium
Hydrogen Sulfide	Sodium Nitrite
Isoniazid	Pyridoxine
Calcium Antagonist	Calcium
Carbamate	Atropine
Carbon Monoxide	Oxygen
Lead	Dimercaprol, Penicillamine
Metoclopramide	Prochlorperazine
Methanol	Ethanol
Methemoglobinemia	Methylene Blue
Methotrexate	Folic Acid
Nickel	Dimercaprol
Opioid Analgesics	Naloxone
Organophosphate	Atropine, Pralidoxime
Paracetamol	N-Acetylcysteine
Sympathomimetics	B Blocker

## Gambaran Klinis Intoksikasi

74

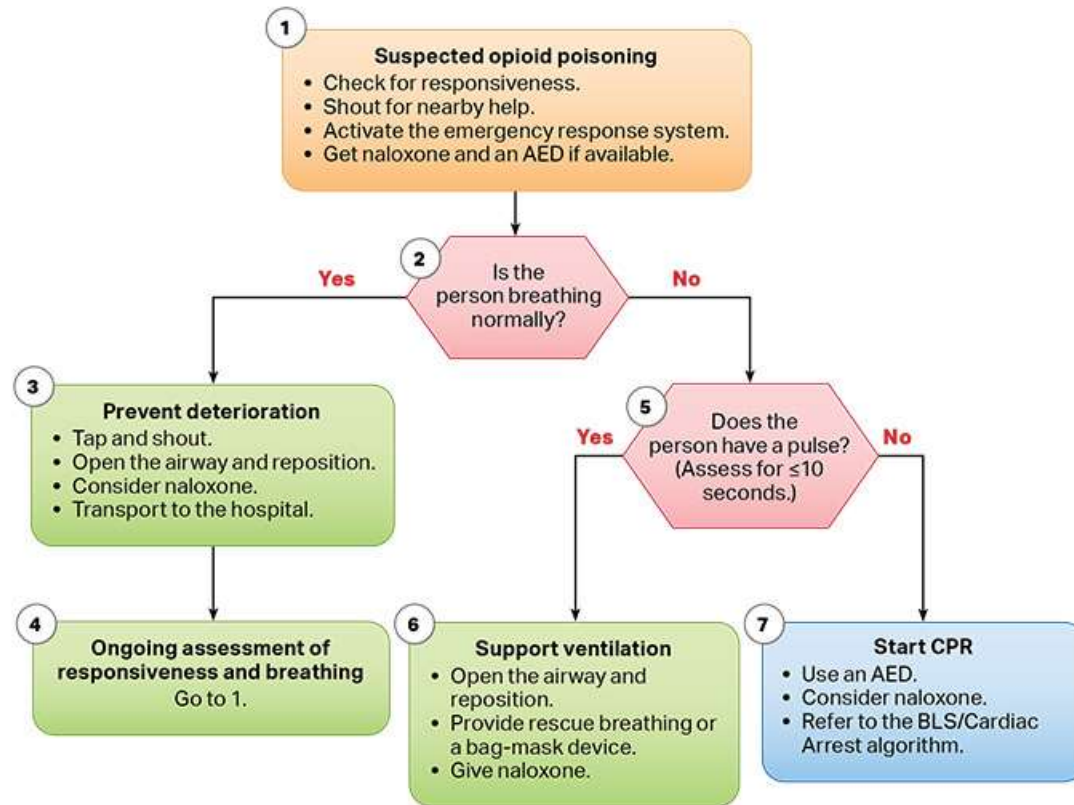
Administer **activated charcoal** if the time of ingestion is within 4 hours. **Gastric lavage** is limited to large ingestions or mixed ingestions within an hour. However, the airway must be protected and the patient intubated, if necessary, during gastric lavage or activated charcoal administration.

