The response of community staff to a person experiencing cardiac arrest can be critical to saving that individual’s life. UK ambulance services respond to approximately 60,000 cases of suspected cardiac arrest each year and resuscitation is performed during approximately 28,000 of these calls; unfortunately, less than one-in-ten people actually survive long enough to be discharged from hospital (British Resuscitation Council, 2015).

Current British Resuscitation Council (2015) guidelines recommended that basic life support consists of two elements: mouth-to-mouth resuscitation and chest compressions. The aim of this article is to challenge the need for so-called ‘rescue breaths’ within cardiopulmonary resuscitation (CPR).

The importance of ventilation during resuscitation has been accepted for centuries and the earliest known description of assisted ventilation appears in the bible (Hermreck, 1988). However, in modern times, the need for rescue breaths (hereafter referred to as mouth-to-mouth resuscitation) during basic life support has become a controversial subject.

While the British Resuscitation Council stated that there was insufficient evidence to support compression-only cardiopulmonary resuscitation (CPR), recommending that ‘CPR providers trained and able to perform rescue breaths should perform chest compressions and rescue breaths if it is safe to do so’ (British Resuscitation Council, 2015), the American Heart Association (AHA) has issued guidelines supporting hands-only CPR (AHA, 2016).

Very few studies have focused on the efficacy of mouth-to-mouth in basic life support. Ethically it would be impossible to conduct a human randomised trial examining the effects of mouth-to-mouth, not only because of the challenges of consent (many patients will have already died), but also because of the many variables to consider such as the length of time from an incident to commencing basic life support, any underlying health conditions and age, all of which could affect the outcome of any trial.

The majority of studies have therefore been carried out in animals (Kern et al, 1988; Chandra et al, 1994; Idris et al, 1994a) with swine studies where ventricular failure is induced showing a nearly identical 24-hour survival and neurological outcome in chest compression alone versus chest compression plus assisted ventilation.

**WHAT IS MOUTH-TO-MOUTH RESUSCITATION?**

Respiration involves both oxygenation (the diffusion of oxygen into the blood), and ventilation (the movement of gas in and out of the lungs). During cardiac arrest, respiratory circulation ceases, the lungs deflate and hypoxia (inadequate oxygenation) occurs, thus causing the onset of ischaemia and tissue acidosis (Waugh and Grant, 2014).

The aim of mouth-to-mouth resuscitation is to reduce the incidence of hypoxia by imitating normal breathing and the British Resuscitation Council guidelines (2015) recommended that artificial ventilation should be started as soon as possible (see Table 1 for procedure).

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**Table 1: Procedure for artificial ventilation**

The British Resuscitation Council’s (2015) guidelines for artificial ventilation are as follows:

- Tilt the person’s head gently and lift the chin with two fingers
- Pinch the person’s nose, seal your mouth over their mouth and blow steadily and firmly into their mouth for about one second
- Check that the chest rises
- Perform two further mouth-to-mouth resuscitation blows
- Continue with cycles of 30 chest compressions and two mouth-to-mouth resuscitation blows until they begin to recover or emergency help arrives
THE CASE AGAINST

Atmospheric air contains 21% oxygen, while expired oxygen concentration is approximately 16–17% and also has a higher mean CO₂ (carbon dioxide) content (Waugh and Grant, 2014). Therefore, in mouth-to-mouth ventilation, only 16–17% oxygen would be provided (i.e. the expired air from the rescuer). This is approximately 4% less than that which would be received from compression-induced ventilation alone because, in this case, atmospheric air containing 21% oxygen would be absorbed (as opposed to the exhaled air from the ‘rescuer’). Based on this evidence alone, surely it is not worth performing mouth-to-mouth resuscitation.

There are also other methods in which oxygen intake can occur during CPR; for example, the action of chest compressions can induce ventilation because air is passively inhaled following elastic recoil from the chest wall during relaxation (Idris et al., 1994b; Noc et al., 1995). This would allow 21% of oxygen to be inhaled. Agonal or gasping breathing, which often occurs during cardiac arrest, can also contribute to ventilation and it is associated with a better outcome (Noc et al., 1994; Yang et al., 1994).

