

Educational material for the First aid class prepared by the Medical Education Center JFMED

ABCDE - a systematic approach to the critically ill patient

Every healthcare professional may encounter a patient with sudden deterioration to failure of vital functions in his/her practice.

In this situation, he is obliged to:

- (a) assess the condition of the affected person
- (b) provide emergency medical treatment; and
- c) bridge the time until the arrival of specialists in emergency/intensive care medicine.

ABCDE procedure refers to a systematic approach to critically ill or injured individuals with immediate assessment of the condition and provision of emergency first aid. As the clinical manifestations of vital signs are similar, regardless of the triggering cause, this procedure can be used by any healthcare professional for all patients in critical condition, whether on the street without any equipment, but also in a physician's office or hospital ward.

The ABC principle was first formulated by Peter Safar as part of his pioneering algorithm for cardiopulmonary resuscitation in 1961 (1). Additional letters were added in 1976 by orthopaedic surgeon James K. Styner, who observed the poor effectiveness of emergency care at a local hospital after a small plane crash with family members. Based on this, he formulated a systematic approach to trauma patients, later known as Advanced Trauma Life Support (2). The ABCDE approach can be considered an extension of the "resuscitative" ABC approach for patients with internal medicine, surgical, and trauma critical conditions.

Objectives of the ABCDE procedure

1. Provide support for failing vital functions
2. Divide a complex situation into several smaller ones that can be handled more easily
3. Tune all members of the ad hoc team (the team that is currently on site) to the same wave
4. Gain time to make a definitive diagnosis and treatment.

Is the ABCDE procedure effective?

There is expert consensus on the usefulness of this approach. This procedure is routinely used by emergency and intensive care physicians, anaesthesiologists and trauma surgeons dealing with poly-trauma patients. It is generally recommended that this system be mastered in theory and practice by all healthcare professionals, as they may encounter a patient with acutely failing vital signs at any time. For ad hoc team interplay, this algorithm needs to be applied uniformly. Mastery of this approach, patient assessment, and first aid boosts each paramedic's confidence to deal with the occasional critical patient.

Which patients need ABCDE?

The ABCDE approach can be applied to all patients, adults and children. The clinical symptoms of critical conditions are similar, regardless of the triggering cause. Therefore, it is not necessary to

immediately determine the cause of the condition. The procedure should be applied as soon as a critical condition is suspected.

In daily practice, the method makes it possible to identify or exclude a critical situation in time.

Circulatory arrest is often preceded by a gradual deterioration of vital functions, e.g. typically in hospital, which can be detected early by repeated application of the ABCDE procedure by nurses or physicians and thus prevent the transition to circulatory arrest with the need for cardiopulmonary resuscitation and subsequent poorer clinical outcome. This procedure should also be used to assess the current status after restoration of spontaneous circulation.

However, in the case of a patient "collapse", the basic emergency resuscitation algorithm should be followed: after verifying the safety of the environment for self, patient, and bystanders, the presence of the capacity for awareness (response to being addressed) and breathing (observing, listening, and feeling). A patient who is unconscious and not breathing has cessation of breathing and circulation. The emergency medical services (155/112) or resuscitation team should be activated immediately and basic/extended emergency resuscitation should be started according to the algorithm currently in place (3). In other cases of failure/ vital signs, the ABCDE approach should be used.

Who should use the ABCDE approach?

Every health professional may encounter a patient in critical condition, whether in their workplace or in their private life. Patients may also seek out their doctor in a situation where they should rather directly activate the emergency medical service with rapid intervention and transport to the hospital. The public expects paramedics to act efficiently to save the life of a critically disabled patient, whether it is in an equipped medical workplace or unaided on the street or in the woods. These expectations can be met by using the life-saving ABCDE approach. Assessment and first aid can be provided without any aids; in a medical facility, or after the arrival of an ambulance, the procedure can be augmented by the use of devices, aids, and medications.

ABCDE principles

The basic principle is the simultaneous implementation of the assessment of the patient's condition and urgent treatment - first aid. Although a critical condition may be obvious, its cause may not be immediately apparent. Unlike less acute conditions, where treatment is preceded by a diagnosis using history, physical examination, biochemical tests and other ancillary investigations, in the case of a critical condition, treatment must be administered before a definitive diagnosis is made. Early recognition of failing vital function(s) and immediate effective first aid are the prevention of complete failure, allowing time for clarification and causal treatment of the underlying cause. Failure to recognise deteriorating vital signs and failure to intervene/receive help immediately are a common yet unacceptable cause of patient harm.

The ABCDE mnemonic aid denotes the English words Airway, Breathing, Circulation, Disability and Exposure. Patient management follows this sequence: first, life-threatening airway patency problems are assessed and resolved, then respiration is assessed and, if necessary, provided, followed by management of blood flow and consciousness. Once the condition is stable, a more detailed general examination of the patient is performed.

