

# Resuscitation Service: An Overview

## Introduction

Every hospital has a duty of care to ensure that an effective and safe resuscitation service is provided for its patients. The satisfactory performance of the resuscitation service has wide-ranging implications in terms of resuscitation equipment, resuscitation training, standards of care, clinical governance, risk management and clinical audit (Jevon, 2002; Royal College of Anaesthetists *et al.*, 2008). Standards for resuscitation and resuscitation training have been published (Royal College of Anaesthetists *et al.*, 2008).

The aim of this chapter is to provide an overview to the resuscitation service in the hospital setting.

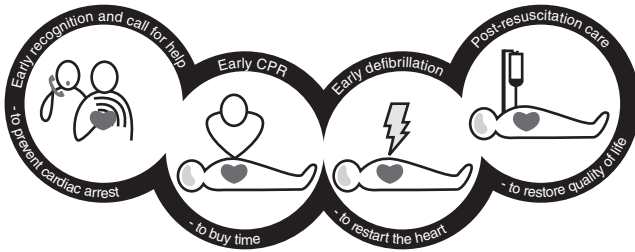
## Learning outcomes

At the end of the chapter the reader will be able to:

- Discuss the concept of the chain of survival
- Summarise *Cardiopulmonary Resuscitation: Standards for Clinical Practice and Training*
- Discuss the key recommendations in the joint statement
- Discuss the principles of safer handling during cardiopulmonary resuscitation (CPR)

## Concept of the chain of survival

Survival from cardiac arrest relies on a sequence of time-sensitive interventions (Nolan *et al.*, 2006). The concept of the original chain of survival emphasises that each time-sensitive intervention



**Fig. 1.1** Chain of survival. Reproduced with permission from Laerdal Medical Ltd, Orpington, Kent, UK.

must be optimised in order to maximise the chance of survival: a chain is only as strong as its weakest link (Cummins *et al.*, 1991).

The chain of survival was revised in 2005 (Figure 1.1) to stress the importance of recognising critical illness and/or angina and preventing cardiac arrest (both in and out of hospital) and post-resuscitation care (Nolan, 2005):

- *Early recognition and call for help to prevent cardiac arrest*: this link stresses the importance of recognising patients at risk of cardiac arrest, calling for help and providing effective treatment to hopefully prevent cardiac arrest; up to 80% of patients sustaining an in-hospital cardiac arrest have displayed signs of deterioration prior to collapse (Nolan *et al.*, 2006); most patients sustaining an out-of-hospital cardiac arrest also display warning symptoms for a significant duration before the event (Muller *et al.*, 2006)
- *Early CPR to buy time and early defibrillation to restart the heart*: the two central links in the chain stress the importance of linking CPR and defibrillation as essential components of early resuscitation in an attempt to restore life
- *Post-resuscitation care to restore quality of life*: the priority is to preserve cerebral and myocardial function, to restore quality of life and indicates the potential benefit that may be provided by therapeutic hypothermia

(Nolan *et al.*, 2006)

## **Cardiopulmonary Resuscitation: Standards for Clinical Practice and Training**

*Cardiopulmonary Resuscitation: Standards for Clinical Practice and Training* (Royal College of Anaesthetists *et al.*, 2008) is a joint statement from the Royal College of Anaesthetists, Royal College of Physicians of London, Intensive Care Society and Resuscitation Council (UK). It has been endorsed by a number of national bodies, including the Royal College of Nursing and builds on previous reports and guidelines including those from the Royal College of Physicians and Resuscitation Council (UK) (Royal College of Anaesthetists *et al.*, 2008).