	HR/BP	Resp	Suhu	Pupil	Saluran Cerna	Diaphoresis
atropin, scopolamine Antihistamin: diphenhidramin		Tetap				
<b>Kolinergik</b> Organofosfat, carbamates	<b>Muskarinik</b> (bradikardia) <b>Nikotinik</b> (taki dan HTN)	Tetap	Tetap	Pinpoint 		
<b>Opioid</b> Morfin, heroin, hidromorfon, oksikodon, metadon				Miosis 		
<b>Simpatomimetik</b> Kokain, amfetamin				Midriasis 		
<b>Sedatif-Hipnotik</b> Benzodiazepin, barbiturat				Tetap 		



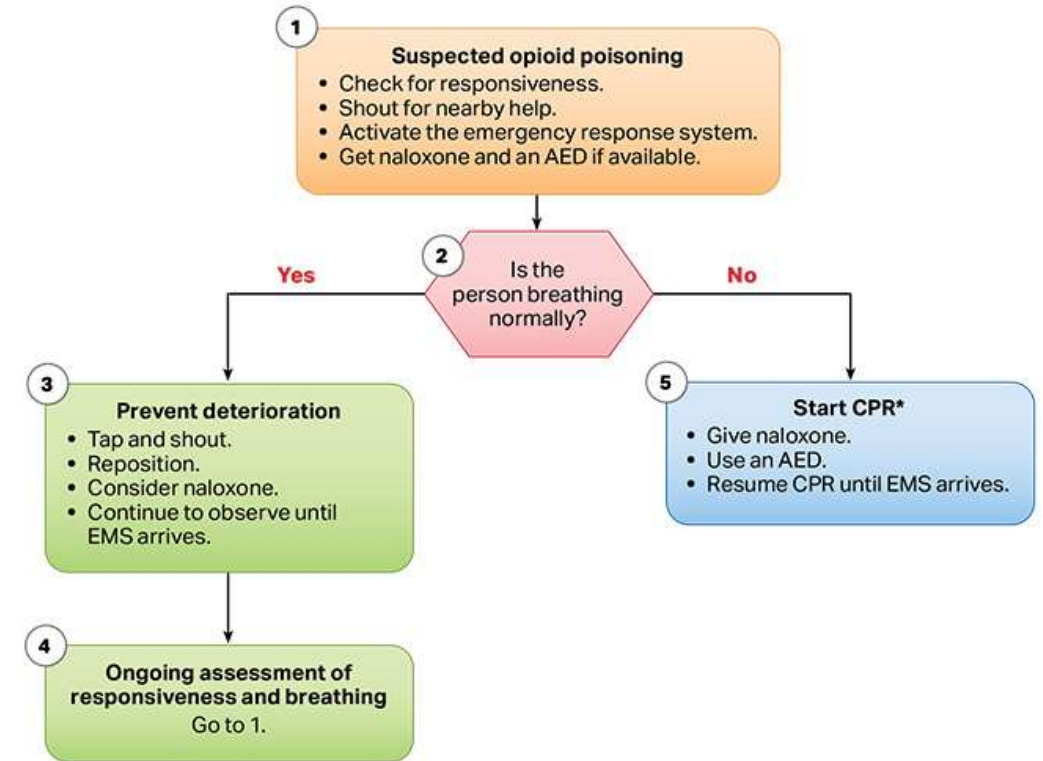
# Keracunan opioid

## Opioid-Associated Emergency for Healthcare Providers Algorithm



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## Opioid-Associated Emergency for Lay Responders Algorithm



\*For adult and adolescent victims, responders should perform compressions and rescue breaths for opioid-associated emergencies if they are trained and perform Hands-Only CPR if not trained to perform rescue breaths. For infants and children, CPR should include compressions with rescue breaths.

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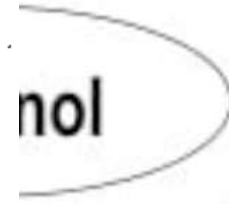
• **IV flumazenil** in a dose of 0.2 mg given over 30 seconds can be administered depending on the response and repeated until a total dose of 0.5 mg is given. As its effects are generally short-lived, repeat doses may be required. However, the **contraindications** in using it are:

1. If there is **concomitant tricyclic anti-depressant overdose** where reversal of benzodiazepine effects may precipitate status epilepticus induced by the former.
2. Patients who are **addicted to benzodiazepines**, whereby flumazenil can precipitate withdrawal reaction, manifested by seizures and autonomic instability.
3. Patients who may already be predisposed to developing seizures, e.g. those who have injuries or are known epileptics.

