

SAFETY

simulation for medical practice

SIMULATION APPROACH FOR
EDUCATION AND TRAINING
IN EMERGENCY

Systematic Approach to Emergency

University of Stavanger



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VIRTUAL PATIENTS



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Welcome to this module on Systematic Approach to Emergency. We will be covering the primary assessment XABCDE, how to take an acute medical history concisely using SAMPLER, use of the communication tool ISBAR and cardiopulmonary resuscitation.

XABCDE & SAMPLER

Primary assessment (XABCDE)

Introduction

Structured assessment involves the use of standardized assessment tools for patient care. Patient assessment is crucial in managing medical patients. Symptoms may be vague and untypical. There may be several different explanations for the patients' medical condition. A good patient assessment must therefore be systematic to ensure that important findings are registered. The Airway, Breathing, Circulation, Disability, Exposure (ABCDE) approach is applicable in all clinical emergencies for immediate assessment and treatment. The approach is widely accepted by experts in emergency medicine and likely improves outcomes by helping health care professionals focusing on the most life-threatening clinical problems. In an acute setting, high-quality (X)ABCDE skills among all treating team members can save valuable time and improve team performance. (1)

Primary Assessment

The primary assessment focuses on the identification and management of life-threatening conditions and to establish immediate management strategies. To determine the patient's status, providers must identify if there is any ongoing life-threatening bleeding or obstacles in airway, breathing, circulation and then evaluate the patient's level of consciousness. If a life threat is identified, immediate interventions must be initiated before further assessment is performed. The primary assessment is the most time effective aspect of the assessment process because it focuses on the identification and management of life-threatening conditions. In the first 60 to 90 seconds, as you look at, talk with, and touch your patient, you should be able to identify the threats. You will form the general impression of your patient based almost solely on the initial presentation and presenting complaint. The remaining history taking, and physical exam should be done after the primary assessment.

X – catastrophic hemorrhage is bleeding severe enough to cause exsanguination (bleeding out). Once the scene assessment has been completed, you need to check for and manage any actual or potential life-threatening hemorrhage. When this has been completed you can return to the normal ABCDE.

A – Assessment of the patient airways status focuses on two questions: Is the airway open and patent? Is it likely to remain so? A patient's inability to maintain a patent airway is a life-threatening emergency and will need immediate interventions to establish a free airway. If you hear sonorous respiration (snoring), it is likely that the tongue is partially obstructing the airway due to the position of the patient.

B – Assess the patient's breathing in the same way as with the airways. First, is the patient breathing? If no, you have to breathe for the patient. Second, if the patient is breathing, you need to assess if the breathing is adequate? If the breathing isn't adequate, you need to expose the chest and inspect for injuries. Note the patient's breathing rate, and the work of breathing. Signs of increased work of breathing may include the use of accessory muscles, intercostal recession, restlessness, and leaning forward to inhale. Assess for chest rise and fall, look for symmetry of the chest wall, and the depth and rhythm of respiration. Auscultate lung sounds, if the breathing isn't adequate, note the presence, clarity, and abnormal sounds. If the breathing assessment reveals hypoxia or inadequate ventilations, then it's important to begin correcting these problems.

C – Assess circulation helps you to evaluate how well blood is circulating to the major organs, including the brain, lungs, heart, kidneys, and the rest of the body. The patient's pulse rate, quality, and regularity should be noted. Palpating the radial, carotid, or femoral artery is essential. The normal resting pulse rate for an adult is between 60 and 100 beats/min. In pediatric patients, the younger the patient, the faster the pulse will be. Pulse quality is described as absent, weak, thready, bounding, or strong. A weak pulse may indicate poor perfusion. The pulse should also be evaluated to determine whether it is regular or irregular. If the patient has inadequate circulation, you must take immediate action to restore or improve circulation, control severe bleeding, and improve oxygen delivery to the tissue. At this point, perform a rapid exam to identify any major external bleeding. Once the pulse rate, quality, and regularity have been assessed, the skin needs to be assessed for color, temperature, moisture, and capillary refill. Capillary refill time is often evaluated to determine the status of the cardiovascular system.

D - Once you've examined the patient's airway, breathing, and circulation and addressed any life-threatening conditions, perform a brief neurologic evaluation of the patient including Glasgow coma scale. Do not forget to measure the blood glucose levels.