There is also a risk of gastric inflation and pulmonary aspiration of gastric contents with mouth-to-mouth resuscitation (Johannigman et al., 1991). During cardiac arrest, the oesophageal sphincter tone is reduced and is therefore unable to prevent gastric regurgitation. The risk is naturally increased in patients with low pulmonary compliance, i.e. obesity, atelectasis (collapse or closure of a lung), pulmonary oedema and those with airway resistance chronic obstructive pulmonary disease (COPD) (Bowman et al., 1995). These conditions reflect the majority of the patients the author reviews in the community.

Mouth-to-mouth infection risks

A question which is often asked during basic life support training is ‘what are the infection risks for the individual providing mouth-to-mouth?’ Concerns have been raised regarding the possible transmission of Helicobacter pylori, Mycobacterium tuberculosis, meningococcus, herpes simplex, Shigella, streptococcus, salmonella and even HIV. Becker et al (1997) suggested that it is highly unlikely that this could occur, but universal precautions should always be implemented in to form of pocket mask or key fob barrier sheet.

In the author’s opinion, apart from being very unpleasant, the main reason for not performing mouth-to-mouth is because ‘time is muscle’. Coronary arteries perfuse the myocardium, therefore any delay or cessation to coronary blood flow causes ischaemia and eventual necrosis (Waugh and Grant, 2014). Thus, any time spent not performing chest compressions, i.e. carrying out mouth-to-mouth, decreases the chances of survival by reducing circulation to the heart, brain and other vital organs. DeNoon (2007) supports this theory and examined 4,068 adults who had experienced an out-of-hospital cardiac arrest witnessed by bystanders. Eighteen percent of cases received CPR, but were 2.2 times less likely to suffer brain damage if they were among the 11% of those who received chest compressions only.

It is important to remember, however, that there are occasions when mouth-to-mouth is essential, particularly when the cardiac

MOUTH-TO-MOUTH: A PERSONAL VIEW

To be honest I had never given the need for mouth-to-mouth much thought until earlier this year when on holiday in Italy where I witnessed an emergency department nurse from London perform basic life support with mouth-to-mouth on a man who was involved in a road traffic accident outside the hotel I was staying in. As a result, the nurse found blood in her mouth and the Italian hospitals refused to provide her with any anti-viral medication.

In the UK this incident would have been treated in the same way as a needlestick injury and the appropriate drugs prescribed (Health and Safety Executive [HSE], 2016). My initial thought was ‘poor girl’ but this then changed to ‘why an earth did she perform mouth-to-mouth?’ I wouldn’t have done so regardless of whether there was any blood visible. What would I do as a community matron if I found a patient (who needed resuscitation) dying in their home and how would my trust support me if I decided not to perform mouth-to-mouth?

Until a year ago, my background was in acute cardiac care. If a cardiac arrest occurred in my unit, I had the luxury of all the airway management equipment and adjunct therapy anyone could possibly need, i.e bag valve mask/ambu bag etc. More importantly, we had an anaesthetist who could promptly intubate the patient thus securing the airway. The issue of whether or not to perform mouth-to-mouth simply never arose. I myself have taught basic life support and assessed other staff performing mouth-to-mouth on a mannequin, deeming them competent in the skill. I too have been assessed. However, one could argue that it is hard to assess someone’s competency at a skill not performed on an actual human being. I have never performed mouth-to-mouth and even with a pocket face mask or a key fob shield I would still refuse because I don’t believe there is enough evidence to support its effectiveness.

Emma Gardner
arrest is the result of hypoxia, i.e. drowning, drug overdose or an infant cardiac arrest (British Resuscitation Council, 2015).

CONCLUSION

Currently the jury is still out on the efficacy of performing mouth-to-mouth, but until the British Resuscitation Council changes its guidelines, mouth-to-mouth resuscitation will remain a primary recommendation. It is important that nurses act in accordance with their competency and within their trust guidelines, however, the author does believe that providing mouth-to-mouth resuscitation should be the individual nurse's decision.

REFERENCES

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