

# ABCDE - approach to the critically ill patient

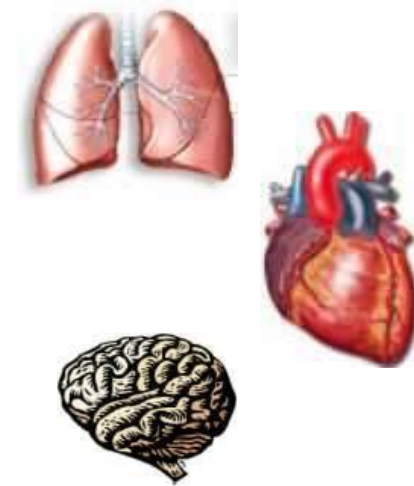
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MedEd and Simulation Center JFMED CU

# Vital functions

1. Ventilation - airways
2. Cardiovascular system activity (circulation)
3. Central nervous system (responsiveness)

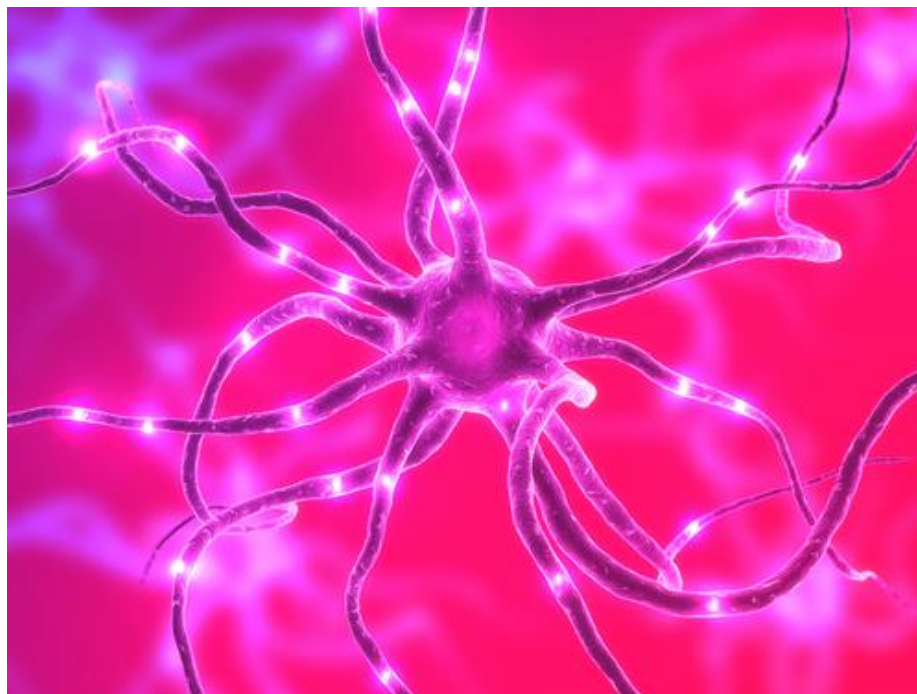


What is the diagnosis of failure of basic life functions?

The symptoms are always the same !!!

Support of basic life functions is needed

Cardiopulmonary resuscitation



# Consciousness

- active state of awareness of oneself and the environment and a set of responses to stimuli from that environment and internal signals
- state in which the person is awake , and is able to **detect, perceive, evaluate and respond to** the stimuli from the outside & inside of the body
- **arousal, and orientation in the time, space, and condition** - are the most sensitive indicators of the function of the CNS.
- in healthy subjects the consciousness could be changed during sleep, or hypnosis

the correct interpretation of reality – connection to reality - responsiveness

# Consciousness has two major components

- arousal and content of thoughts - the ability to think
- arousal depends on the activity of ARAS
- the content of the thinking process requires activity of the cerebral cortex.
- both components depend on connections between ARAS with other structures within the brainstem, thalamic nuclei and cerebral cortex.
- **ARAS – ascending reticular activating system** – is a part of reticular formation localized within the brainstem, contains both ascending and descending pathways and has connections with many areas of CNS. Its main function is to keep us awake.

## Mechanisms affecting ARAS neurons

- Damage of the brainstem is manifested by progressive rostro-caudal lack of the functions of particular „centers“ or nuclei localized within the brainstem
- metabolic changes
- destructive processes (tumor, apoplexia)
- ischemic damage (vertebral arteries)
- compressive damage (ICH)
- those types of neuronal injury could lead to unconsciousness

# Qualitative disorders

**A: qualitative disorders** are related to the content of thoughts, how appropriate or not it is

This kind of disorder is characterized by abnormal inappropriate content of thoughts, abnormal perception of the stimuli from outside, abnormal processing of those stimuli, and therefore abnormal evaluation and inappropriate reactions to them

These problems are predominantly in the scope of psychiatry but is also present in patients with generalized metabolic disorders, withdrawal syndrome, intoxications, and so on

# Qualitative disorders – level of consciousness

- Level of consciousness is the most critical clinical index of nervous system function of dysfunction
- An individual who is alert and oriented to self, others, place, and time is considered to be functioning at the highest level of consciousness