E - As you physically examine the patient, visually inspect each area to ensure an accurate and thorough assessment. Although not every patient needs to be completely exposed for appropriate assessment to occur, it is important to keep in mind that you can't assess what you can't see. Look through the environment for anything that can be relevant. And never ever forget hypothermia. Cover the patient with blankets.

History taking in an acute setting (SAMPLER)

An efficient, systematic, and comprehensive medical history can help you eliminate differential diagnoses, establish a working diagnosis, and determine treatment interventions. A sensible approach to obtaining a patient's medical history is to follow the SAMPLER mnemonic.

The SAMPLER is an acronym:

- **S**igns/symptoms: Symptoms are the subjective perceptions of what the patient feels, such as nausea, headache, and dizziness. Signs, on the other hand, are objective things you can observe, feel, see, hear etc.
- **A**llergies: Ask the patient if they have any known allergies.
- **M**edications: Get an overview of which medications the patient takes regularly. It may also be of interest if the patient is using any drugs or alternative medication.
- **P**ertinent past medical history: Try to discern which medical history is pertinent to the presenting complaint.
- **L**ast oral intake: Ask the patient when and what they last ate and drank. This is important in terms of planning acute surgery.
- **E**vents preceding: Were there any events that led to the signs and symptoms that the patient now is experiencing? What did the patient do before the symptoms started?
- **R**isk factors: The risk factors can be either environmental, social, psychological or familiar.

Structured communication tool - ISBAR

Introduction

Clinical handover is defined as “The exchange between health professionals of information about a patient accompanying either a transfer of control over, or of responsibility for, the patient”. (2) It is one of the most critical steps in a patient’s journey and is an important skill that needs to be taught to all health professionals. Performed well, clinical handover should ensure that lapses in continuity of patient care, errors and harm are reduced in the hospital or community setting. (3) The key function of clinical handover is to improve the effectiveness of the actions taken by the recipient/s. (2)

Evidence suggests the use of structured, standardized frameworks for handover improves information transfer and patient outcomes. (4) A number of structured formats have been developed, however, one of the most widespread and well-studied frameworks is the ISBAR. (5) The ISBAR framework, endorsed by the World Health Organization is a patient safety communication structure that aids simplified, effective, structured, and anticipated communication between healthcare personnel. The ISBAR framework represent a standardizes approach to communication which can be used in any situation. ISBAR stand for introduction, situation, background, assessment, and recommendation.

ISBAR

The ISBAR framework consists of five elements focused on communication, which include:

Introduction

Who you are, your role, where you are and why you are communicating?

Situation

What is happening at the moment?

Background

What are the issues that led up to this situation?

Assessment

What do you believe the problem is?

Recommendation

What should be done to correct the situation?

Who can use ISBAR?

ISBAR can be used for information exchange between all health professionals, including doctor to doctor; nurse to nurse; doctor to nurse, doctors to paramedic, nurse to paramedic.

ISBAR can be used in a number of situations including end of shift reports inter-hospital transfers, medical emergencies and patient discharge.

Tips for preparing for handover (ISBAR)

- Preparation is vital, with the reason of referral being made absolutely clear.
- Having written, prepared questions will assist.
- It is important to gather all patient information before handover e.g. charts, ECG, vital measurement.
- Take notes and record any instructions.
- ISBAR works best when both parties are using the same framework.

Cardiopulmonary Resuscitation (BLS/ALS Algorithm)

Introduction

In this module you will learn more about cardiopulmonary resuscitation and the Basic Life Support (BLS) and Advanced Life Support (ALS) algorithm. When a patient condition is critical, it is essential that you are well trained to make the right decisions and provide the right care for the patient. This module is an introduction that will give you basic knowledge. For more knowledge we recommend taking a course and practice on your own. Sudden cardiac arrest (SCA) is the third leading cause of death in Europe. (6)
Cardiopulmonary resuscitation (CPR) is the supply of circulation and ventilation by artificial effort to avoid irreversible destruction of the brain. (7)

In-Hospital Cardiac Arrest (IHCA)