• If the history is not accurate, then the administration of IV thiamine, IV 50% dextrose and IV naloxone should be considered in patients presenting with altered mental state. **Specific points in the management of methanol and ethylene glycol poisoning**

- Metabolic acidosis must be treated aggressively with intravenous sodium bicarbonate. The outcome correlates directly with keeping the serum pH levels >7.2–7.3.
- The inhibition of alcohol dehydrogenase (ADH) is now the mainstay of treatment of poisoning by these two agents.
- **Fomepizole** (antizol, 4-MP) is a potent inhibitor of ADH that has many advantages over ethanol, the historically preferred antidote. Its advantages are as follows:
  1. An affinity for ADH 8000 times greater than that of ethanol.
  2. A longer duration of action.
  3. Easier dosing with more predictable kinetics.
  4. A wider therapeutic index.
  5. Avoidance of the side effects seen with ethanol administration, i.e. headache, nausea and dizziness.
  6. Reduction in the need for haemodialysis.
- The principal disadvantage of fomepizole is its cost.
- **Intravenous ethanol**, though outdated, still has application if fomepizole is unavailable, or haemodialysis is not indicated, but the side effects of central nervous system depression, hypotension, hypoglycaemia and electrolyte disturbance require close monitoring in an intensive care unit setting.

1. It is effective because ADH has an affinity for ethanol 15 times greater than its affinity for methanol (60–70 times greater than its affinity for ethylene glycol).



**All** are found in a variety of household products:

1. **Methanol:** Windshield washer fluid, model airplane fuel, photocopying fluid, paint and illicitly-brewed alcohol or 'moonshine'.
2. **Ethylene glycol:** Automotive anti-freeze, brake and hydraulic fluids, deodorizers, lacquers and paints.
3. **Isopropyl alcohol:** Rubbing alcohol, lacquers and as a solvent in many household cosmetic and topical pharmaceutical products.

2. A **10% intravenous solution** is administered via a central venous catheter to maintain a serum concentration of 100 mg/dl.
3. **Oral alcohol** can be used if no intravenous source is available; the goal is to give 0.7 g/kg as a loading dose and **0.12 g/kg/hr** as a maintenance dose by administering any common alcoholic beverage using the following conversion:

$$\text{Grams of ethanol} = \text{Volume of beverage in ml} \times 0.9 \times \text{Proof}/200$$

However, oral ethanol should not be used if the patient is obtunded or has no gag reflex.

*Indications for methanol and ethylene glycol toxicity*

**Indications for haemodialysis** (removes both parent compounds and their toxic by-products)

- Severe metabolic acidosis that is not correctable with intravenous sodium bicarbonate.
- Impending renal failure.
- End-organ toxicity, e.g. vision changes, fits and coma.
- Haemodynamic instability.
- Worsening electrolyte imbalance.

### Drug therapy

- **Activated charcoal** via gastric lavage tube.

**Dosage:** 1 g/kg body weight.

- **Atropine:** First drug to be given in the treatment of symptomatic poisoning.

1. Its major use is in the reduction of bronchorrhoea/bronchospasm.
2. Large doses may be needed to control airway secretions.

**Dosage:** Adult: 2 mg IV q 10–15 minutes as needed (prn); the child: 0.05 mg/kg q 10 minutes until secretions have been controlled or signs of atropine toxicity (flushed and dry skin, tachycardia, mydriasis, and dry mouth).

Children: 0.05 mg/kg body weight q 10 minutes until secretions

PARVOLEX® (N-ACETYLCYSTEINE) IV INFUSION

*Dosage in adults (Table 1)*

TABLE 1 Treatment with Parvolex®

PATIENT'S BODY WEIGHT (kg)	Volume of Parvolex® (ml)			
	INITIAL 150 mg/kg in 200 ml of 5% dextrose in 15 minutes	SECOND 50 mg/kg in 500 ml of 5% dextrose in 4 hours	THIRD 100 mg/kg in 1 litre of 5% dextrose in 16 hours	TOTAL PARVOLEX (ml)
50	37.5	12.5	25	75
60	45.0	15.0	30	90
70	52.5	17.5	35	105
80	60.0	20.0	40	120
90	67.5	22.5	45	135
x	0.75x	0.25x	0.5x	1.5x

- Initial dosage: 150 mg/kg IV over **15 minutes**, followed by continuous infusion (50 mg/kg in 500 ml of 5% dextrose in **4 hours**), followed by continuous infusion (100 mg/kg in 1 litre 5% dextrose over **16 hours**).
- Total dosage: 300 mg/kg in 20 hours.