This approach also makes it possible to find out in time whether the help of specialists will be needed, whether the urologists from the emergency medical service in the field or anaesthesiologists - intensivists in the hospital. Hospitals are now introducing so-called rapid response teams for these situations. These teams are activated by the medical staff in the hospital, who, based on a regularly performed assessment of hospitalised patients by the ABCDE system, detect the failure of vital function early. This is to prevent respiratory and circulatory arrest, when a resuscitation team would already have to intervene. Prevention of failure is also the recognition of

patients at risk of developing complications or deterioration of vital signs who need increased monitoring.

In addition to early detection of a critical condition and calling for specialized help, it is necessary to apply procedures to maintain vital functions until its arrival. In addition to specialist knowledge, non-technical skills such as good communication, leadership and a team approach are crucial to achieving a favourable clinical outcome.

Another principle is to repeat the ABCDE procedure if the condition persists, worsens or improves. It should also be remembered that some procedures require a certain amount of time to have an effect.

Summary of ABCDE principles

1. Quickly identify and address life-threatening conditions. Universal access. Airway, Breathing, Circulation, Disability and Exposure.
2. Assess the patient and reassess regularly. Use sight, hearing, touch, feel, smell.
3. If the patient responds normally to the question, it means that he is conscious, oriented, has a patent airway and is breathing
4. Address life-threatening conditions before implementing the next step in the investigation
5. Evaluate the effect of your procedure/treatment
6. Recognize the need for help - call for help (lay, professional) promptly
7. Use all team members - this will allow some activities to be done at the same time
8. Communicate
9. The first goal is to keep the patient alive or to achieve some improvement - you will have time to make a diagnosis and choose the next treatment
10. Remember that every treatment needs its time to take effect.

ABCDE procedure

When approaching a person with a potentially critical condition, the first step should always be to verify your own and the patient's safety. The first general impression of the patient and their surroundings is important: position, skin colour, perspiration, activity, environment, etc. As a critical clinical condition is usually complex, it needs to be divided into manageable parts by a systematic approach (Table) (4).

A - airway, respiratory tract. Is the upper airway patent?

If the patient can talk normally, his airway is patent. Symptoms of **partial** airway obstruction are altered voice, inspiratory stridor, increased respiratory effort (intercostal space intrusion, accessory respiratory muscles). With **complete** airway obstruction (foreign body directly on the vocal cords), the affected person cannot speak, despite great effort, breathing is not present (paradoxical breathing, symptom of chest-abdomen swing). Impaired consciousness may be present. In the case of unconsciousness, snoring is a manifestation of airway obstruction.

Unresolved airway obstruction can quickly lead to hypoxemia, unconsciousness, and circulatory arrest. The **head-tilt/chin-raise** manoeuvre should be used to clear the airway.

Here we stop for the first aid without equipment, feel free to read further for more advanced procedures, but remember – we are first year students and what we said at the lecture/ practical is enough for now. Please consider this statement for each ABCDE section.

If suction is available, liquid material such as vomitus and blood should be suctioned from the mouth. The presence of a foreign body should be checked and removed by prompting to cough or manually in one attempt. For complete airway obstruction, the algorithm should be followed: if the patient is conscious, alternate blows between the shoulder blades and the Heimlich manoeuvre. If the patient is unconscious, help should be summoned and basic emergency resuscitation should be started.

An oral or nasal **airway** can be used to clear the airway. Personnel can also be trained in the use of a so-called **supraglottic** device - a laryngeal mask or cannula, the insertion of which is relatively simple because it is performed blindly, without the use of a laryngoscope. The gold standard, but intended only for professionals, is **intubation** - insertion of an endotracheal cannula, or in the extreme case, puncture or invasive **coniotomy**.

As soon as possible, 10 - 15 l/min **oxygen** should be administered through the mask to improve blood oxygenation in partial obstruction. Higher concentrations can be achieved with the use of a reservoir mask (Fig. 3). Once the condition has stabilised, the minimum necessary oxygen concentration should be administered based on the pulse oximeter reading (target value usually 94-96%).

The most common causes of upper airway 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...) spasm
- Bronchial secretion
- Clogged/broken aids to maintain passageways

Procedures for clearing the upper respiratory tract

1. Chin lift / sled forward
2. Air duct - oral, nasal
3. Supraglottic device (laryngeal mask, cannula...)
4. Endotracheal
5. Coniotomy - bougie assisted coniotomy (BACT), tracheostomy.

B - breathing. Is breathing sufficient?

Breathing should be assessed by sight, hearing, and feeling (Figure 4). The basic parameter is the respiratory rate; rates < 10 or > 25/min are indicative of possible failure. The magnitude of chest movements, symmetry of breathing, involvement of accessory respiratory muscles, fatigue, and respiratory muscle exhaustion should also be assessed. A chest hatch can detect the presence of a pneumothorax or effusion (blood). The lungs can be auscultated with a phonendoscope, but also by placing the ear against the chest, or by using rolled paper. Dilated neck veins, cyanosis of the lips (late sign), deviation of the position of the tongue should be noted. If available, the oxygen saturation of haemoglobin should be checked using a pulse oximeter; it should not be less than 90%. Small fingertip saturation sensors with built-in electronics and display are currently available, as well as sensors transmitting a signal via Bluetooth to a smartphone screen.

