LUCAS® Chest Compression System

Safe and effective chest compressions during ambulance transport

Some patients will require ongoing chest compressions during transportation in an ambulance. As many as 30-40% of patients who have achieved return of spontaneous circulation on the scene will re-arrest prior to hospital arrival, some during the transport.[1,2] However, it is well known that it's nearly impossible to provide effective CPR with minimal interruptions in a moving ambulance. In addition, performing manual chest compressions during ambulance transport puts the rescuer's safety at risk.

"Restrained ambulance occupants involved in a crash had 3.77 times lower risk of fatality and 6.49 times lower risk of incapacitating injury than unrestrained occupants."[3]

Becker R, et al. *Accident Analysis & Prevention*. 2003:35;941-948.

The LUCAS chest compression system allows rescuers to remain seated and safely belted in the ambulance while the device performs effective, guidelines-consistent chest compressions with minimal interruptions. This helps ensure chest compressions that are both safe for the patient and for the rescuers during ambulance transport.

"Some patients may need to be transported in cardiac arrest if hospital treatment is necessary to treat the cause of the cardiac arrest. Examples include patients in refractory ventricular fibrillation that may benefit from percutaneous coronary intervention and cardiac arrest secondary to hypothermia. In these patients, the use of mechanical chest compression devices seems reasonable."[4]

Couper K, et al. *Curr Opin Crit Care*. 2015:21:188-194.

"Our consensus is that mechanical CPR is a safer alternative to manual CPR in the ambulance."

"Mechanical devices can constitute a useful alternative to manual CPR, in terms of safety for the ambulance crew."[5]

Ong M, et al. *Prehosp Emerg Care*. 2013:17:491-500.

"The two patients admitted to hospital with on-going LUCAS CPR and who were treated with cardiopulmonary support were resuscitated during a particularly long time; regardless of this, both patients were alive after 30 days with minimal neurological sequelae. We believe that it is unlikely that these patients would have survived if transported and treated with manual CPR only."

Tranberg T, et al. *Scand J Trauma Resusc Emerg Med*. 2015;23:37

Manual CPR Simulation During Crash Test

The LUCAS device confirmed as safe in 10g and 16g crash tests

In crash tests performed by an independent company the LUCAS device was found to be safe for rescuers and patients during both 10g and 16g deceleration tests.

- The crash test was performed with the LUCAS 2 chest compression system at Klippan Safety, an independent company performing crash tests. Klippan Safety also performs truck safety tests for major truck manufacturers.
- A 74 kg (163 lb) crash test manikin (type hybride 2) was used. This is the same type of manikin used to test car safety belts.
- The manikin was secured to a stretcher using standard ambulance transportation practices. The stretcher was then fixed to the crash test sled.
- The LUCAS device was applied on the manikin with the Stabilization Strap attached, and tested with and without hands strapped to the device using the Patient Straps. (There was no difference in results.)
- Deceleration forces of 10g (in accordance with European Ambulance Standard EN 1789) and up to 16g were tested. The LUCAS device was found to be safe. The LUCAS device was confirmed as safe for both rescuers and patients.

The LUCAS upper part may be secured using additional straps applied from the device support legs to the transportation stretcher side rails. This combination has been shown to meet the required 20 G static test performance criteria according to AS/NZS 4535:1999.

REFERENCES

1. Salcido DD, Stephenson AM, Condle JP, Callaway CW, Menegazzi JJ. Incidence of rearrest after return of spontaneous circulation in out-of-hospital cardiac arrest. *Prehosp Emerg Care.* 2010;14(4):413-8.
2. Lerner EB, O'Connell M, Pirrallo RG. Rearrest after prehospital resuscitation. *Prehosp Emerg Care.* 2011 Jan-Mar;15(1):50-4.
3. Becker L, Zaloshnja E, Levick N, et al. Relative risk of injury and death in ambulances and other emergency vehicles. *Accident Analysis and Prevention.* 2003;35(6):941-948.
4. Couper K, Smyth M, Perkins G. Mechanical devices for chest compression: to use or not to use? *Curr Opin Crit Care.* 2015;21:188-194.
5. Ong M, Shin S, Sung S, et al. Recommendations on ambulance cardiopulmonary resuscitation in basic life support systems. *Prehosp Emerg Care.* 2013;17:491-500.
6. Tranberg T, Lassen JF, Kaltoft AK et al „Quality of cardiopulmonary resuscitation in out-of-hospital cardiac arrest before and after introduction of a mechanical chest compression device, LUCAS-2; a prospective, observational study. *Scand J Trauma Resusc Emerg Med.* 2015;23:37

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