- **Pralidoxime (2-PAM® or Protopam®)**

1. Pralidoxime should be given with atropine to every symptomatic patient.
2. Effects will be apparent within 30 minutes and include the disappearance of convulsions and fasciculations, improvement in muscle power, and recovery of consciousness.
3. The administration of pralidoxime usually necessitates reduction in the amount of atropine given and may unmask atropine toxicity.

**Dosage:** Adult: 1 gm IV over 15–30 minutes; can be repeated in 1 to 2 hours as needed.

Children: 25–50 mg/kg/body weight IV over 15–30 minutes; can be repeated in 1 to 2 hours.

Respiratory arrest, half the dosage

1 to control convulsions.

of convulsions.

- Paracetamol is the commonest drug used. A dose of 7.5 g is used empirically as a threshold dose.

- **Toxicity** has been shown to occur in children (15 tablets) in an average-sized adult.

# - Neurology -

- Acute stroke is characterized by the sudden onset of focal neurological deficits, usually referable to a brain vascular territory. Common clinical presentations include hemiparesis, hemisensory loss, facial weakness, dysarthria, aphasia, and visual disturbance, occurring alone or in combination.
- **Strokes are classified** as follows (refer to Table 1):
  1. **Ischaemic** strokes (IS, 70–90%, higher incidence in Caucasians). Common aetiologies include large artery atherothrombosis, cardioembolism, and small vessel disease (lacunar strokes).
  2. **Haemorrhagic** strokes, which are **intra-cerebral haemorrhage** (higher incidence in non-Caucasian ethnic groups), and **subarachnoid haemorrhage** (about 2%).

is numb.

TABLE 1 Clinical features of three types of stroke

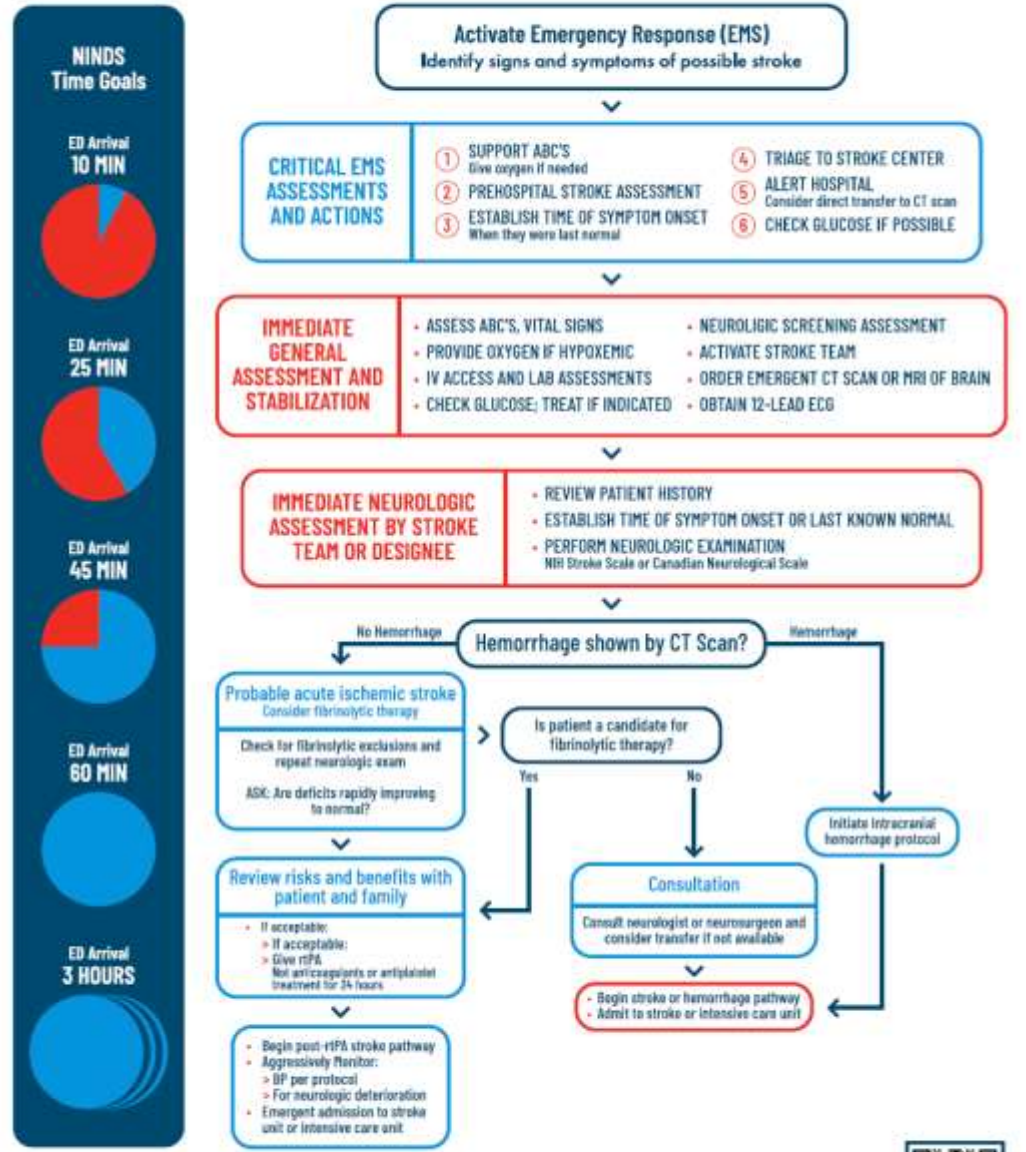
Clinical features	Types of stroke		
	Haemorrhagic	Thrombotic	Ischaemic Embolitic
Onset	Sudden	Gradual	Sudden
Conscious level	Often decreased	Often normal unless large	Often normal
Headache	Usually +	+/-	Usually -
Nausea, vomiting	++	Usually -	Usually -
Past medical history	Hypertension On anti-coagulants Coagulopathies	Similar factors for coronary artery disease	Atrial fibrillation
Vital signs	Usually severe hypertension	Usually moderate or normal blood pressure	Variable blood pressure but usually no hypertension