The tension pneumothorax should be released as soon as possible using 1-3 thicker i.v. cannulas inserted above the third rib in the mid-clavicular line (needle thoracocentesis). Currently, a more invasive approach using a scalpel, peanus and finger is preferred. Bronchospasm can be relieved with the use of an appropriate bronchodilator spray.

In the event of cessation of breathing, rescue breaths should be administered, preferably using a barrier device (drape, pocket mask) that can be carried in a purse or handbag. In a medical facility, mask ventilation and a self-expanding bag (ambu bag) (one, preferably two persons) with oxygen supply should be used to support breathing (Figure 5).

C - circulation. Is the blood circulation sufficient?

To evaluate the blood circulation, the frequency and quality of the pulse and capillary return should be examined. Circulatory failure tends to be associated with an intangible peripheral pulse, with heart rates < 40 or > 120-140/min, and capillary return (after nail bed pressure) longer than 2 seconds (Fig. 6). Skin condition (pallor, cold sweat) and onset of impaired consciousness are suggestive of developing shock. Auscultation of the heart (stethoscope or paper cylinder) is appropriate. Blood pressure should be measured and an ECG recorded as soon as possible.

In first aid, the patient should be placed in the anti-shock position (horizontally, possibly in the supra-leg raise or Trendelenburg position), a 14-16 G i.v. cannula should be inserted and a crystalloid solution administered. Alternatively, an intraosseous approach may be used. Infusion of catecholamine (noradrenaline) may also be indicated.

In the event of circulatory arrest, a defibrillator - manual or automatic - should be available to medical staff and they should be trained in its use in the event of a defibrillatable rhythm (Figure 7). A 12-lead ECG should be taken and analysed to determine the possible presence of an acute coronary event.

D - disability. What is consciousness?

Awareness is present if the person responds unambiguously to a simple verbal prompt (stick out tongue, open eyes, squeeze hand ...). If the patient does not respond to a verbal prompt, he/she is unconscious; its depth is assessed by the response to a painful stimulus (purposeful response, flexion/extension of the upper limbs, no movement). The Glasgow Coma Scale can be used for quantitative assessment, but in routine practice the simple AVPU scale is sufficient:

1. awake (Alert)
2. responsive to the word (Responsive)
3. responsive only to pain (Pain responsive)
4. unresponsive (Unresponsive).

Pupillary responses and symmetry of limb movement to the presence of lateralization and focal process should be evaluated. As part of first aid, the airway, breathing, and circulation should be stabilized in a patient with primary brain involvement. In case of hypoxaemia, administer targeted oxygen. If the patient responds only to pain or is unresponsive, ensure airway patency (manoeuvre, airway, supraglottic device, intubation) and prevent aspiration. A recovery position on the side is therefore appropriate (Fig. 8). In unconscious patients, glycaemia should be investigated (e.g. by the strip method) to exclude hypoglycaemia. Hypoglycaemia can be rapidly corrected by intravenous administration of 20-60 ml of 40% glucose.

E - exposure. What is the cause of the critical condition?

Once the vital signs are stabilized, a complete head-to-toe examination of the patient is possible and necessary. A thorough physical examination requires stripping the patient(s) to preserve dignity and prevent hypothermia. The head, neck, chest, lungs, and heart, abdomen, pelvis, spine, upper and lower extremities should be examined sequentially by sight, touch, and hearing. Look for signs of trauma, skin reaction, puncture marks, etc. Body temperature should be determined by touch or with the use of a thermometer. It is also time to complete a medical history or obtain and study medical documentation.

Upon arrival of the professional team, the patient should be handed over using a structured protocol.

References:

<https://www.resus.org.uk/library/abcde-approach>

ABCDE chart

	EXAMINATION	INTERVENTION	GOAL
A 	• airway noises • position of head • foreign body • fluid, secretions • oedema	• open • suction • secure • O₂	Patent airway
B 	• look - listen - feel approach • respiratory rate and effort • breath and added sounds • subcutaneous emphysema • symmetry of chest movement • tracheal deviation • jugular vein distention • cyanosis SpO₂ - ETCO₂ - USG - X-ray - CT	• O₂ according to SpO₂ • pneumothorax therapy • inhalation therapy • ventilation	Sufficient oxygenation and ventilation
C 	• heart rate • blood pressure • capillary refill time • bleeding • skin colour • blood samples • diuresis ECG - USG - CT - X-ray	• I.V. / I.O. access • control of bleeding • massive haemorrhage protocol • fluids • drugs • transfusion	Stabilization of circulation
D 	• AVPU / GCS • reactivity and symmetry of pupils • blood glucose level • basic neurological examination • posture • toxicological examination	• glucose • antidotes	Evaluation of neurological state
E 	• head to toe examination • medical history • temperature • injuries • oedemas • scars • signs of drug abuse • skin changes • signs of infection/sepsis	• identified cause therapy • thermomanagement • trauma treatment • insertion of NGT, IUC	Revealing other symptoms and thermomanagement