# Quantitative disorders of consciousness – how much awake the patient is



- **Confusion** – loss of ability to think quickly, and clearly, impaired judgement and the decision-making, which can be followed by disorientation to place and memory problems
- **Lethargy** – very slight disorder when an individual is sleepy but arousable with certain difficulties, a little slow mental performance may be present
- **Obtundation** – mild to moderate reduction in arousal, with limited responses to the environment, patient is passive, sleepy, falls asleep unless stimulated verbally or by tactile stimuli, questions answered with minimal verbal response

# Quantitative disorders of consciousness – how much awake the patient is

- **Stupor** – profound lethargic sleep or unresponsiveness from which the person may be aroused or caused to respond motor-wise or verbally only by vigorous and repeated stimulus, response is often a withdrawal or grabbing at a stimulus, arousal is very short, with no verbal communication
- **coma** – patient does not respond to any external stimuli, no verbal or motor responses to the external environment, including painful stimulation, no arousal at any stimulus
- affection of the autonomic nervous systems changes according to the coma severity, pupils are narrowed, do not respond to light, and corneal reflex disappears. Deep coma is characterized by lack of defensive reflexes. Coma is serious life endangered situation, no matter what is the underlying condition – disease or pathological process, trauma.....

# Causes of unresponsiveness

- A. Alcohol
- E. Epilepsy
- I. Intoxication
- O. Lack of oxygen
- U. Uremia
- T. Trauma
- I. Infection
- P. Psychiatric
- S. Sugar (hypoglycaemia) Stroke, Syncope

# Glasgow coma scale

| Glasgow Coma Scale -2014 terminology |                  |           |
|--------------------------------------|------------------|-----------|
| Action                               | Response         | Score     |
| Eye Opening                          | Spontaneous      | 4         |
|                                      | To Sound         | 3         |
|                                      | To Pressure      | 2         |
|                                      | None             | 1         |
|                                      | Not Testable     | <b>NT</b> |
| Verbal                               | Orientated       | 5         |
|                                      | Confused         | 4         |
|                                      | Words            | 3         |
|                                      | Sounds           | 2         |
|                                      | None             | 1         |
|                                      | Not Testable     | <b>NT</b> |
| Motor                                | Obey commands    | 6         |
|                                      | Localising       | 5         |
|                                      | Normal Flexion   | 4         |
|                                      | Abnormal Flexion | 3         |
|                                      | Extension        | 2         |
|                                      | None             | 1         |
|                                      | Not Testable     | <b>NT</b> |

# AVPU scale

|                         |                                               |
|-------------------------|-----------------------------------------------|
| <b>A</b> = Alert        | • <b>Alert</b> and Conscious                  |
| <b>V</b> = Verbal       | • Responds to <b>Verbal</b> stimulus          |
| <b>P</b> = Pain         | • Responds to <b>Painful</b> stimulus         |
| <b>U</b> = Unresponsive | • <b>Unresponsive</b> to any form of stimulus |

# AVPU scale

## A – Alert

The first check should consist of questions assessing the patient's level of consciousness. You should avoid asking yes or no questions. Instead, ask questions that require a little more cognitive effort, such as:

**What's the time? What's the date? Where are we? What happened?**

The answers don't really need to be correct. A patient can still count as alert even if they're confused or disoriented. You're checking the ability to respond, not quizzing them.

## V – Vocal Commands

Suppose the patient can't answer your questions promptly and with discernible words. In that case, they qualify as below alert and the emergency services should be called. You should continue to speak to them, however, to determine their level of consciousness. Give them vocal commands such as:

**Open your eyes, Tell me your name, Move your arm (or other body part)**

Ideally, a patient will respond to your commands with the correct action. But there might be other non-verbal responses. Monitor the patient for any of these reactions to your instructions: **Eye movement, Grunts or moans**

**Basic motor functions, such as limb movement**

# AVPU scale

## P – Pain

Try to get a response by using a pain stimulus technique, such as:

- Squeezing the patient's fingers
- Applying pressure to the bed of the casualty's fingernail
- Pinching the casualty's ear

A conscious patient should be able to locate the pain and will attempt to push you away or move to protect themselves. However, it's more likely the patient will respond with an involuntary grunt or movement.

If there's no response whatsoever, you know the situation is critical.

## U – Unresponsive

A patient is considered unresponsive if there is no response (eye movement, limb movement, or vocalization) to your previous checks.

Unresponsive patients should be put into the recovery position immediately to keep their airways clear. As urgent medical care is needed, you must also contact the emergency services as soon as possible (or ask someone else to) if you haven't already.

# AVPU scale

**AVPU** was the original method of rapidly assessing the level of consciousness, and this scale is still commonly referred to. With the development of **NEWS2**, new-onset confusion ('C') was added to the score to make **ACVPU**.

Patients who develop new or worsening confusion (e.g. delirium) are at risk of **deterioration**. Therefore, identifying and implementing appropriate treatment for these patients is important.

|          |                                                                          |
|----------|--------------------------------------------------------------------------|
| <b>A</b> | <b>Alert</b><br>• Fully awake                                            |
| <b>C</b> | <b>Confusion (new)</b><br>• New-onset or worsening confusion             |
| <b>V</b> | <b>Voice</b><br>• Responds to verbal stimulus                            |
| <b>P</b> | <b>Pain</b><br>• Responds to pain stimulus (e.g. supra-orbital pressure) |
| <b>U</b> | <b>Unresponsive</b><br>• No response to verbal or pain stimulus          |

NEWS2 is the latest version of the National Early Warning Score in UK e.g.