The joint statement makes a number of recommendations relating to:

- The resuscitation committee
- The resuscitation officer
- Resuscitation training
- Prevention of cardiopulmonary arrest
- The resuscitation team
- Resuscitation in children, pregnancy and trauma
- Resuscitation equipment
- Decisions relating to CPR
- Patient transfer and post-resuscitation care
- Audit and reporting standards
- Research

### **Key recommendations in the joint statement**

#### *Resuscitation committee*

Each hospital should have a resuscitation committee that meets on a regular basis and is responsible for implementing operational policies relating to resuscitation practice and training. The chairperson should be a senior clinician who is actively involved in resuscitation. Membership of the committee should include:

- A physician
- A senior resuscitation officer
- An anaesthetist/intensivist
- A senior manager

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- Representatives from appropriate departments, for example, accident and emergency (A&E), paediatrics, based on local needs

Responsibilities of the resuscitation committee include:

- Advising on the composition and role of the resuscitation team
- Ensuring that resuscitation equipment and resuscitation drugs are available
- Ensuring the adequate provision of resuscitation training
- Ensuring that Resuscitation Council (UK) guidelines and standards for resuscitation are followed
- Updating resuscitation and anaphylaxis policies
- Recording and reporting clinical incidents related to resuscitation
- Auditing resuscitation attempts and do not attempt resuscitation (DNAR) orders

#### *Resuscitation officer*

Each hospital should have a resuscitation officer responsible for resuscitation training, ideally one for every 750 clinical staff. The resuscitation officer should possess a current Resuscitation Council (UK) advanced life support (ALS) certificate and should ideally be a Resuscitation Council (UK) ALS instructor. Adequate training facilities, training equipment and secretarial support should be provided. Responsibilities of the resuscitation officer include:

- Implementing Resuscitation Council (UK) guidelines and standards in resuscitation
- Providing adequate resuscitation training for relevant hospital personnel
- Ensuring there are systems in place for checking and maintaining resuscitation equipment
- Auditing resuscitation attempts using the current Utstein template
- Attending resuscitation attempts and providing feedback to team members
- Coordinating participation in resuscitation-related trials
- Keeping abreast of current resuscitation guidelines

### *Resuscitation training*

Clinical staff should receive regular (at least annual) resuscitation training appropriate to their level and expected clinical responsibilities. It should also be incorporated in the induction programme for new staff. The training should include the recognition and effective treatment of critical illness and providing effective treatment to prevent cardiopulmonary arrest. Some staff, e.g. members of the cardiac arrest team, will require appropriate advanced resuscitation training, e.g. Resuscitation Council (UK) Advanced Life Support (ALS) Course (see Chapter 17).

Extended nursing roles in resuscitation should be encouraged – for example, airway adjuncts, intravenous cannulation and administration of specific emergency drugs, electrocardiogram (ECG) interpretation and defibrillation.

The resuscitation officer is responsible for organising and coordinating the training; a cascade system of training may be needed to meet training demands, particularly in basic life support. Help should be sought from other medical and nursing specialities to provide specific training, such as in neonatal resuscitation.

See Chapter 17 for more detailed information on resuscitation training.

### *Prevention of cardiopulmonary arrest*

Systems should be in place to identify patients who are critically ill and therefore at risk of cardiopulmonary arrest (Royal College of Anaesthetists *et al.*, 2008). Every hospital should have an early warning scoring system in place to identify these patients; adverse clinical indicators or scores should elicit a response to alert expert help, e.g. critical care outreach service, medical emergency team (National Institute for Health and Clinical Excellence (NICE), 2007).

Each healthcare organisation should have a patient's observation chart that facilitates the regular measurement and recording of early warning scores; there should be a clear and specific policy that requires a clinical response to 'calling criteria' or early warning systems ('track and trigger'), including the specific responsibilities of senior medical and nursing staff (Royal College of Anaesthetists *et al.*, 2008). For further information see Chapter 3.

### *The resuscitation team*

Every hospital should have a resuscitation team. Ideally, this should include a minimum of two doctors who are trained in advanced life support. The resuscitation committee should advise on the composition of the cardiac arrest team, but overall the team should be able to perform:

- Airway management (including tracheal intubation)
- Intravenous cannulation (including central venous access)
- Defibrillation (advisory and manual) and electrical cardioversion
- Drug administration
- Advanced techniques, e.g. external cardiac pacing and pericardiocentesis
- Appropriate skills for effective post-resuscitation care

The resuscitation team should have a team leader (usually a doctor), whose responsibilities include:

- Directing and coordinating the resuscitation attempt
- Ensuring the safety of the patient and the team
- Terminating the resuscitation attempt when indicated
- Communicating with the patient's relatives and other health-care professionals
- Documenting the resuscitation attempt (including audit forms)

The resuscitation team should be alerted within 30 seconds of dialing 2222 (recommended telephone number for contacting switchboard following an in-hospital cardiac arrest) (National Safety Patient Agency (NSPA), 2004). The system should be tested on a daily basis.

