

CURRENT CONCEPTS OF LIFE SAVING ALPHABETS

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Abstract - ABC and its variations are initialism mnemonics for essential steps used when dealing with an unconscious patient. In its original form **A** stands for Airway, **B** stands for Breathing and **C** stands for Circulation. CPR is performed to restore and maintain breathing and circulation and to provide oxygen and blood flow to the heart, brain, and other vital organs. Respiratory and cardiac arrest can be caused by allergic reactions, an ineffective heartbeat, asphyxiation, breathing passages that are blocked, choking, drowning, drug reactions or overdoses, severe shock or trauma.

In 2010, the American Heart Association and International Liaison Committee on Resuscitation changed the recommended order of CPR interventions for most cases of cardiac arrest from **ABC to CAB** (chest compressions, airway, breathing).

Since its development, the mnemonic has been extended and modified to fit the different areas in which it is used, with different versions changing the meaning of letters (such as from the original 'Circulation' to 'Compressions') or adding other letters [such as an optional **"D"** step for Disability or Defibrillation, **"E"** step for exposure or environment, **"F"** step for fluid resuscitation and **"G"** step for glucose test, golden hour (the UK ambulance service version for patient assessment)].

Introduction - Life support refers to a spectrum of techniques used to maintain life after the failure of one or more vital organs. A patient requires life support when one or more vital organs fail, due to trauma, infection, **cancer, heart attack**, or chronic disease. The purposes of basic life support are to Establish and maintain the ABC's of resuscitation (airway, breathing, and circulation), to restore the patient's homeostasis—the internal chemical and physical balance of the body and to protect the patient from complications of the underlying disease and its treatment.

History - The 'ABC' method of remembering the correct protocol for CPR is almost as old as the procedure itself, and is an important part of the history of cardiopulmonary resuscitation. Throughout history, a variety of differing methods of resuscitation had been attempted and documented, although most yielded very poor outcomes.^[5] In 1957, Peter Safar^[6] wrote the book **ABC of Resuscitation**,^[1] which established the basis for mass training of CPR.^[7] This new concept was distributed in a 1962 training video called "The Pulse of Life" created by James Jude,^[8] Guy Knickerbocker and Peter Safar. Jude and Knickerbocker, along with William Kouwenhouen^[9] developed the method of external chest compressions, while Safar worked with James Elam to prove the effectiveness of artificial respiration.^[10] Their

combined findings were presented at annual Maryland Medical Society meeting on September 16, 1960 in Ocean City, and gained rapid and widespread acceptance over the following decade, helped by the video and speaking tour the men undertook. The ABC system for CPR training was later adopted by the American Heart Association, which promulgated standards for CPR in 1973. As of 2010, the American Heart Association chose to focus CPR on reducing interruptions to compressions, and has changed the order in its guidelines to **Circulation, Airway, Breathing (CAB)**.^[11]

Airway - The **airway** refers to a clear passageway for air to enter the lungs from outside the body. The patient's airway may become blocked by:

- Foreign body obstruction, as by food or dentures
- Injury-related damage and swelling, as from a wound or surgery
- Loss of protective reflexes due to **coma** of any origin

Airway maintenance techniques ^{[12],[13]}

- 1) Chin lift
- 2) Jaw thrust
- 3) Oropharyngeal airway
- 4) Nasopharyngeal airway
- 5) Laryngeal mask
- 6) Comi tube airway

Definitive airway techniques

1. Orotracheal intubation
2. Nasotracheal intubation
3. Surgical airway – tracheostomy, cricothyroid puncture, cricothyroidotomy

Life support may begin with basic **cardiopulmonary resuscitation (CPR)**, as in cases of cardiac arrest. Thereafter, the most common technique used to create a secure airway is insertion of an endotracheal (ET) tube through the mouth or nose into the windpipe (trachea). An alternative method of securing an airway is by **tracheotomy**, a surgical procedure in which a tube is inserted into the trachea through an incision made in the base of the throat. Of the two options, placement of an ET tube is usually quicker and more convenient, and thus occurs much more commonly. Doctors perform a tracheotomy when they cannot establish an ET airway, or when the patient will require an artificial airway for more than a week or two.

Breathing refers to the movement of air in and out of the lungs. Inadequate breathing may result from:

- Heart disease, as in congestive heart failure
- Primary disease of the lungs, such as **pneumonia**, **asthma**, or emphysema
- Coma of any cause, such as narcotic overdose or stroke
- Muscle **fatigue** or neuromuscular disease (**spinal cord injury** or polio)
- Pain, from rib **fractures** or surgery on the chest

Assessment: Look for respiratory rate, tracheal position, Chest movement.