In Europe, the annual incidence of IHCA is between 1.5 and 2.8 per 1,000 hospital admissions. The initial rhythm, the place of SCA, and the degree of monitoring at the time of SCA are all factors associated with survival.
The rates of survival after 30 days vary, ranging from Survival 15% to 34%. (6)

Out of Hospital Cardiac Arrest (OHCA)

The annual incidence of OHCA in Europe is between 67 to 170 per 100,000 inhabitants. Resuscitation is attempted or continued by emergency medical service personnel in about 50–60% of cases (between 19 to 97 per 100,000 inhabitants).
Survival rates at hospital discharge are on average 8%, varying from 0% to 18%. (6)

Long term outcomes

In European countries where withdrawal of life-sustaining treatment (WLST) is routinely practiced, a good neurological outcome is seen in > 90% of patients. Most patients can return to work. (6)
In countries where WLST is not practiced, poor neurological outcomes are more common (50% with 33% in a persistent vegetative state). (7)
Amongst survivors with a good neurological outcome, neurocognitive, fatigue and emotional problems are common and cause deteriorated health-related quality of life. Patients and relatives may develop post-traumatic stress disorder. (8)

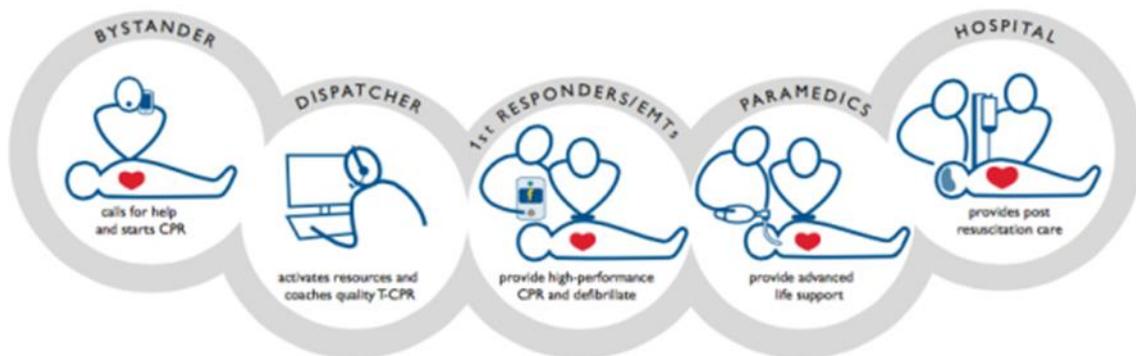
Response time

Data from a large Swedish registry showed that a delay of more than one minute from cardiac arrest to call or to start of CPR a delay of more than 2 min from call until the arrival of the rescue team, and a delay of more than 3 min from cardiac arrest to defibrillation were all associated with worse overall outcome. (9)

Chain of survival

The chain of survival aims to demonstrate the interrelationship between key stages of resuscitation and emphasizes the need for all links to be effective to optimize the chances of survival. The contribution of each of the four links diminishes rapidly as patients succumb at each stage and the actual attrition rate results in rapidly decreasing numbers of patients progressing along the chain. The Chain of survival illustrates equally important steps that have an impact on survival from cardiac arrest. All of these interventions are time-sensitive and must be optimized to maximize the chance of survival (10).

Fig. 1 Chain of survival



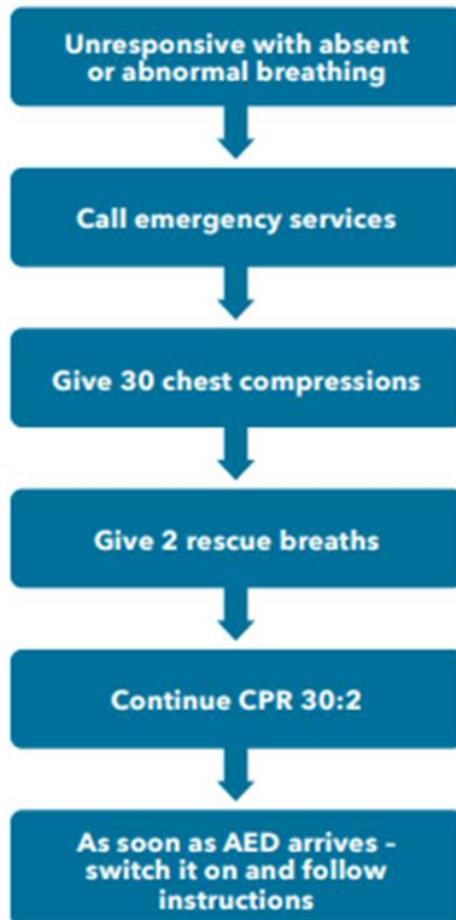
(Reproduced with permission from Laerdal Medical)