### *Resuscitation in children, pregnancy and trauma*

**Children:** ideally, there should be a separate paediatric resuscitation team, with the team leader having expertise and training in paediatric resuscitation. All staff who are involved with paediatric resuscitation should be encouraged to attend national paediatric courses, e.g. European Paediatric Advanced Life Support (PALS), Advanced Paediatric Life Support (APLS) and Newborn Life Support (NLS).

**Pregnancy:** an obstetrician and a neonatologist should be involved at an early stage; minimising vascular compression by the gravid uterus and early advanced airway intervention are paramount, together with early consideration for peri-mortem Caesarean section (see Chapter 9).

**Trauma:** hospitals that admit patients with major injuries should have a multi-disciplinary trauma team; in particular, advanced airway management skills may be required.

### *Resuscitation equipment*

The resuscitation committee is responsible for advising on resuscitation equipment, which will largely depend on local requirements and facilities. Ideally, it should be standardised throughout the hospital. Resuscitation equipment is discussed in detail in Chapter 2.

### *Decisions relating to cardiopulmonary resuscitation*

Every hospital should have a 'Do not attempt resuscitation' policy, which should be based on national guidelines (British Medical Association *et al.*, 2007). For further information see Chapter 15.

### *Patient transfer and post-resuscitation care*

Complete recovery from a cardiac arrest is rarely immediate, and the return of spontaneous circulation is just the start, not the end, of the resuscitation attempt; the immediate post-resuscitation period is characterised by high dependency and clinical instability (Jevon, 2002). The patient will probably need to be transferred to a coronary care unit or critical care unit.

Prior to transfer, the patient should be stabilised as far as possible, although this should not delay definitive treatment. Where appropriate, relevant equipment, drugs and monitoring devices should be available. Relatives will need to be informed of the transfer. Policies should be in place relating to transfers within and between hospitals (Jevon, 2002). Patient transfer and post-resuscitation care are discussed in detail in Chapter 13.

### *Audit and reporting standards*

To help ensure a high quality resuscitation service, each hospital should audit:

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- Resuscitation attempt (using the Utstein template), including outcomes
- The availability and use of resuscitation equipment
- The availability of emergency drugs
- Do not attempt resuscitation orders
- Critical incidents which cause, or occur during, cardiopulmonary arrests
- Health and safety issues, including cleaning and decontamination of resuscitation training mannequins (following each training session)

Hospital management should be informed of any problems that arise; the local clinical governance lead should support the resuscitation committee to rectify any deficiencies in the service.

### *Research*

Healthcare practitioners interested in undertaking resuscitation-related research, should be encouraged to do so. They should be advised to seek the advice and support of the local research ethics committee.

## **Role of the Resuscitation Council (UK)**

The Resuscitation Council (UK) was formed in August 1981 by a group of medical practitioners from a variety of specialities who shared an interest in, and concern for, the subject of resuscitation.

### **Objectives**

The aim of the Resuscitation Council (UK) is to facilitate education of both lay and healthcare professionals in the most effective methods of resuscitation appropriate to their needs by:

- Encouraging research into methods of resuscitation
- Studying resuscitation teaching techniques
- Establishing appropriate guidelines for resuscitation procedures
- Promoting the teaching of resuscitation as established in the guidelines



- Establishing and maintaining standards for resuscitation
- Fostering good working relations between all organisations involved in resuscitation and producing and publishing training aids and other literature concerned with the organisation of resuscitation and its teaching

## **Courses**

In order to teach theoretical and practical resuscitation skills to healthcare professionals, the Resuscitation Council (UK) has developed a variety of advanced courses. Including advanced life support courses in adult, paediatric and newborn resuscitation, which are run at centres throughout the UK.

Further details and information on all the Resuscitation Council (UK) courses are available on its website, [www.resus.org.uk](http://www.resus.org.uk).

