Guidelines: Introduction

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1. Introduction

These new guidelines are the culmination of many years of international collaboration to improve the practice and teaching of resuscitation medicine in order to improve survival from cardiorespiratory arrest.\(^1\,^2\) English ambulance services initiate resuscitation on about 28,000 people who sustain an OHCA each year (52 cases per 100,000 inhabitants) and approximately 8% survive to leave hospital.\(^3\) Data from the UK National Cardiac Arrest Audit (NCAA) indicate that in-hospital cardiac arrest occurs in 1.6 per 1000 hospital admissions with rate of survival to hospital discharge of 18.4%.\(^4\) Recent international data suggests that survival rates after both in- and out-of-hospital cardiac arrest are slowly improving.\(^5\,-\,^7\) It is hoped that refinements in resuscitation guidelines will continue to contribute to increasing survival rates.

The process used to produce the Resuscitation Council UK Guidelines 2015 has been accredited by the National Institute for Health and Care Excellence (NICE). The guidelines process includes:

- Systematic reviews with grading of the quality of evidence and strength of recommendations (detailed below). These reviews formed the basis of the 2015 International Liaison Committee on Resuscitation (ILCOR) Consensus on Cardiopulmonary Resuscitation (CPR) Science with Treatment Recommendations (CoSTR).\(^1\,^2\)
- The involvement of stakeholders from around the world including members of the public and cardiac arrest survivors.
- Collaboration with the European Resuscitation Council (ERC) and adaption of the ERC Guidelines for use in the UK.\(^8\)
Details of the guidelines development process can be found in Resuscitation Council UK’s Guidelines Development Process Manual.

2. The ILCOR evidence evaluation process

For the 2015 evidence evaluation process ILCOR formed seven task forces: basic life support (BLS), advanced life support (ALS), acute coronary syndromes (ACS), paediatric BLS and ALS, neonatal resuscitation, education implementation and teams (EIT), and, for the first time, first aid. Using the PICO [population, intervention, comparator, outcome] format, each task force identified and prioritised the questions to be addressed and then performed detailed systematic reviews. The task forces used the methodological approach for evidence evaluation and development of recommendations proposed by the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) Working Group. A detailed search for relevant articles was performed in each of three online databases (MEDLINE, Embase, and the Cochrane Library). The quality of the evidence (or confidence in the estimate of the effect) was categorised as high, moderate, low, or very low, based on the study methodologies and the risk of bias, inconsistency, indirectness, imprecision, and publication bias. Written summaries of evidence for each outcome (the Consensus on Science statements) were drafted by the evidence reviewers and then discussed, debated and refined by the task forces until consensus was reached. Whenever possible, consensus-based treatment recommendations were created. These recommendations (designated as strong or weak and either for or against a therapy or diagnostic test) were accompanied by an overall assessment of the evidence, and a statement from the task force about the values and preferences that underpinned the recommendations. There was open public and stakeholder consultation at several stages during this process.

3. From science to guidelines

The 2015 CoSTR summarises the science supporting CPR; although this includes treatment recommendations these are generally broad and do not provide sufficient practical detail for clinical implementation. These Resuscitation Council UK guidelines have been adapted from the 2015 ERC Guidelines and are tailored specifically to clinical practice in the UK. The guidelines have been peer reviewed by the Executive Committee of Resuscitation Council UK, which comprises 25
individuals and includes lay representation and representation of the key stakeholder groups.

4. Summary of main changes since the 2010 Guidelines

Main changes in the 2015 Guidelines are summarised at the beginning of each guideline topic and are listed below.