+ = Present  
- = Absent









CATEGORY

1a. Level of consciousness

Alert, Drowsy, etc

1b. LOC Questions

Month, age

1c. LOC Commands

Open/close eyes, make a fist & let go

2. Best Gaze

Eyes open - pt follows examiner's fingers or face.

3. Visual

Introduce visual stimulus/threat to pt's field quadrants. Cover 1 eye and hold fingers in all 4 quadrants.

4. Facial Palsy

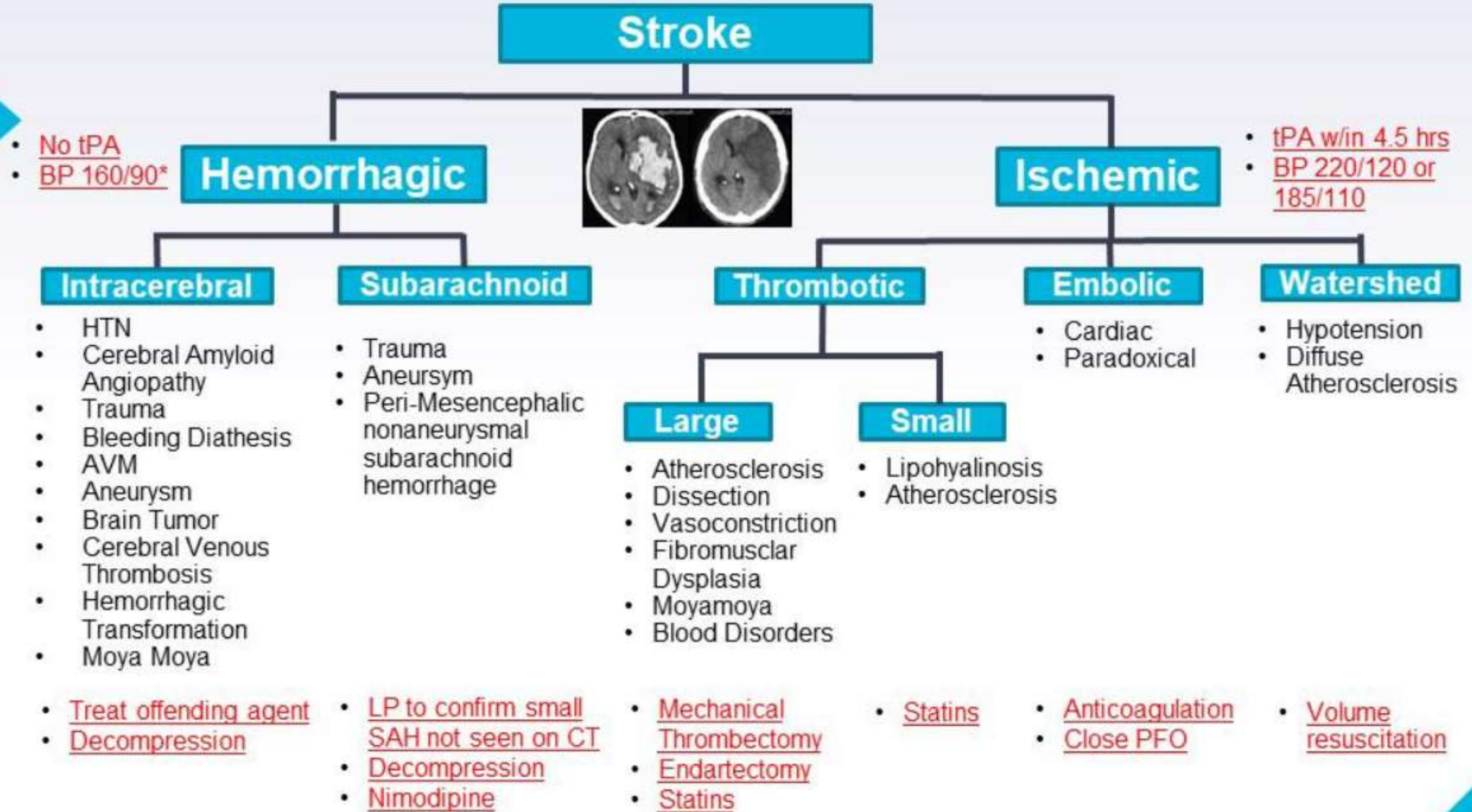
Show teeth, raise eyebrows and squint eyes tightly shut.

