Resuscitation skills – part four
Chest compressions

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The new guidelines from the Resuscitation Council UK (RCUK) emphasise the importance of performing chest compressions after cardiac arrest, and of doing so optimally and with minimal interruptions (RCUK, 2005). This article, the fourth in a six-part series, describes how to perform them effectively and safely.

Anatomy and physiology
Chest compressions produce circulatory bloodflow by increasing intrathoracic pressure and directly compressing the heart (Handley et al, 2005). Although effective chest compressions achieve systolic blood pressures of only 60–80mmHg (Paradis et al, 1989), this is still sufficient to maintain adequate coronary and cerebral bloodflow, optimising the chance of successful defibrillation (Handley et al, 2005). A palpable carotid or femoral pulse is not a reliable indicator of effective arterial bloodflow during chest compressions.

Unfortunately chest compression technique is often poor (Abella et al, 2005). During resuscitation compressions are frequently interrupted for lengthy periods (Abella et al, 2005) and efforts should be made to minimise these interruptions (RCUK, 2005).

Care should be taken to minimise the risk of fracturing ribs and damaging internal organs (Jevon, 2002). Pressure should be applied only to the sternum and no pressure should be applied to the ribs, the end of the sternum or the upper abdomen (Handley et al, 2005).

Procedure

- Following cardiac arrest, begin chest compressions immediately while others alert the cardiac arrest team and bring the defibrillator. The initial two ventilations are no longer recommended.
- Ensure the patient is supine on a firm, flat surface. If the patient is on a pressure-relieving bed, follow the manufacturer’s recommendations for performing resuscitation – there is usually either a ‘CPR tag’ to pull or ‘CPR button’ to press to ensure the surface is sufficiently firm for effective chest compressions.
- If the patient is on a height-adjustable bed, trolley or couch, ensure it is at an optimum height for the person performing chest compressions – the patient should be at a level between the person’s knee and mid-thigh. If the patient is on a fixed-height bed, trolley or couch, it may be necessary to stand on a firm stool or steps in order to safely perform effective chest compressions (RCUK, 2001).
- Stand at the side of the bed with the feet shoulder-width apart, flexing forward from the hips (RCUK, 2001). If it is necessary to kneel on the bed, it is important to kneel on both knees and to ensure that the combined weight of the patient and rescuer does not exceed the safe-loading work of the bed (RCUK, 2001).
- When performing chest compressions on a patient who has collapsed on the floor, kneel in the high-kneeling position, at the side of the patient level with his chest, with the knees a shoulder-width apart (RCUK, 2001).
- Place one hand on the centre of the patient’s chest (Fig 1) in the middle of the lower half of the sternum and then place the other on top (Fig 2) (this is quicker than...
wasting time using the ‘rib margin’ location method). Do not apply pressure over the end of the sternum or the upper abdomen (Handley et al, 2005).

To avoid applying pressure over the patient’s ribs, interlock (Fig 3) and extend the fingers.

Position the shoulders directly vertically above the patient’s sternum, straighten the arms and lock the elbows (Fig 4); ensure the back is not twisted.

Compress the sternum 4–5cm (in adults) and, following each compression, allow the chest to recoil back to its normal position, thus allowing venous return. The force of compression should result from flexing the hips and the shoulders should be positioned directly above the patient’s sternum (RCUK, 2001) – this will facilitate downward pressure.

Perform chest compressions in a controlled way; they should not be erratic or jerky (Jevon, 2002).

Continue chest compressions at a rate of 100/min (Yu et al, 2002); this rate refers to the speed of compressions rather than the actual number delivered per minute; interruptions in chest compressions – for example – will result in less than 100 being delivered in a minute.

Ensure that the chest compression/chest relaxation phases are of equal duration.

Ensure a ratio of 30 compressions to two ventilations (30:2) to allow more time for chest compressions (Fig 5); once the airway is secured with a tracheal tube, perform chest compressions and ventilations asynchronously: chest compressions 100/min and ventilations 10/min.

After defibrillation, do not perform time-wasting pulse checks – begin chest compressions, unless there are obvious signs of life.

Consider over-the-head chest compressions if the patient is in a confined space.

REFERENCES


PROFESSIONAL RESPONSIBILITIES

All nurses who carry out clinical procedures must have received approved training, undertaken supervised practice and demonstrated competence in the clinical area. The onus is also on the individual to ensure that knowledge and skills are maintained from both a theoretical and a practical perspective. Nurses should also undertake this role in accordance with an organisation’s protocols, policies and guidelines.