**Basic life support and automated external defibrillation**

- Guidelines 2015 highlights the critical importance of the interactions between the emergency medical dispatcher, the bystander who provides CPR and the timely deployment of an automated external defibrillator (AED).
- The emergency medical dispatcher plays an important role in the early diagnosis of cardiac arrest, the provision of dispatcher-assisted CPR (also known as telephone CPR), and the location and dispatch of an AED.
- The knowledge, skills and confidence of bystanders will vary according to the circumstances of the arrest, level of training and prior experience. The bystander who is trained and able should assess the collapsed victim rapidly to determine if the victim is unresponsive and not breathing normally and then immediately alert the emergency services. Whenever possible, alert the emergency services without leaving the victim.
- The victim who is unresponsive and not breathing normally is in cardiac arrest and requires CPR. Immediately following cardiac arrest, blood flow to the brain is reduced to virtually zero, which may cause seizure-like episodes that may be confused with epilepsy. Bystanders and emergency medical dispatchers should be suspicious of cardiac arrest in any patient presenting with seizures and carefully assess whether the victim is breathing normally.

**Advanced life support**

- There is increased emphasis on minimally interrupted high-quality chest compressions throughout any ALS intervention.
- Chest compressions must only be paused briefly to enable specific interventions. This includes minimising interruptions in chest compressions
to less than 5 seconds when attempting defibrillation or tracheal intubation.

- There is a new section on monitoring during ALS.
- Waveform capnography must be used to confirm and continually monitor tracheal tube placement, and may be used to monitor the quality of CPR and to provide an early indication of return of spontaneous circulation (ROSC).
- There are a variety of approaches to airway management during CPR and a stepwise approach based on patient factors and the skills of the rescuer is recommended.
- The recommendations for drug therapy during CPR have not changed, but there is equipoise for the role of drugs in improving outcomes from cardiac arrest.
- The routine use of mechanical chest compression devices is not recommended, but they may be useful in situations where sustained high-quality manual chest compressions are impractical or compromise provider safety.
- Peri-arrest ultrasound may be used to identify reversible causes of cardiac arrest.
- Extracorporeal life support techniques may be used as a rescue therapy in selected patients where standard ALS measures are not successful.
- The ALS algorithm has been modified slightly to show these changes.

**Post-resuscitation care**

- There is a greater emphasis on the need for urgent coronary catheterisation and percutaneous coronary intervention (PCI) following out-of-hospital cardiac arrest of likely cardiac cause.
- Targeted temperature management remains important but the target temperature can be either 36°C or 33°C according to local policy. There was a preference for 36°C among the guidelines group because it is easier to implement and there is no evidence that it is inferior to 33°C.
- Prognostication is now undertaken using a multimodal strategy and there is emphasis on allowing sufficient time for neurological recovery and to enable sedatives to be cleared.

**Paediatric life support**

- The duration of delivering a breath is about 1 second, to coincide with adult
practice.
• For chest compressions, depress the lower sternum by at least one-third the anterior-posterior diameter of the chest, or by 4 cm for the infant and 5 cm for the child.
• In the presence of a febrile illness, if there are no signs of septic shock, children should be given fluid cautiously and then reassessed. In some forms of septic shock, restricted fluid resuscitation with isotonic crystalloid may be more beneficial than the liberal use of fluids.
• For cardioversion of a supraventricular tachycardia (SVT), the initial dose has been revised to 1 J kg\(^{-1}\).
• Prevent fever in children who have return of spontaneous circulation (ROSC) after out-of-hospital cardiac arrest.
• In children, targeted temperature management can be with normothermia or mild hypothermia.