Basic Life Support refers to the initial care for anyone who is experiencing a cardiac arrest, respiratory distress, or an obstructed airway. BLS includes knowledge and skills in cardiopulmonary resuscitation (CPR), using automated external defibrillators (AED) and relieving airway obstructions. (11)

Basic Life Support

Fig. 2 – BLS algorithm

BASIC LIFE SUPPORT



(reproduced from Olasveengen et. al 2021, Resuscitation) (11)

Fig. 3 – BLS step by step

BASIC LIFE SUPPORT STEP-BY-STEP



SEQUENCE/ACTION	TECHNICAL DESCRIPTION
SAFETY 	<ul style="list-style-type: none"> • Make sure that you, the victim and any bystanders are safe
RESPONSE Check for a response 	<ul style="list-style-type: none"> • Shake the victim gently by the shoulders and ask loudly: "Are you all right?"
AIRWAY Open the airway 	<ul style="list-style-type: none"> • If there is no response, position the victim on their back • With your hand on the forehead and your fingertips under the point of the chin, gently tilt the victim's head backwards, lifting the chin to open the airway
BREATHING Look, listen and feel for breathing 	<ul style="list-style-type: none"> • Look, listen and feel for breathing for no more than 10 seconds • A victim who is barely breathing, or taking infrequent, slow and noisy gasps, is not breathing normally
ABSENT OR ABNORMAL BREATHING Alert emergency services 	<ul style="list-style-type: none"> • If breathing is absent or abnormal, ask a helper to call the emergency services or call them yourself • Stay with the victim if possible • Activate the speaker function or hands-free option on the telephone so that you can start CPR whilst talking to the dispatcher
SEND FOR AED Send someone to get an AED 	<ul style="list-style-type: none"> • Send someone to find and bring back an AED if available • If you are on your own, DO NOT leave the victim, but start CPR
CIRCULATION Start chest compressions 	<ul style="list-style-type: none"> • Kneel by the side of the victim • Place the heel of one hand in the centre of the victim's chest - this is the lower half of the victim's breastbone (sternum) • Place the heel of your other hand on top of the first hand and interlock your fingers • Keep your arms straight • Position yourself vertically above the victim's chest and press down on the sternum at least 5 cm (but not more than 6 cm) • After each compression, release all the pressure on the chest without losing contact between your hands and the sternum • Repeat at a rate of 100-120 min-1

Fig. 3 – BLS step by step (continued)

BASIC LIFE SUPPORT STEP-BY-STEP



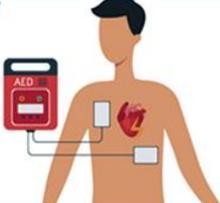
SEQUENCE/ACTION	TECHNICAL DESCRIPTION
<p>COMBINE RESCUE BREATHING WITH CHEST COMPRESSIONS</p> 	<ul style="list-style-type: none"> • If you are trained to do so, after 30 compressions, open the airway again, using head tilt and chin lift • Pinch the soft part of the nose closed, using the index finger and thumb of your hand on the forehead • Allow the victim's mouth to open, but maintain chin lift • Take a normal breath and place your lips around the victim's mouth, making sure that you have an airtight seal • Blow steadily into the mouth whilst watching for the chest to rise, taking about 1 second as in normal breathing. This is an effective rescue breath • Maintaining head tilt and chin lift, take your mouth away from the victim and watch for the chest to fall as air comes out • Take another normal breath and blow into the victim's mouth once more to achieve a total of two rescue breaths • Do not interrupt compressions by more than 10 seconds to deliver the two breaths even if one or both are not effective • Then return your hands without delay to the correct position on the sternum and give a further 30 chest compressions • Continue with chest compressions and rescue breaths in a ratio of 30:2
<p>COMPRESSION-ONLY CPR</p> 	<ul style="list-style-type: none"> • If you are untrained, or unable to give rescue breaths, give chest-compression-only CPR (continuous compressions at a rate of 100-120 min-1)
<p>WHEN AED ARRIVES Switch on the AED and attach the electrode pads</p> 	<ul style="list-style-type: none"> • As soon as the AED arrives switch it on and attach the electrode pads to the victim's bare chest • If more than one rescuer is present, CPR should be continued whilst the electrode pads are being attached to the chest
<p>FOLLOW THE SPOKEN/VISUAL DIRECTIONS</p> 	<ul style="list-style-type: none"> • Follow the spoken and visual directions given by the AED • If a shock is advised, ensure that neither you nor anyone else is touching the victim • Push the shock button as directed • Then immediately resume CPR and continue as directed by the AED

