EDITORIAL

# On the need to improve the quality of cardiopulmonary resuscitation

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The need for high quality chest compressions during resuscitation attempts is indisputable. The latest guidelines published by the International Liaison Committee on Resuscitation emphasize the importance of meeting the recommendations on frequency and depth of chest compressions and minimizing pauses in order to improve patient prognosis[1]. Yet numerous studies indicate that in most cases the quality of manual chest compressions performed by resuscitation teams is poor[2] and worsens because of rescuer fatigue[3].

Various solutions to this problem of manual chest compression have been conceived. On the one hand, mechanical chest compressors may improve the quality of resuscitation maneuvers, especially during transfer[4], and organ perfusion[5], but they have not been shown to improve the prognosis of patients with cardiac arrest. Then there are simple CPR feedback devices, which indicate the frequency and depth of chest compressions being performed. These devices are based on an accelerometer that detects rescuer motion[6], so errors can occur if the patient is lying on a compressible surface[7]. This error may soon be remedied with the emergence of new devices that base their measurement on changes generated by chest compression on a magnetic field[8]. However, to date these devices have not been shown to improve survival.

In this issue of EMERGENCIAS, Camacho and colleagues present an interesting study on the use of a feedback device in patients with out-of-hospital cardiac arrest. Until now, many studies have demonstrated the ability of these devices to improve the quality of chest compression[9], but no effect on patient prognosis, and even less in the community setting. Most cases of cardiac arrest occur outside the hospital, and research must focus on improving care and patient outcomes in this context. Before the work of Camacho et al, only Kramer-Johansen[10] using a similar feedback device, have shown improved short term prognosis as well as higher quality compressions. A clinical trial is currently underway to determine whether the use of feedback devices with subsequent debriefings (analyzing the data obtained by the device), enhance patient survival, but this is a hospital-based study and the results are not yet available[11].

The results of the Camacho study are encouraging; they suggest that increased quality of resuscitation entails better prognosis. Even so, some doubts remain about their interpretation. The authors attribute the improved survival on arrival at the hospital ("survived event" in the Utstein terminology) to the use of a Q-CPR device, but without analyzing factors related to the quality of resuscitation that could bias the results. Variables such as the number of pauses in compressions, compression time with respect to total resuscitation time ("hands on" time), or the duration of pauses before and after defibrillation, were not analyzed in this study, but they too are related with patient prognosis[12]. In addition, not being able to analyze the quality of compressions in the control group disallows attributing the improved results to the quality of resuscitation, since this was unknown in the controls. A study design in which one group of rescuers use the Q-CPR device with feedback indications, while the other use the same device with these feedback indications disabled, would have allowed the researchers to analyze the quality of compressions in all patients and thus resolve this doubt. Furthermore, the authors were perhaps somewhat optimistic when interpreting the results to infer

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that the number of patients needed to treat with the device to save a life is eighteen. From the study data provided, if we calculate the confidence interval of this value, we see that the number of patients needed to treat for a recovery of spontaneous circulation (not a survivor of the cardiac arrest) is between seven and infinity with a 95% confidence interval. However, the fact that the results show no statistically significant differences does not detract from an undoubtedly innovative and pioneering study in Spain. We Spanish emergency physicians, despite having improved in recent years, have little research tradition in general and even less in the field of CPR[13]. To this must be added the difficulty of performing research on subjects with cardiac arrest, which increases the value of the work by Camacho et al. So, we can only congratulate the authors for their work and encourage them to continue in this line of research.

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