5.a Motor Arm - Left

Elevate extremity to 90 degrees and drift/movement. Count to 10 out loud fingers for visual cue.

5.b Motor Arm - Right

Elevate extremity to 90 degrees and drift/movement. Count to 10 out loud fingers for visual cue.





- **Pre-eclampsia:** Elevation of the systolic or diastolic blood pressure that occurs after the 20th week up until the 24th week of pregnancy in a previously normotensive or hypertensive woman, in association with proteinuria (0.3 g/24 hr) with/without oedema.
- **Eclampsia:** Grand mal seizures (fits) or com

**FIGURE 2.** Case Definitions of Preeclampsia, Severe Preeclampsia, and Eclampsia According to National Protocol, Bangladesh



Abbreviation: dBP, diastolic blood pressure.

• **Clinical features** of severe pre-eclampsia (in addition to hypertension and proteinuria) are:

1. Symptoms of severe headache.
2. Visual disturbances.
3. Epigastric pain and/or vomiting.
4. Signs of clonus.
5. Papilloedema.
6. Liver tenderness.
7. Platelet count falling to  $<100 \times 10^9/L$ .
8. Abnormal liver enzymes (alanine transaminase, ALT, or aspartate transaminase, AST  $>70$  IU/L).
9. HELLP syndrome (see below).

• **HELLP syndrome** is a very severe form of pre-eclampsia characterized by:

1. Haemolysis.
2. Elevated liver enzymes.
3. Low Platelets ( $<100,000/mm^3$ ).

# Post-Partum Hemorrhage (PPH): Pathogenesis and clinical findings

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Alina Constantin\*  
\*MD at time of  
publication

**Note:**  
• Remember the four T's that cause PPH: **tissue, thrombus, tone, trauma**  
• Uterine atony accounts for 70% of all PPH cases

**Note:**  
• Following resuscitation for PPH (using only crystalloid solutions or packed red blood cells), a dilutional coagulopathy may occur (fluids given dilute out endogenous clotting factors) → this can exacerbate the bleeding