**Resuscitation and support of transition of babies at birth**

• For uncompromised term and preterm infants, a delay in cord clamping of at least one minute from the complete delivery of the infant, is now recommended. As yet there is insufficient evidence to recommend an appropriate time for clamping the cord in infants who are severely compromised at birth. For infants requiring resuscitation, resuscitative intervention remains the immediate priority.
• The temperature of newly born infants should be actively maintained between 36.5°C and 37.5°C after birth unless a decision has been taken to start therapeutic hypothermia.
• Preterm infants of less than 32 weeks gestation may benefit from a combination of interventions to maintain their body temperature between 36.5°C and 37.5°C after delivery, through stabilisation and neonatal unit admission.
• An ECG, if available, can give a rapid accurate and continuous heart rate reading during newborn resuscitation. It does not, however, indicate the presence of a cardiac output and should not be the sole means of monitoring the infant.
• Resuscitation of term infants should commence in air. For preterm infants, a low concentration of oxygen (21–30%) should be used initially for resuscitation at birth. If, despite effective ventilation, oxygenation (ideally guided by oximetry) remains unacceptable, use of a higher concentration of oxygen should be considered.
• Attempts to aspirate meconium from the nose and mouth of the unborn infant, while the head is still on the perineum, are not recommended.
• Nasal continuous positive airways pressure (CPAP) rather than routine intubation may be used to provide initial respiratory support of all spontaneously breathing preterm infants with respiratory distress.
• The recommended compression: ventilation ratio for CPR remains at 3:1 for newborn resuscitation. Asynchronous compressions are not recommended.

**Prehospital resuscitation**

• The team approach is emphasised.
• Supraglottic airways often provide an ideal airway and should be used as part of a stepwise airway management pathway. Tracheal intubation is attempted only by those with adequate training and only if simpler airways prove inadequate.
• There is no evidence that a pre-defined period of CPR before defibrillation improves success rates. Mechanical chest compression devices are a reasonable alternative to high quality manual chest compressions in situations where sustained high quality manual chest compressions are impractical or compromise provider safety.
• The use of waveform capnography is emphasised not only to indicate placement of a tracheal tube in the airway (and not the oesophagus), but also as a useful indicator of cardiac output and the effectiveness of chest compressions. A sudden increase in end-tidal CO2 may be an early indicator of ROSC.
• After ROSC is achieved passive cooling is recommended in the prehospital phase.
• In patients with evidence of ST elevation, transfer to a cardiac arrest centre capable of performing PCI is the optimal care pathway.

**Prevention of cardiac arrest and decisions about CPR**

• Prevention of in-hospital cardiac arrest requires staff education, monitoring of patients, recognition of patient deterioration, a system to call for help and an effective response.
• Ensure that all clinical staff are trained in the recognition, monitoring, and management of critically ill patients, and that they know their role in the rapid response system.
• Ensure that all policies on CPR decisions are based on current national guidance, and ensure that all clinical personnel understand it.
• Identify those fully informed patients who do not wish to receive CPR, those patients for whom cardiorespiratory arrest is an anticipated terminal event and for whom CPR would be inappropriate, and those patients who have lost capacity in whom a decision not to attempt CPR is in their best interests.

In-hospital resuscitation

• There is continuing emphasis on the use of rapid response systems for care of the deteriorating patient and prevention of in-hospital cardiac arrest.
• There is continued emphasis on minimally interrupted high-quality chest compressions throughout CPR: chest compressions are paused briefly only to enable specific interventions. This includes minimising interruptions in chest compressions to attempt defibrillation.

Peri-arrest arrhythmia

• The basic principles of assessment and treatment of a suspected cardiac arrhythmia are unchanged.
• Use of oxygen therapy is not recommended unless the patient is hypoxic, in which situation the concentration of oxygen delivered should be guided by monitoring arterial oxygen saturation whenever possible.
• There is stronger emphasis on the use of antithrombotic therapy in atrial fibrillation (AF) and the importance of assessing thromboembolic risk in people with AF.

Education and implementation

• All school children should be taught how to perform CPR and should be made aware of how to use an AED.
• Ambulance services should have access to a national database of AEDs and their dispatchers should have specific training in how to provide clear and effective instructions to rescuers over the telephone.
• Frequent ‘low-dose’ training may be a beneficial method for providing CPR/AED retraining.
• The outcomes for candidates attending an e-ALS course are the same as
those attending a conventional 2-day ALS course.
• High-fidelity manikins are not essential for life support courses.
• Life support courses should incorporate training in non-technical skills (e.g. leadership, team behaviour and communication) into their curricula.
• Healthcare systems should evaluate their processes to ensure those with a cardiac arrest have the best outcomes.
• Teams who manage patients in cardiac arrest should use data-driven performance-focused debriefing.
• Social media and innovative technology have vital roles to play in improving outcomes from cardiac arrest.