# Assessment of vital signs - examination with the ABCDE systematic approach + support (treatment)



| ABCDE chart                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                         |                                                              |
|-----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
|                                                                                               | EXAMINATION                                                                                                                                                                                                                                                                                                                                                                           | INTERVENTION                                                                                                                                                                                            | GOAL                                                         |
| <b>A</b>    | <ul style="list-style-type: none"> <li>• airway noises</li> <li>• position of head</li> <li>• foreign body</li> <li>• fluid, secretions</li> <li>• oedema</li> </ul>                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>• open</li> <li>• suction</li> <li>• secure</li> <li>• O<sub>2</sub></li> </ul>                                                                                  | <b>Patent<br/>airway</b>                                     |
| <b>B</b>    | <ul style="list-style-type: none"> <li>• look - listen - feel approach</li> <li>• respiratory rate and effort</li> <li>• breath and added sounds</li> <li>• subcutaneous emphysema</li> <li>• symmetry of chest movement</li> <li>• tracheal deviation</li> <li>• jugular vein distention</li> <li>• cyanosis</li> </ul> <p>SpO<sub>2</sub> - ETCO<sub>2</sub> - USG - X-ray - CT</p> | <ul style="list-style-type: none"> <li>• O<sub>2</sub> according to SpO<sub>2</sub></li> <li>• pneumothorax therapy</li> <li>• inhalation therapy</li> <li>• ventilation</li> </ul>                     | <b>Sufficient<br/>oxygenation<br/>and ventilation</b>        |
| <b>C</b>    | <ul style="list-style-type: none"> <li>• heart rate</li> <li>• blood pressure</li> <li>• capillary refill time</li> <li>• bleeding</li> <li>• skin colour</li> <li>• blood samples</li> <li>• diuresis</li> </ul> <p>ECG - USG - CT - X-ray</p>                                                                                                                                       | <ul style="list-style-type: none"> <li>• I.V. / I.O. access</li> <li>• control of bleeding</li> <li>• massive haemorrhage protocol</li> <li>• fluids</li> <li>• drugs</li> <li>• transfusion</li> </ul> | <b>Stabilization<br/>of circulation</b>                      |
| <b>D</b>   | <ul style="list-style-type: none"> <li>• AVPU / GCS</li> <li>• reactivity and symmetry of pupils</li> <li>• blood glucose level</li> <li>• basic neurological examination</li> <li>• posture</li> <li>• toxicological examination</li> </ul>                                                                                                                                          | <ul style="list-style-type: none"> <li>• glucose</li> <li>• antidotes</li> </ul>                                                                                                                        | <b>Evaluation<br/>of neurological<br/>state</b>              |
| <b>E</b>  | <ul style="list-style-type: none"> <li>• head to toe examination</li> <li>• medical history</li> <li>• temperature</li> <li>• injuries</li> <li>• oedemas</li> <li>• scars</li> <li>• signs of drug abuse</li> <li>• skin changes</li> <li>• signs of infection/sepsis</li> </ul>                                                                                                     | <ul style="list-style-type: none"> <li>• identified cause therapy</li> <li>• thermomanagement</li> <li>• trauma treatment</li> <li>• insertion of NGT, IUC</li> </ul>                                   | <b>Revealing other<br/>symptoms and<br/>thermomanagement</b> |

# Underlying principles

1. Use the Airway, Breathing, Circulation, Disability, Exposure (ABCDE) approach to assess and treat the patient.
2. Do a complete initial assessment and re-assess regularly.
3. Treat life-threatening problems before moving to the next part of the assessment.
4. Assess the effects of treatment.
5. Recognize when you will need extra help. Call for appropriate help early.
6. Use all members of the team. This enables interventions (e.g. assessment, attaching monitors, intravenous access) to be undertaken simultaneously.
7. Communicate effectively - use the Situation, Background, Assessment, Recommendation (SBAR) or Reason, Story, Vital signs, Plan (RSVP) approach.
8. The initial treatment aims to keep the patient alive and achieve some clinical improvement. This will buy time for further treatment and diagnosis.
9. Remember – it can take a few minutes for treatments to work, so wait a short while before reassessing the patient after an intervention.

# First steps

1. Ensure personal safety.
2. First look at the patient in general to see if the patient appears unwell.
3. If the patient is awake, ask “How are you?” If the patient appears unconscious or has collapsed, shake him and ask “Are you all right?” If he responds normally, he has a patent airway, is breathing, and has brain perfusion. Speaking in short sentences may indicate breathing problems. Failure of the patient to respond is a clear marker of critical illness.
4. This first rapid ‘Look, Listen, and Feel’ of the patient should take about 30 s and will often indicate a patient is critically ill and there is a need for urgent help. Ask a colleague to ensure appropriate help is coming.
5. If the patient is unresponsive, and is not breathing normally start CPR according to the guidelines. If you are confident and trained to do so, feel for a pulse to determine if the patient has a respiratory arrest. If there are any doubts about the presence of a pulse start CPR.
6. Monitor the vital signs early. Attach a pulse oximeter, ECG monitor, and a NIBP monitor as soon as possible.
7. Insert an intravenous cannula as soon as possible.