Fig. 3 – BLS step by step (continued)

BASIC LIFE SUPPORT STEP-BY-STEP



SEQUENCE/ACTION	TECHNICAL DESCRIPTION
<p>IF NO SHOCK IS ADVISED Continue CPR</p> 	<ul style="list-style-type: none"> • If no shock is advised, immediately resume CPR and continue as directed by the AED
<p>IF NO AED IS AVAILABLE Continue CPR</p> 	<ul style="list-style-type: none"> • If no AED is available, OR whilst waiting for one to arrive, continue CPR • Do not interrupt resuscitation until: <ul style="list-style-type: none"> • A health professional tells you to stop OR • The victim is definitely waking up, moving, opening eyes, and breathing normally • OR • You become exhausted • It is rare for CPR alone to restart the heart. Unless you are certain that the victim has recovered continue CPR • Signs that the victim has recovered <ul style="list-style-type: none"> • Waking-up • Moving • Opening eyes • Breathing normally
<p>IF UNRESPONSIVE BUT BREATHING NORMALLY Place in the Recovery Position</p> 	<ul style="list-style-type: none"> • If you are certain that the victim is breathing normally but still unresponsive, place them in the recovery position SEE FIRST AID SECTION • Be prepared to restart CPR immediately if the victim becomes unresponsive, with absent or abnormal breathing

(reproduced from Olasveengen et. al 2021, Resuscitation) (11)

Fig. 4 – BLS infographic summary



(reproduced from Olasveengen et. al 2021, Resuscitation) (11)

Here you can find more information about basic life support:

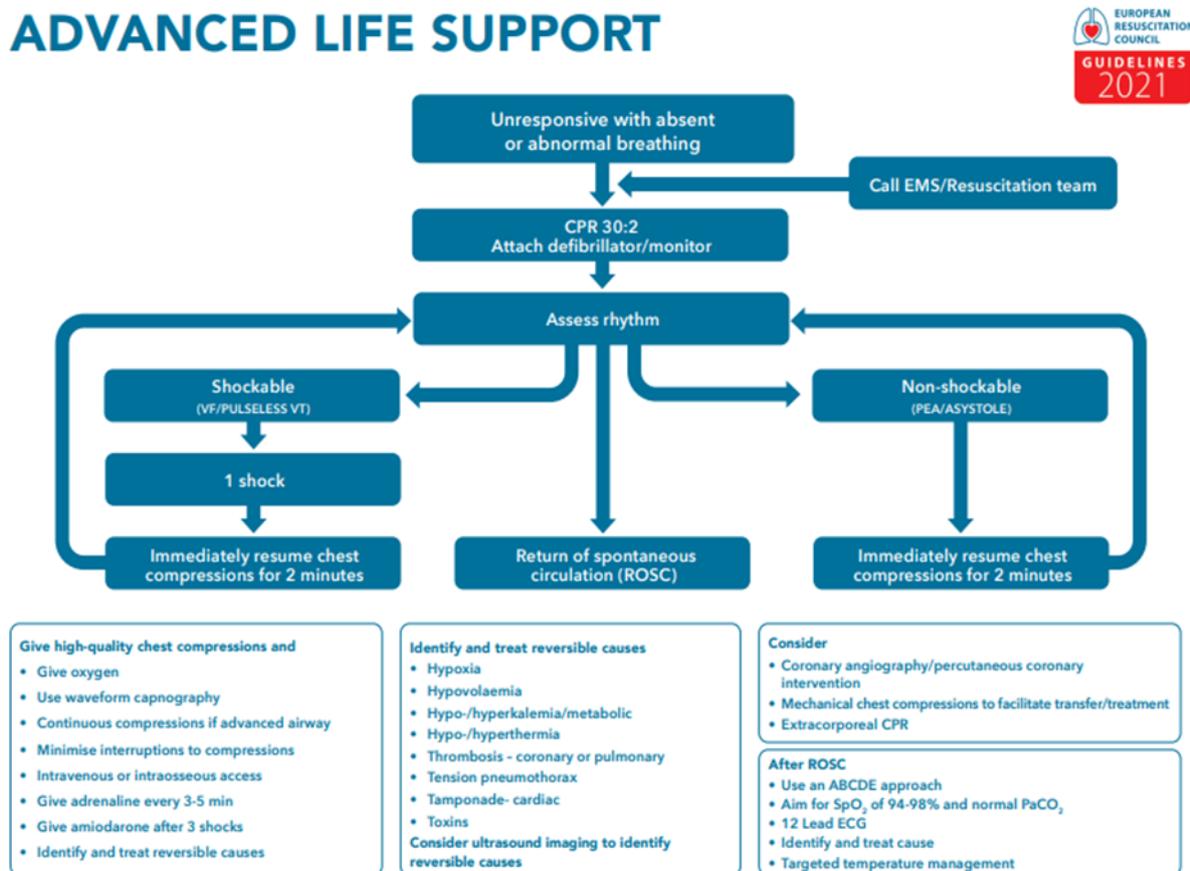
[Basic Life Support - ERC Guidelines 2021](#)