Quality and safety
The changes in the new Guidelines 2015 compared with the previous 2010 Guidelines are relatively subtle. Nevertheless, some of the treatment recommendations in these guidelines will change the way resuscitation is delivered. It will take time for courses and training materials to be updated and for this change in practice to be disseminated to healthcare professionals and laypeople by resuscitation trainers. As this transition is made there will inevitably be some variation in practice between individuals and healthcare organisations. Healthcare organisations should implement those components of Guidelines 2015 relevant to them by the end of 2016. Resuscitation Council UK’s Quality standards for cardiopulmonary resuscitation practice and training will help with the implementation of these guidelines in health care settings.

Guidelines 2015 do not define the only way that resuscitation should be achieved; they merely represent a widely accepted view of how resuscitation can be undertaken both safely and effectively. The publication of new treatment recommendations does not imply that current clinical care is either unsafe or ineffective.

Resuscitation Council UK Guidelines undergo a major revision every 5 years (synchronised with the International Consensus on Cardiopulmonary Resuscitation Science Conferences and new ERC Guidelines) with occasional interim amendments to reflect very important new science. These interim amendments are generally made only if delaying guideline changes until a major revision is thought to put patients at risk. The decision to publish interim ‘advisory statements’ is made by the ILCOR delegates and although some experts advocate a more continuous process of science review, the next major review of these guidelines is likely to be in 2020.

These 2015 Guidelines include some changes in practice that reflect new science that has been published since 2010. Consistency in practice among countries provides the basis for the large trials necessary to establish best practice, and the further development of such international collaboration is encouraged. Similarly, consistent collection and reporting of audit data in registries that enable comparison between systems does much to improve practice and ensure that the victims of sudden cardiac arrest are given the best chance of successful resuscitation.⁹

The National Out of Hospital Cardiac Arrest Outcomes project measures patient, process and outcome variables from out-of-hospital-cardiac arrest in the UK. The
The project is run in collaboration with the National Ambulance Service Medical Directors Group with support from the British Heart Foundation, Resuscitation Council UK and University of Warwick. The project is designed to measure the epidemiology and outcomes from cardiac arrest and to serve as a national resource for continuous quality improvement initiatives for cardiac arrest.

The National Cardiac Arrest Audit (NCAA) is an ongoing, national, comparative outcome audit of in-hospital cardiac arrests. It is a joint initiative between Resuscitation Council UK and the Intensive Care National Audit & Research Centre (ICNARC) and is open to all acute hospitals in the UK and Ireland. The audit monitors and reports on the incidence of, and outcome from, in-hospital cardiac arrest in order to inform practice and policy. It aims to identify and foster improvements in the prevention, care delivery and outcomes from cardiac arrest.

Conflict of interest policy

All the individuals contributing to the writing of these guidelines have signed and adhered to the Resuscitation Council UK Conflict of Interest (COI) Policy. The COI declarations of all authors are listed in Appendix 1.

Acknowledgement

The process leading to the publication of the guidelines has entailed considerable work by many individuals over a protracted period. Resuscitation Council UK would like to thank all the individuals and organisations that have contributed to the process and made this publication possible.

5. Abbreviations used

The following abbreviations have been used in these guidelines:

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Accreditation of the 2015 Guidelines

NICE has accredited the process used by Resuscitation Council UK to produce its Guidelines development Process Manual. Accreditation is valid for 5 years from March 2015. More information on accreditation can be viewed at https://www.nice.org.uk/about/what-we-do/accreditation.

References


Related content
- The ABCDE Approach
- Training Courses

Downloads
- Guidance for safer handling (PDF)840.81 KB
- Guidelines Development Process Manual323.56 KB