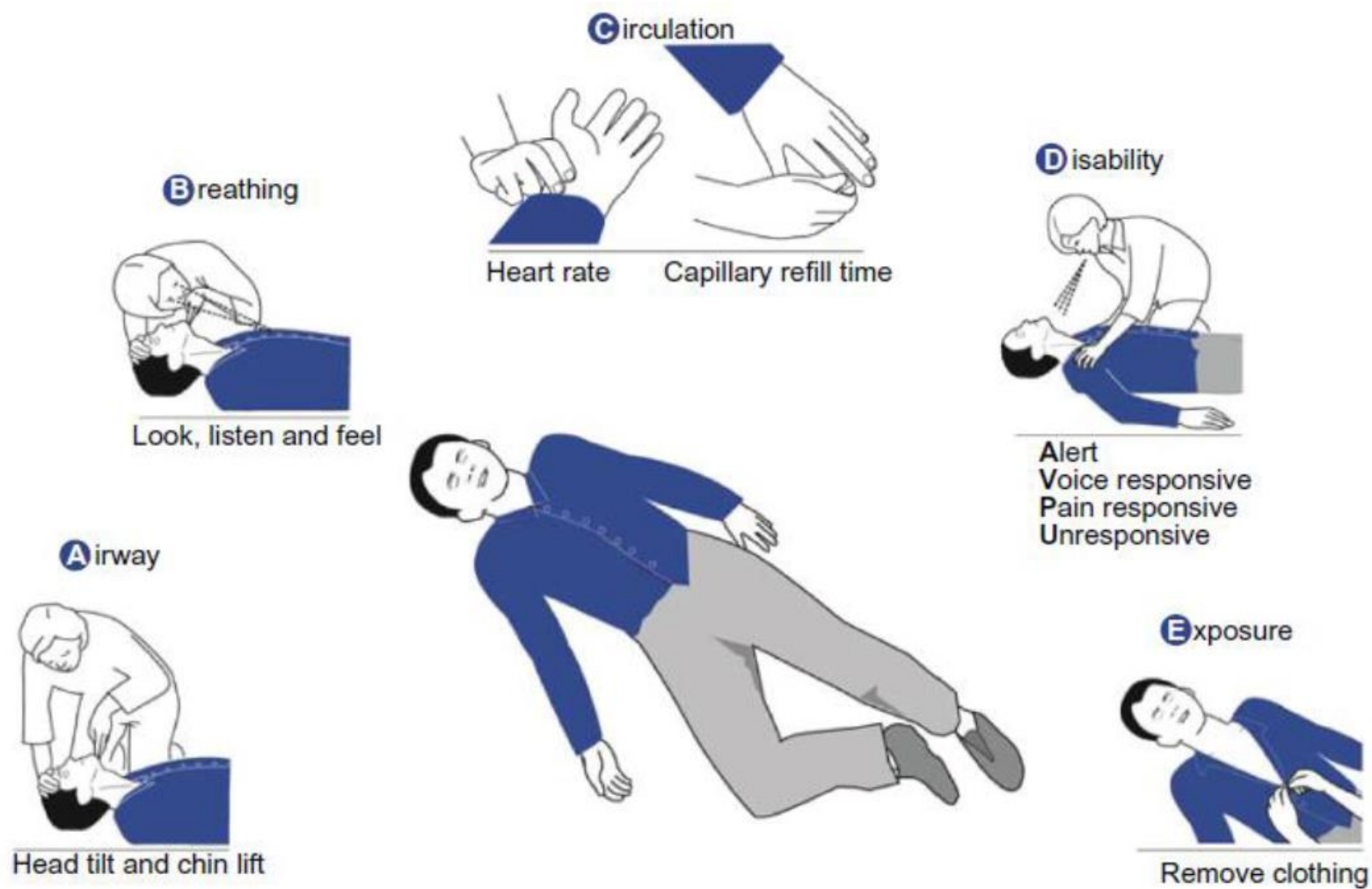


**Figure 1** The ABCDE approach without the use of equipment.

# A - airway

## 1. Look for the signs of airway obstruction (AO)

AO causes paradoxical chest and abdominal movements ('see-saw' respirations) and the use of the accessory muscles of respiration. Central cyanosis is a late sign of AO. In complete AO, there are no breath sounds at the mouth or nose. In partial AO, air entry is diminished and often noisy. In critically ill patients, depressed consciousness often leads to AO.

## 2. Treat AO as a medical emergency

In most cases, only simple methods of airway clearance are required (e.g. airway opening manoeuvres, airway suction, and insertion of an oropharyngeal or nasopharyngeal airway). Tracheal intubation may be required when these fail.