[European-Resuscitation-Council-Guidelines-2021-Ba.pdf](#)

Adult Advanced Life Support

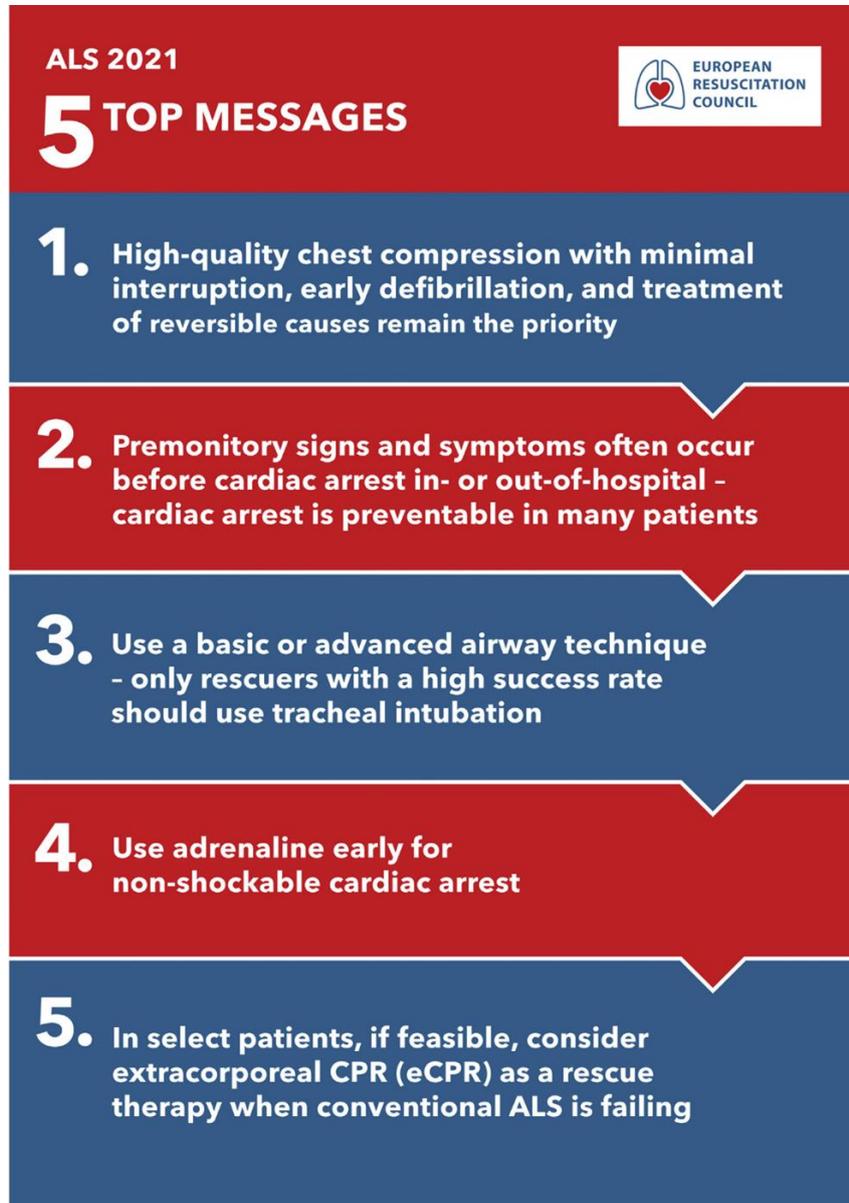
Adult advanced life support (ALS) includes the advanced interventions that follow basic life support (BLS) and the use of an automated external defibrillator (AED). Basic life support continues during, and overlaps with ALS interventions. This ALS section includes the prevention and treatment of both IHCA and OHCA, the ALS algorithm, manual defibrillation, and airway management during CPR, drugs and their delivery during CPR and the treatment of peri-arrest arrhythmias. (12)