Insufflation, also known as 'rescue breaths' or 'ventilations', is the act of mechanically forcing air into a patient's respiratory system. This can be achieved via a number of methods, which will depend on the situation and equipment available. All methods require good airway management to perform, which ensures that the method is effective. These methods include:

- Mouth to mouth - This involves the rescuer making a seal between their mouth and the patient's mouth and 'blowing', to pass air into the patient's body
- Mouth to nose - In some instances, the rescuer may need or wish to form a seal with the patient's nose. Typical reasons for this include maxillofacial injuries, performing the procedure in water or the remains of vomit in the mouth
- Mouth to mouth and nose - Used on infants (usually up to around 1 year old), as this forms the most effective seal
- Mouth to mask – Most organisations recommend the use of some sort of barrier between rescuer and patient to reduce cross infection risk. One popular type is the 'pocket mask'. This may be able to provide higher tidal volumes than a Bag Valve Mask.^[6]
- Bag valve mask (BVM) - This is a simple device manually operated by the rescuer, which involves squeezing a bag to expel air into the patient.
- Laryngeal mask - A newer generation of the laryngeal mask actually utilizes both airway sealing mechanisms (peripharyngeal sealing and base of tongue sealing), and they result in higher average seal pressures during controlled and assisted ventilation of the patient. The apex of the mask, with its open end pointing downwards toward the tongue, is pushed backwards towards the uvula. The cuff follows the natural bend of the oropharynx, and is seated over the pyriform fossae. Once placed, the cuff around the mask is inflated with air to create a tight seal. Air entry is confirmed by listening for air entry into the lungs with a stethoscope, by presence of end tidal carbon dioxide and by monitoring the degree and pressure at which the air leaks around the mask in the oropharynx
- Mechanical resuscitator - An electric unit designed to breathe for the patient. When the patient cannot breathe sufficiently, the physician will use a ventilator, a machine that pumps air in and out of the patient's lungs. For many doctors and members of the public, the term "life support" calls up the image of an ET tube and ventilator.

C — Circulation

Once oxygen can be delivered to the lungs by a clear airway and efficient breathing, there needs to be a circulation to deliver it to the rest of the body.

Non-breathing patients

Circulation is the original meaning of the 'C' as laid down by Jude, Knickerbocker & Safar, and was intended to suggest assessing the presence or absence of circulation, usually by taking a carotid pulse, before taking any further treatment steps.

In modern protocols for lay persons, this step is omitted as it has been proven that lay rescuers may have difficulty in accurately determining the presence or absence of a pulse, and that, in any case, there is less risk of harm by performing chest compressions on a beating heart than failing to perform them when the heart is not beating. For this reason, lay rescuers proceed directly to cardiopulmonary resuscitation, starting with chest compressions, which is effectively artificial circulation. In order to simplify the teaching of this to some groups, especially at a basic first aid level, the C for '**Circulation**' is changed for meaning '**CPR**' or '**Compressions**'^{[14][15][16]}

It should be remembered, however, that health care professionals will often still include a pulse check in their ABC check, and may involve additional steps such as an immediate ECG when cardiac arrest is suspected, in order to assess heart rhythm.

Breathing patients

In patients who are breathing, there is the opportunity to undertake further diagnosis and, depending on the skill level of the attending rescuer, a number of assessment options are available, including:

- **Observation of colour and temperature of hands and fingers** where cold, blue, pink, pale, or mottled extremities can be indicative of poor circulation
- **Capillary refill** is an assessment of the effective working of the capillaries, and involves applying cutaneous pressure to an area of skin to force blood from the area, and counting the time until return of blood. This can be performed peripherally, usually on a fingernail bed, or centrally, usually on the sternum or forehead
- **Pulse checks**, both centrally and peripherally, assessing rate (normally 60-80 beats per minute in a resting adult), regularity, strength, and equality between different pulses
- **Blood pressure measurements** can be taken to assess for signs of shock
- **Auscultation of the heart** can be undertaken by medical professionals
- **Observation for secondary signs of circulatory failure** such as oedema or frothing from the mouth (indicative of congestive heart failure)
- **ECG monitoring** will allow the healthcare professional to help diagnose underlying heart conditions, including myocardial infarction.

D stands for -

- **Defibrillation**^[17] — The definitive treatment step for cardiac arrest
- **Disability** or Dysfunction^{[2][18]} — Disabilities caused by the injury, not pre-existing conditions
- **Deadly Bleeding**^{[19][20]}
- **(Differential) Diagnosis**^[21]
- **Decompression**^[22]

Disability – check for neurological status

A - ALERT

V - RESPONSE TO VOCAL STIMULI

P - RESPONSE TO PAIN STIMULI

U - UNRESPONSIVENESS

Record Pupil Size And Reflexes

E - Additionally, some protocols call for an 'E' step to patient assessment. *All* protocols that use 'E' steps diverge from looking after basic life support at that point, and begin looking for underlying causes. In some protocols, there can be up to 3 E's used. E can stand for:

- **Expose and Examine**^{[2][18]} — Predominantly for ambulance-level practitioners, where it is important to remove clothing and other obstructions in order to assess wounds. Tight clothing should be loosened to prevent hypothermia.
- **Environment**^{[23][24]} — only after assessing ABCD does the responder deal with environmentally related symptoms or conditions, such as cold and lightning.
- **Escaping Air** — Checking for air escaping, such as through a sucking chest wound, which could lead to a collapsed lung.
- **Evaluate** — Is the patient "time-critical" and/or does the rescuer need further assistance