## 3. Give oxygen at high concentration

Provide high-concentration oxygen using a mask with oxygen reservoir. Ensure that the oxygen flow is sufficient (usually 15 L min<sup>-1</sup>) to prevent collapse of the reservoir during inspiration. If the patient's trachea is intubated, give high-concentration oxygen with a self-inflating bag. In acute respiratory failure, aim to maintain an oxygen saturation of 94–98%. In patients at risk of hypercapnic respiratory failure aim for an oxygen saturation of 88–92%.

# A - airways - causes of obstruction

- CNS depression (disturbances of consciousness from various causes, ... medications)
- Foreign body in the airway-blood, vomit, tooth, food, toy parts...
- Trauma to the face or neck
- Swelling of the pharynx (inflammation, allergy...)
- Laryngeal spasm
- Epiglottitis, laryngitis
- Bronchial secretion
- Clogged/broken aids to maintain passageways

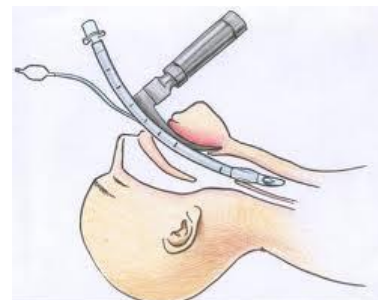
# A - airways - causes of obstruction

- **Partial obstruction**
  - inspirational stridor
  - difficulty swallowing, feeling of a lump in the throat
  - cough
  - interrupted speech
  - cyanosis (late symptom)
  - paradoxical movements of the chest and abdomen
  - involvement of accessory respiratory muscles
- **Complete obstruction - silent patient**
  - absence of breathing movements
  - absence of airflow around the nose and mouth



# A - airways - DC clearance manoeuvres

- 1.Head tilt/lifting the chin up
- 2.Tubus
- 3.Supraglottic aids
- 4.Endotracheal intubation
- 5.Coniopuncture, tracheostomy



# B- breathing

1. Look for the general signs of respiratory distress: sweating, central cyanosis, use of the accessory muscles of respiration, and abdominal breathing.
2. Count the RR. The normal RR is 12–20 breaths min<sup>-1</sup>.
3. Assess the depth of each breath, the pattern (rhythm) of respiration and make sure chest expansion is equal on both sides.
4. Note any chest deformity; look for a raised jugular venous pulse (e.g. in acute severe asthma or a tension pneumothorax); note the presence and patency of any chest drains; remember that abdominal distension may limit diaphragmatic movement, thereby worsening respiratory distress.
5. Record the inspired oxygen concentration (%) and the SpO<sub>2</sub> reading of the pulse oximeter. The pulse oximeter does not detect hypercapnia. If the patient is receiving supplemental oxygen, the SpO<sub>2</sub> may be normal in the presence of a very high PaCO<sub>2</sub>.
6. Listen to the patient's breath sounds a short distance from his face: rattling airway noises indicate the presence of airway secretions, usually caused by the inability of the patient to cough or to take a deep breath. Stridor or wheeze suggests partial, but significant, AO