Fig. 5 – Advanced Life Support algorithm



(reproduced from Soar et al. 2021, Resuscitation)
(12)

Fig. 6 – ALS summary



(reproduced from Soar et al. 2021, Resuscitation) (12)

Here you can find more information about advanced life support:

[Advanced Life Support - ERC Guidelines 2021](#)
[European-Resuscitation-Council-Guidelines-2021-Ad.pdf](#)

References

1. Thim T, Krarup NH, Grove EL, Rohde CV, Lofgren B. Initial assessment and treatment with the Airway, Breathing, Circulation, Disability, Exposure (ABCDE) approach. *Int J Gen Med.* 2012;5:117-21.
2. Cohen MD, Hilligoss PB. The published literature on handoffs in hospitals: deficiencies identified in an extensive review. *Quality & safety in health care.* 2010;19(6):493-7.
3. Jorm CM, White S, Kaneen T. Clinical handover: critical communications. *The Medical journal of Australia.* 2009;190(S11):S108-9.
4. Foster S, Manser T. The effects of patient handoff characteristics on subsequent care: a systematic review and areas for future research. *Academic medicine : journal of the Association of American Medical Colleges.* 2012;87(8):1105-24.
5. Tingle J. The WHO Patient Safety Curriculum Guide. *Br J Nurs.* 2011;20(22):1456-7.
6. Grasner JT, Herlitz J, Tjelmeland IBM, Wnent J, Masterson S, Lilja G, et al. European Resuscitation Council Guidelines 2021: Epidemiology of cardiac arrest in Europe. *Resuscitation.* 2021;161:61-79.
7. Perkins GD, Graesner JT, Semeraro F, Olasveengen T, Soar J, Lott C, et al. European Resuscitation Council Guidelines 2021: Executive summary. *Resuscitation.* 2021;161:1-60.
8. Gräsner J-T, Herlitz J, Tjelmeland IB, Wnent J, Masterson S, Lilja G, et al. European Resuscitation Council Guidelines 2021: epidemiology of cardiac arrest in Europe. *Resuscitation.* 2021;161:61-79.
9. Tirkkonen J, Tamminen T, Skrifvars MB. Outcome of adult patients attended by rapid response teams: a systematic review of the literature. *Resuscitation.* 2017;112:43-52.
10. Nolan J, Soar J, Eikeland H. The chain of survival. *Resuscitation.* 2006;71(3):270-1.
11. Olasveengen TM, Semeraro F, Ristagno G, Castren M, Handley A, Kuzovlev A, et al. European Resuscitation Council Guidelines 2021: Basic Life Support. *Resuscitation.* 2021;161:98-114.
12. Soar J, Bottiger BW, Carli P, Couper K, Deakin CD, Djarv T, et al. European Resuscitation Council Guidelines 2021: Adult advanced life support. *Resuscitation.* 2021;161:115-51.