F in the protocol can stand for:

- **Fundus** — relating to pregnancy, it is a reminder for crews to check if a female is pregnant, and if she is, how far progressed she is (the position of the fundus in relation to the bellybutton gives a ready reckoning guide)
- **Family** (in France) — indicates that rescuers must also deal with the witnesses and the family, who may be able to give precious information about the accident or the health of the patient, or may present a problem for the rescuer.
- **Fluids**^[22] — A check for obvious fluids (blood, cerebro-spinal fluid (CSF) etc.)
- **Fluid resuscitation**^[24]

- **Final Steps**^[25] — Consulting the nearest definitive care facility

Fluid resuscitation refers to the flow of blood around the body from the heart to vital organs. Circulation can fail due to:

- Primary disease of the heart (heart attack)
- Blood loss (trauma or internal bleeding of any cause)
- Severe infection (sepsis)
- Drug reactions or overdoses
- Extreme allergic reaction
- Severe **dehydration (gastroenteritis or heat-related illness)**

In order to ensure adequate circulation, the patient will require one or more intravenous (IV) tubes (catheters). The IVs may include both the short needle and tube commonly used in the hand or forearm, and longer catheters inserted into the larger and more central veins of the body. Catheters inserted into these larger veins are known as central lines. Through the IVs the patient receives fluids, drugs, and blood transfusions as needed to support the circulation.

'G' in the protocol can stand for

- **Go Quickly!** — A reminder to ensure all assessments and on-scene treatments are completed with speed, in order to get the patient to hospital within the Golden Hour
- **Glucose** — The professional rescuer may choose to perform a blood glucose test, and this can form the 'G' or alternately, the 'DEFG' can stand for "**Don't Ever Forget Glucose**

Variations

Nearly all first aid organisations use "ABC" in some form, but some incorporate it as part of a larger initialism, ranging from the simple 'ABCD' (designed for training lay responders in defibrillation) to 'AcBCDEEEFG' (the UK ambulance service version for patient assessment).

DR ABC

One of the most widely used adaptations is the addition of "DR" in front of "ABC", which stands for **Danger** and **Response**.^[27] This refers to the guiding principle in first aid to protect yourself before attempting to help others, and then ascertaining that the patient is unresponsive before attempting to treat them, using systems such as AVPU or the Glasgow Coma Score. As the original initialism was devised for in-hospital use, this was not part of the original protocol.^[28]

In some areas, the related SR ABC is used, with the S to mean **Safety**.^[26]

DRsABC

A modification to DRABC is that when there is no response from the patient, the rescuer is told to *send for help*^{[29][30]}

AcBC

Some trainers and protocols use an additional (small) 'c' in between the A and B, standing for 'cervical spine' or 'consider C-spine' This is a reminder to be aware of potential neck injuries to a patient, as opening the airway may cause further damage unless a special technique is used.

CABC

The military frequently use CABC. With the first C standing for catastrophic haemorrhage. It is hypothesised that major bleeding will kill a casualty before an airway obstruction and with the development of quick and easy to apply haemostatic agents controlling blood loss should occur first.

Current concepts of Cardio Pulmonary Resuscitation (American heart Association 2010 guidelines)

- 1) Recommended order for CPR changed from ABC to CAB where C stands for Compression.
- 2) No looking, Listening and feeling of Carotid pulse.
- 3) The more harder and faster chest compressions atleast 2 inches deep with atleast 100 compressions per minute.
- 4) Continue Chest compression till emergency medical service arrives.
- 5) For untrained personnel, AHA recommends performing compression only CPR without artificial respiration.
- 6) Compression to ventilation ratio should be 30 : 2 if 1 rescuer is present and 15 : 2 in case of 2 rescuers.

Steps of cardio pulmonary resuscitation

- 1) Check the victim for unresponsiveness. If the person is not responsive and not breathing or not breathing normally. Call emergency medical service and return to the victim.
- 2) If the victim is still not breathing normally, coughing or moving, begin chest compressions. Push down in the center of the chest 2 inches 30 times. Pump hard and fast at the rate of at least 100/minute, faster than once per second.
- 3) Tilt the head back and lift the chin. Pinch nose and cover the mouth with yours and blow until you see the chest rise. Give 2 breaths. Each breath should take 1 second
- 4) Continue with 30 pumps and 2 breaths until help arrives.

Conclusion - India as witnessed tremendous growth, and modernization in the recent years, resulting in rapid changes in lifestyle, motorization and industrialization. As a result, number of road traffic accidents and medical emergencies are steadily on rise. Though we have state-of-the-art hospitals, skilled specials, knowledge and technology and lack of appropriate response in the "Golden Hour" has resulted in unacceptable number of deaths disability and complications following accidents or medical emergencies. This warranted the need for pre hospital care to constrain the damage and prevent the secondary complications.

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