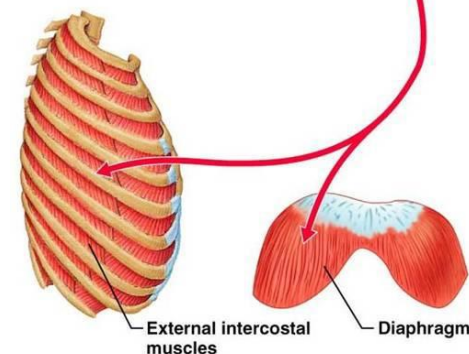
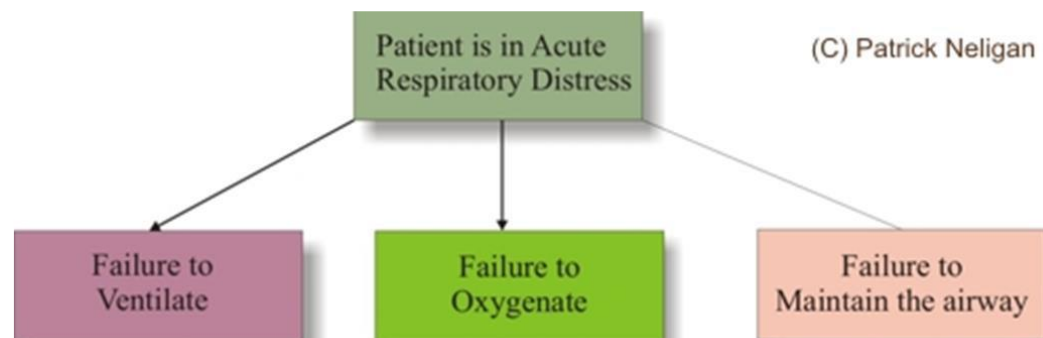
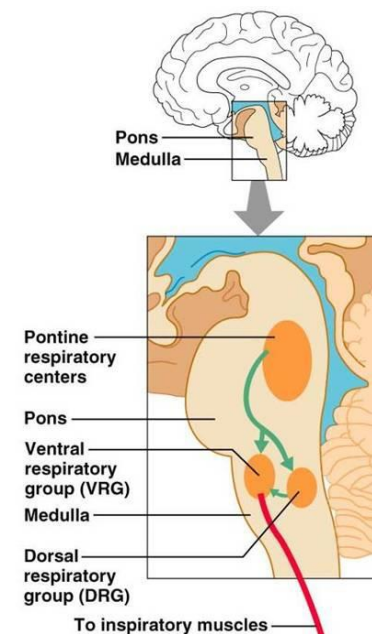
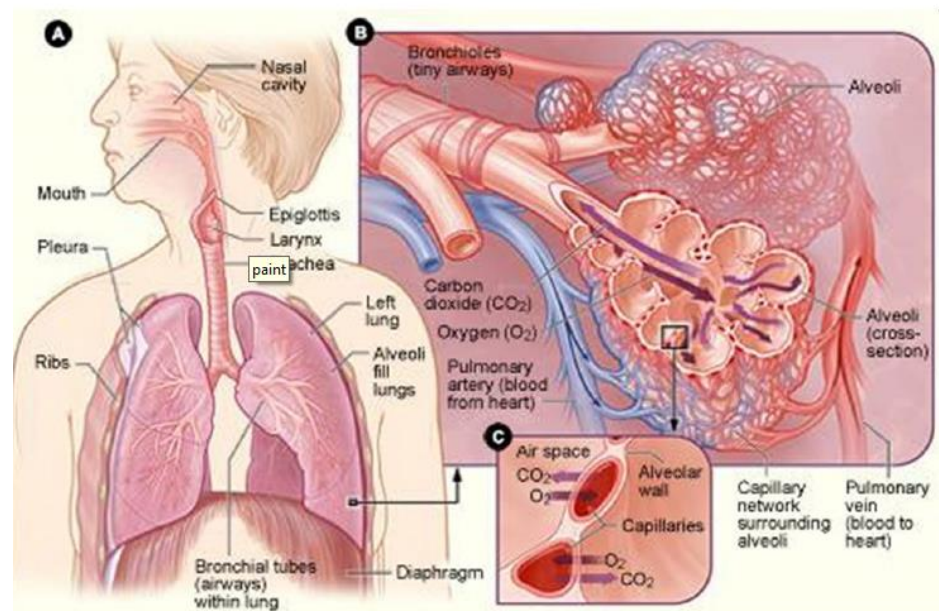
# B- breathing

7. Percuss the chest: hyper-resonance may suggest a pneumothorax; dullness usually indicates consolidation or pleural fluid.
8. Auscultate the chest: bronchial breathing indicates lung consolidation with patent airways; absent or reduced sounds suggest a pneumothorax or pleural fluid or lung consolidation caused by AO.
9. Check the position of the trachea in the suprasternal notch: deviation to one side indicates mediastinal shift (e.g. pneumothorax).
10. Feel the chest wall to detect surgical emphysema or crepitus (suggesting a pneumothorax until proven otherwise).
11. The specific treatment of respiratory disorders depends upon the cause. Nevertheless, all critically ill patients should be given oxygen.
12. If the patient's depth or rate of breathing is judged to be inadequate, or absent, use bag-mask or pocket mask ventilation to improve oxygenation and ventilation, whilst calling immediately for expert help. In cooperative patients who do not have airway obstruction consider the use of non- invasive ventilation (NIV)

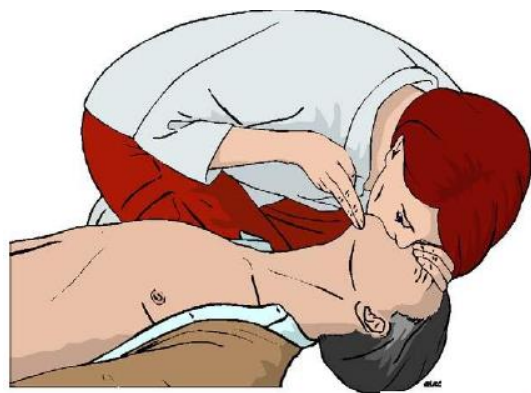
## B - breathing - disorders according to the place of origin

1. Brain (blood vessel, injury, inflammation, tumor, intoxication)
2. Spinal cord (injury, inflammation, tumour)
3. Peripheral nerves (polyradiculoneuritis)
4. Neuromuscular diseases (myasthenia, relaxants)
5. Diaphragm, chest wall (trauma)
6. Airway (obstruction)
7. Lung parenchyma (ARDS, pneumonia, aspiration)

