Excerpts from European Resuscitation Guidelines 2015 and the role of mechanical CPR[1]

High-quality CPR is important for good outcomes

"At best, standard manual CPR produces coronary and cerebral perfusion that is just 30% of normal."

(page 126)

"The importance of early, uninterrupted chest compressions remains emphasised throughout these guidelines, together with minimising the duration of pre-shock and post-shock pauses."

(page 113)

High-quality CPR can be delivered by man or machine

"Ensuring high-quality chest compressions with adequate depth, rate and minimal interruptions, regardless of whether they are delivered by machine or human is important."

(page 126)

"Undertaking high-quality chest compressions for a prolonged time is tiring; with minimal interruption, try to change the person doing chest compressions every 2 min."

(page 106)

"Automated mechanical chest compression devices may enable the delivery of high quality compressions especially in circumstances where this may not be possible with manual compressions – CPR in a moving ambulance where safety is at risk, prolonged CPR (e.g. hypothermic arrest), and CPR during certain procedures (e.g. coronary angiography or preparation for extra-corporeal CPR)."

(page 126)

"The routine use of mechanical chest compression devices is not recommended, but they are a reasonable alternative in situations where sustained high-quality manual chest compressions are impractical or compromise provider safety."

(page 2)

Seven examples of mechanical CPR in the guidelines

1. A Part of Advanced Life Support

"Consider mechanical chest compressions to facilitate transfer or treatment"

(ALS algorithm, page 108)

2. Prolonged CPR

"If it was considered appropriate to start resuscitation, it is usually considered worthwhile continuing, as long as the patient remains in VF/pVT, or there is a potentially reversible cause that can be treated. The use of mechanical compression devices and extracorporeal CPR techniques make prolonged attempts at resuscitation feasible in selected patients."

(page 107)

"Hospitals with the longest resuscitation attempts (median 25 min [IQR 25–28 min]) had a higher risk-adjusted rate of ROSC and survival to discharge compared with a shorter median duration of resuscitation attempt."

(page 107)

3. Transport of refractory VF and/or intermittent ROSC patients

"Transport with continuing CPR may be beneficial in selected patients where there is immediate hospital access to the catheterisation laboratory and experience in percutaneous coronary intervention (PCI) with ongoing CPR"

(page 2)

"Although proper diagnosis of the cause of cardiac arrest may be difficult in a patient already in cardiac arrest, if the initial rhythm is VF it is most likely that the cause is coronary artery disease with an occluded large coronary vessel. In these cases, transport with ongoing CPR and immediate access to the cath lab may be considered if a prehospital and in-hospital infrastructure is available with teams experienced in mechanical haemodynamic support and primary percutaneous coronary intervention (PPCI) with ongoing CPR. A decision to transport with ongoing CPR should take into consideration a realistic chance of survival (e.g. witnessed cardiac arrest with initial shockable rhythm (VF/pVT) and bystander CPR). Intermittent ROSC also strongly favours a decision to transport."

(page 24)

4. Treatment of accidental hypothermia patients

"Patients with signs of cardiac instability should be transferred directly to a centre capable of extracorporeal life support (ECLS)."

(page 2)

"At 18°C the brain can tolerate cardiac arrest for up to 10 times longer than at 37°C. This results in hypothermia exerting a protective effect on the brain and heart, and intact neurological recovery may be possible even after prolonged cardiac arrest if deep hypothermia develops before asphyxia. If an ECLS centre is not available, rewarming may be attempted in hospital using a combination of external and internal rewarming techniques (e.g. forced warm air, warm infusions, forced peritoneal lavage)"

(page 22)

5. CPR in helicopters and air ambulances

"Mechanical chest compression devices enable delivery of high-quality chest compressions in the confined space of an air ambulance and their use should be considered. If a cardiac arrest during flight is thought to be a possibility, consider fitting the patient within a mechanical chest compression device during packaging before flight."

(page 27)

6. CPR in the cath lab

"There is a greater emphasis on the need for urgent coronary catheterisation and percutaneous coronary intervention (PCI) following out-of-hospital cardiac arrest of likely cardiac cause."

(page 3 and page 202)

"On an angiography table with the image intensifier above the patient, delivering chest compressions with adequate depth and rate is almost impossible and exposes the rescuers to dangerous radiation. Therefore, early transition to the use of a mechanical chest compression device is strongly recommended."

(page 26 and page 170)

7. Rescuer fatigue

"Resuscitation at high altitude does not differ from standard CPR. With the lower pO2, CPR is more exhausting for the rescuer than at sea level, and the average number of effective chest compressions may decrease within the first minute. Use mechanical chest compression devices whenever possible."

(page 28)

The importance of a proper implementation of mechanical CPR

"… the success of any technique or device depends on the education and training of the rescuers and on resources (including personnel)."

(page 126)

"Interruptions to CPR during device deployment should be avoided. Healthcare personnel who use mechanical CPR should do so only within a structured, monitored programme, which should include comprehensive competency-based training and regular opportunities to refresh skills."

(page 126)

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For more information about the LUCAS device and best practices on how to implement it, please contact your local Physio-Control sales representative.

REFERENCES

1. All excerpts are taken from the European Resuscitation Council Guidelines for Resuscitation 2015, *Resuscitation*. 2015;95:1-311.
2. As of December 2015.
3. Rubertsson S, Lindgren E, Smekal D, et al. Mechanical chest compressions and simultaneous defibrillation vs conventional cardiopulmonary resuscitation in out-of-hospital cardiac arrest. The LINC randomized trial. *JAMA*. 2013;311(1):53-61.

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