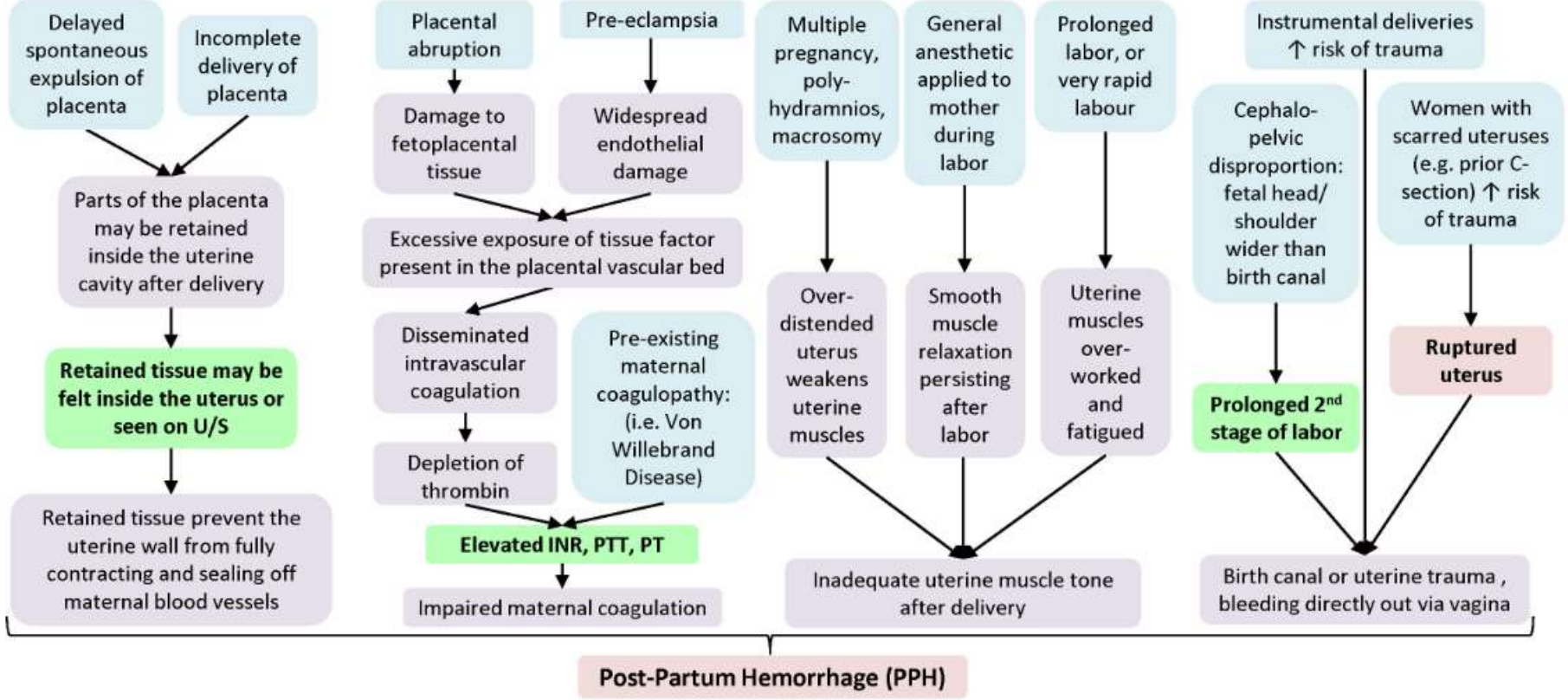
- Assemble local Alert haematologist
- ACTIONS**
- Left lateral position  
High flow oxygen
- Intravenous access  
Two large bore cannulae  
Take blood samples (FBC, clotting screen, fibrinogen), Kleihauer cross match 4 units
- Rapid fluid replacement  
Two litres of crystalloid  
Hartmann's or 0.9% saline  
Consider cell salvage
- Significant pain, uterine tenderness may indicate major trauma
- Umbilical vessels (la...)
- From pre...

**Tissue:** complete detachment and expulsion of the placenta is required to enable adequate uterine contractions and blood vessel occlusion

**Thrombus:** fibrin deposition at the placental attachment site and occlusion of the placenta-supplying vessels are critical to limit post-partum bleeding

**Tone:** the blood supply to the placenta passes through the myometrium, and is normally occluded as the uterine muscle fibers contract after delivery

**Trauma:** the uterus and birth canal are exposed to significant forces during delivery that normally cause a small amount of damage to these tissues



**After birth**  
Significant increased risk of...  
ive management of third...  
e is recommended...  
mmence IV oxytocin...  
sion after birth (40IU as per...)

incident and management  
the woman and her family



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Terimakasih