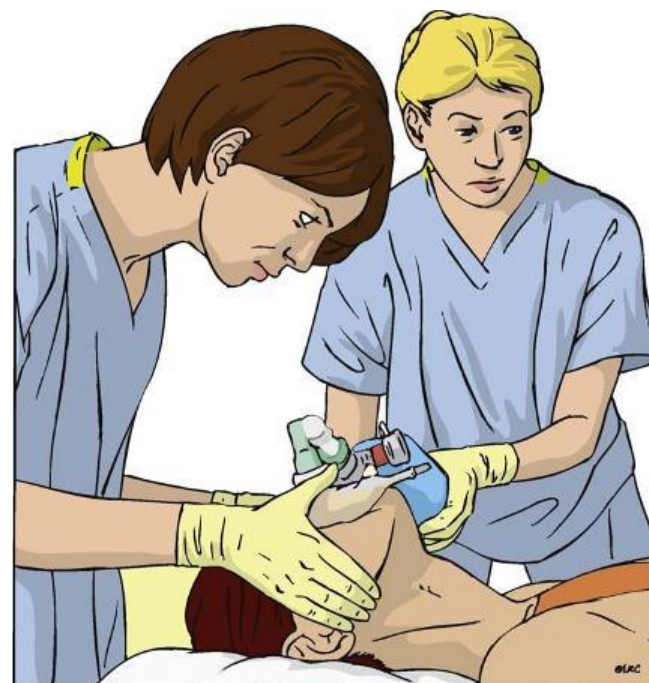
# B - breathing - disorders according to the place of origin



## B - breathing - support



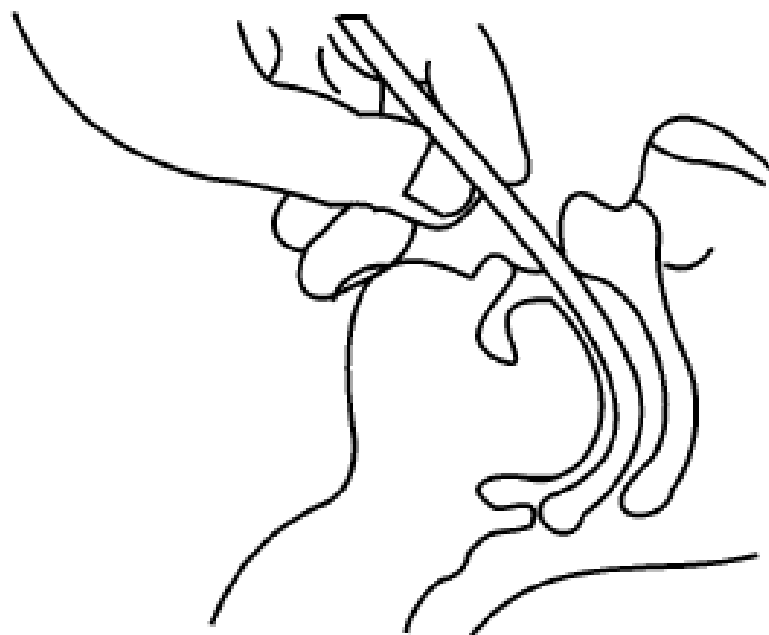
## Ambubag - face mask (self-expanding bag)



# Automatic ventilator



# Suction of secretions



# Oxygen administration



Oxygen glasses



Oxygen mask with reservoir

# Oxygenation monitoring - pulse oximeter



# C - circulation

1. Look at the color of the hands and digits: are they blue, pink, pale or mottled?
2. Assess the limb temperature by feeling the patient's hands: are they cool or warm?
3. Measure the capillary refill time (CRT). Apply cutaneous pressure for 5 s on a fingertip held at heart level (or just above) with enough pressure to cause blanching. Time how long it takes for the skin to return to the color of the surrounding skin after releasing the pressure. The normal value for CRT is usually  $< 2$  s.
4. Assess the state of the veins: they may be underfilled or collapsed when hypovolemia is present.
5. Count the patient's pulse rate (or preferably heart rate by listening to the heart with a stethoscope).
6. Palpate peripheral and central pulses, assessing for presence, rate, quality, regularity and equality. Barely palpable central pulses suggest a poor cardiac output

## C - circulation

7. Measure the patient's blood pressure. Even in shock, the blood pressure may be normal, because compensatory mechanisms increase peripheral resistance in response to reduced cardiac output.
8. Auscultate the heart. Is there a murmur or pericardial rub? Are the heart sounds difficult to hear? Does the audible heart rate correspond to the pulse rate?
9. Look for other signs of a poor cardiac output, such as reduced conscious level and, if the patient has a urinary catheter, oliguria (urine volume  $< 0.5 \text{ mL kg}^{-1} \text{ h}^{-1}$ ).
10. Look thoroughly for external hemorrhage from wounds or drains or evidence of concealed hemorrhage (e.g. thoracic, intra-peritoneal, retroperitoneal or into gut). Intra-thoracic, intra-abdominal or pelvic blood loss may be significant, even if drains are empty.

# C - circulation

11. The specific treatment of cardiovascular collapse depends on the cause, but should be directed at fluid replacement, haemorrhage control and restoration of tissue perfusion.
12. Insert one or more large (14 or 16 G) intravenous cannulae. Use short, wide-bore cannulae, because they enable the highest flow.
13. Give a bolus of 500 mL of crystalloid solution (e.g. Hartmann's solution or 0.9% saline) over less than 15 min if the patient is hypotensive. Use smaller volumes (e.g. 250 mL) for patients with known cardiac failure and use closer monitoring (listen to the chest for crackles after each bolus).
15. Reassess the heart rate and BP regularly (every 5 min), aiming for the patient's normal BP or, if this is unknown, a target > 100 mmHg systolic.
16. If the patient does not improve, repeat the fluid challenge. Seek expert help if there is a lack of response to repeated fluid boluses.

