Issue Overview: The State of CPR

Situation Overview

Cardiopulmonary resuscitation (CPR) is the method of providing oxygen and blood circulation through the delivery of rescue breathing and chest compressions to victims of sudden cardiac arrest, which occurs when the heart loses its ability to pump blood and distribute oxygen through the blood. While much attention focuses on raising awareness and increasing education about the importance of bystander CPR carried out by lay people, CPR is most often performed by healthcare professionals, either on the site of an emergency, in an ambulance, or in the hospital.

While no one knows precisely how many patients go into sudden cardiac arrest (SCA), Arrhythmia Alliance estimates that SCA claims the lives of 250 people every single day in the UK. Given that most of these patients receive CPR from a healthcare professional, training on how to deliver proper CPR and improving skill performance during the delivery of CPR are critical to saving lives.

Adherence to CPR Guidelines

Research shows that the quality of CPR has a direct impact on a victim's chance of survival.[1] The Resuscitation Council (UK) is responsible for issuing CPR guidelines in the UK. These are updated every five years to help improve training and performance of CPR, which in turn will improve survival rates. The UK guidelines are based on those issued by the European Resuscitation Council, which are in turn derived from research and in association with the International Liaison Committee on Resuscitation (ILCOR). The most recent 2005 CPR guidelines put more emphasis on compressions than rescue breaths, recommending 30 chest compressions for every 2 breaths given to cardiac arrest victims. Updated guidelines on CPR techniques are due to be published in October 2010. Recent studies report that compliance to guidelines and CPR performance by healthcare professionals are considered poor, which is likely to be detrimental to survival. According to a study published in the *Journal of the American Medical Association*, CPR performed both outside and inside the hospital setting often does not meet standard guidelines. The 2005 study, led by Benjamin Abella, MD, of the Hospital of the University of Pennsylvania, revealed very poor CPR quality in the in-hospital setting, referencing too few and shallow chest compressions and too many ventilations per minute.[2]

Another study in the *Journal of the American Medical Association*, led by Dr Lars Wik, showed that healthcare professionals are also not adhering to established CPR guidelines in out-of-hospital situations. The study found that during the administration of CPR, there

[1] Ko et al. (2005), *Resuscitation*. 'Evaluating the Quality of Prehospital Cardiopulmonary Resuscitation by Reviewing Automated External Defibrillator Records and Survival for Out-of-Hospital Witnessed Arrests'.
[2] Abella et al. (2005), *JAMA*, 'Quality of Cardiopulmonary Resuscitation During In-Hospital Cardiac Arrest'.

were no chest compressions delivered nearly half of the time and, when delivered, just around one-third adhered to recommended CPR guidelines.[3]

Additionally, a study in *Resuscitation* examining depth and uniformity of compressions found that too-shallow chest compressions are common during the delivery of CPR to cardiac arrest patients in both in-hospital and out-of-hospital settings. Subsequent research has indicated that increasing compression depth is associated with increased defibrillation success and survival rates.[4]

Numerous studies show that increased training and the use of CPR assistance and feedback devices can greatly improve CPR skill and performance. A systematic review conducted by healthcare professionals from the US and the UK, published in *Resuscitation* this year, found that there was good evidence to suggest that CPR feedback/prompt devices during CPR training improve skill acquisition and retention and may also improve the quality of CPR in clinical practice.[5]

Interruptions can also impede CPR performance and be detrimental to patient survival. Another study in *Resuscitation* examined the link between the quality of CPR prior to defibrillation and clinical outcomes. This study, led by Dana Edelson, MD, of the University of Chicago Hospital, concluded that longer interruptions and shallow chest compressions result in defibrillation failure.[6] Therefore approaches to minimise or eliminate interruptions and optimise compression depth may significantly improve resuscitation success.

First Ever Multinational Attitudinal Survey on CPR

When CPR is performed correctly it has the greatest potential to save a life. However, recent studies show there is a *discrepancy* between *perception and reality* when it comes to CPR knowledge and skill level when performing CPR. These studies report that CPR performance by healthcare professionals is considered poor, yet very few CPR practitioners are aware of this.

In an effort to increase understanding of the attitudes of healthcare professionals on CPR and develop strategies that foster CPR quality improvement, the CPR Improvement Working Group is conducting the first ever multinational attitudinal survey concerning the performance by healthcare professionals, including doctors, nurses and paramedics, of CPR compared to perceptions of how CPR is performed. The survey aims to determine the level of awareness among healthcare professionals concerning CPR protocols, to provide a broader analysis of whether CPR is performed correctly on a global basis. The

[3] Wik et al. (2005), *JAMA*, 'Quality of Cardiopulmonary Resuscitation During Out-of-Hospital Cardiac Arrest'.
[4] Kramer-Johansen et al. (2007), *Resuscitation*, 'Uniform reporting of measured quality of cardiopulmonary resuscitation'.
[5] Yeung et al. (2009), *Resuscitation*, 'The use of CPR feedback/prompt devices during training and CPR performance: A systematic review'.
[6] Edelson et al. (2006), *Resuscitation*, 'Effects of compression depth and pre-shock pauses predict defibrillation failure during cardiac arrest'.

survey respondents include healthcare professionals in the US, as well as those from the UK, France and Germany.

Formed in June 2008 and comprised of Laerdal Medical, Philips Healthcare and ZOLL Medical Corporation, the CPR Improvement Working Group's mission is to work to expand the use of CPR feedback by the community, healthcare professionals, including doctors, nurses and paramedics, and to improve skill performance during the administration of CPR. To help raise awareness of the need for effective CPR among the medical community, the CPR Improvement Working Group has established a global Expert Council of resuscitation experts, which includes Robert O'Connor, MD, Dana Edelson, MD, Vinay Nadkarni, MD, Alexandre Mignon, MD, Pascal Cassan, MD, Ken Spearpoint, David Zideman, MD, Stefan Oppermann, MD, Dr Paul Pepe, Professor Peter Sefrin, Professor Alex Lechleutner and Jan-Torsten Gräsner, MD.

Future of CPR

Given the current reality of how CPR is performed and the importance of improved CPR performance to increasing survival rates, resuscitation experts suggest that increased education on the importance of adhering to CPR guidelines, access to training and the use of CPR assistance and feedback devices would greatly improve CPR performance by healthcare professionals.