## **Guidelines**

The Resuscitation Council (UK) has established working parties to review protocols for basic, advanced, paediatric and newborn resuscitation. These are available in the guidelines section on [www.resus.org.uk](http://www.resus.org.uk).

## **Research**

The Resuscitation Council (UK)'s Research Committee has available funding to assist new resuscitation initiatives. For further information access [www.resus.org.uk](http://www.resus.org.uk).

## **Project teams**

The Resuscitation Council (UK) project teams are set up as required to produce new guidelines and reports on relevant resuscitation topics and these are published periodically by the Council (see <http://www.resus.org.uk/SiteIndx.htm>).

## **Principles of safer handling during CPR**

Approximately 80% of cardiac arrests in hospital are neither sudden nor unpredictable. In these situations the possible need

to undertake CPR should therefore be identified and a risk assessment, in relation to handling, carried out following local protocols.

The Resuscitation Council (UK), in their publication *Guidance for Safer Handling during Resuscitation in Hospitals* (Resuscitation Council (UK), 2001), has issued guidelines concerning safer handling during CPR. A brief overview of these guidelines will now be provided.

### **Cardiac arrest on the floor**

- If the patient has collapsed on the floor, perform CPR on the floor. If the area has restricted access, consider sliding the patient across the floor using sliding sheets. Use mobile screens if required
- Ventilation: kneel behind the patient's head ensuring the knees are shoulder-width apart, rest back to sit on the heels and lean forwards from the hips towards the patient's face
- Tracheal intubation: kneel behind the patient's head ensuring the knees are shoulder-width apart, rest back to sit on the heels and lean forwards from the hips over the patient's face. Resting the elbows on the floor may provide the practitioner with greater stability
- Chest compressions: kneel at the side of the patient, level with his chest and adopt a high kneeling position with the knees shoulder-width apart; position the shoulders directly over the patient's sternum and, keeping the arms straight, compress the chest ensuring the force for compressions results from flexing the hips
- Following CPR: transfer the patient from the floor using a hoist (preferable); if a hoist is unavailable or impractical, a manual lift will need to be considered (this is a high-risk procedure and should only be considered as a last resort)

### **Cardiac arrest on a bed, trolley or couch**

- Remove any environmental hazards, ensure the bed brakes are on and lower cotsides if they are up
- Moving the patient into a supine position: if a sliding sheet is already under the patient use that; if not quickly insert one, if

possible, under the patient's hips/buttocks by rolling him on to his side and then slide him down the bed

- Ventilation and intubation: move the bed away from the wall and remove the backrest to allow access; stand at the top of the bed facing the patient with the feet in a walk/stand position and avoid prolonged static postures
- Chest compressions: ensure the bed is at a height which places the patient between the knee and mid-thigh of the practitioner performing chest compressions; stand at the side of the bed with the feet shoulder-width apart, position the shoulders directly over the patient's sternum and, keeping the arms straight, compress the chest ensuring the force for compressions results from flexing the hips; chest compressions can also be performed by kneeling with both knees on the bed
- CPR on a fixed-height bed, couch or trolley: if necessary stand on steps or a firm stool, with a non-slip surface and wide enough to permit the practitioner's feet to be shoulder-width apart; do not kneel on a couch or trolley

### **Cardiac arrest in a chair**

- Lowering the patient to the floor: with two colleagues, preferably using a slide sheet, slide the patient on to the floor; one should be supporting the patient's head during the procedure

### **Cardiac arrest in the toilet**

- Ensure the toilet door is kept open and access maintained
- Lowering the patient to the floor: with two colleagues, slide the patient on to the floor; one should be supporting the patient's head during the procedure

### **Cardiac arrest in the bath**

- Perform risk assessment following local protocols
- *Pull the plug out*
- Ensure the bath floor is quickly dried prior to evacuation
- Follow local evacuation procedure

## Chapter summary

Hospitals must provide an effective resuscitation service and must ensure all appropriate staff are adequately trained and regularly updated to a level compatible with their expected degree of competence (Jevon, 2002). Adhering to the standards in *Cardiopulmonary Resuscitation: Standards for Clinical Practice and Training* (Royal College of Anaesthetists *et al.*, 2008), which have been highlighted in this chapter, will help ensure a high-quality and safe resuscitation service.

## References

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