## C - circulation

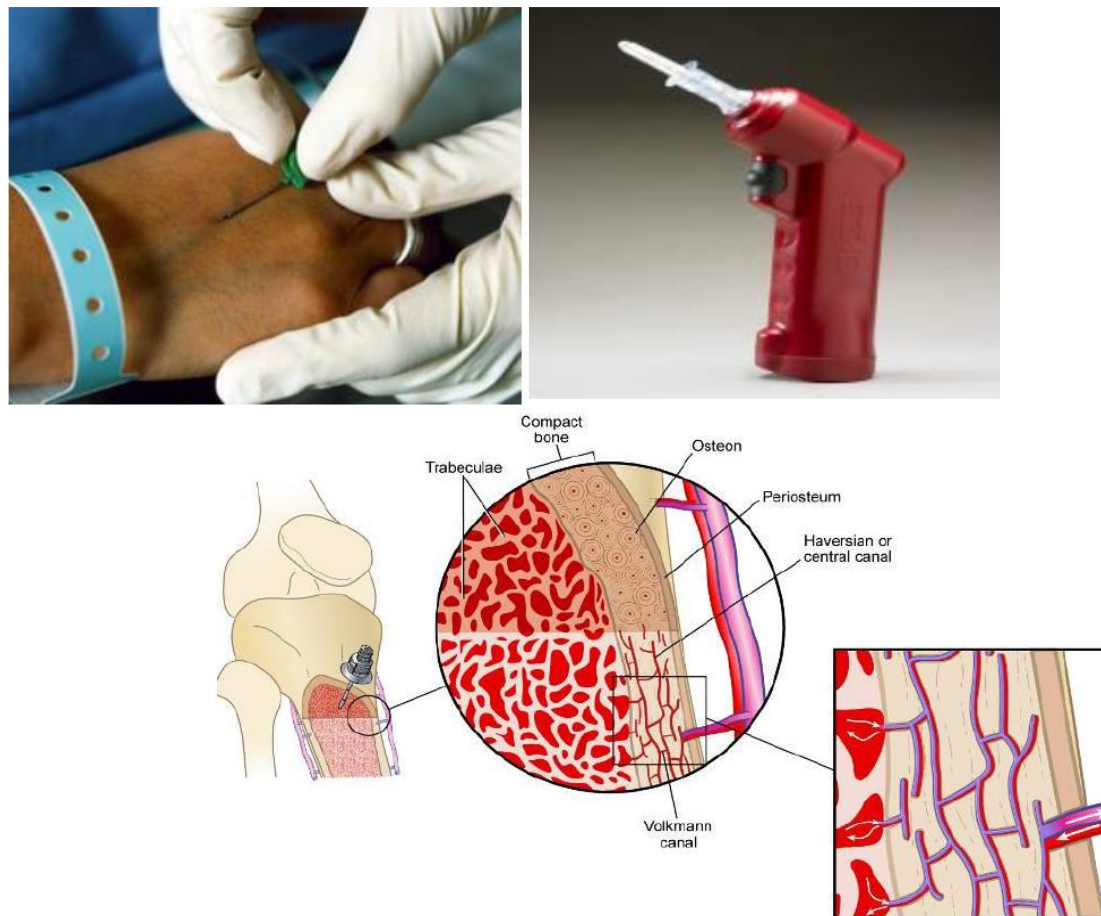
17. If symptoms and signs of cardiac failure (dyspnoea, increased heart rate, raised JVP, a third heart sound and pulmonary crackles on auscultation) occur, decrease the fluid infusion rate or stop the fluids altogether. Seek alternative means of improving tissue perfusion (e.g. inotropes or vasopressors).

18. If the patient has primary chest pain and a suspected ACS, record a 12-lead ECG early.

19. Immediate general treatment for ACS includes:

- Aspirin 300 mg, orally, crushed or chewed, as soon as possible.
- Nitroglycerine, as sublingual glyceryl trinitrate (tablet or spray).
- Oxygen: only give oxygen if the patient's SpO<sub>2</sub> is less than 94% breathing air alone.
- Morphine (or diamorphine) titrated intravenously to avoid sedation and respiratory depression

# Volume resuscitation



## D - disability

Common causes of unconsciousness include profound hypoxia, hypercapnia, cerebral hypoperfusion, or the recent administration of sedatives or analgesic drugs.

1. Review and treat the ABCs: exclude or treat hypoxia and hypotension.
2. Check the patient's drug chart for reversible drug-induced causes of depressed consciousness. Give an antagonist where appropriate (e.g. naloxone for opioid toxicity).
3. Examine the pupils (size, equality and reaction to light).
4. Make a rapid initial assessment of the patient's conscious level using the ACVPU method: is the individual Alert? Are they newly Confused? Are they only responding to Vocal stimuli? Do they only respond to Painful stimuli, or are they Unresponsive to all stimuli?
5. Measure the blood glucose to exclude hypoglycemia using a rapid finger-prick bedside testing method.
6. Nurse unconscious patients in the lateral position if their airway is not protected

## E - exposure

- examine the patient properly full exposure of the body may be necessary.
- respect the patient's dignity and minimise heat loss.