LUCAS™ Chest Compression System

The goal of using LUCAS is to provide effective, consistent, and uninterrupted chest compressions. When an interruption to chest compressions occurs, the patient’s coronary perfusion pressure (CPP) drops rapidly. Coronary perfusion pressure is the measure of the pressure that drives blood flow through the coronary arteries to the heart muscle. The heart normally maintains a CPP of 60 millimeters of mercury (mmHg) or more. During cardiac arrest, the CPP drops dramatically, threatening the heart muscle’s blood supply. As it can take some time to build-up CPP again, interruptions to chest compressions should be minimized. The current American Heart Association Guidelines recommend limiting interruptions “to no longer than 10 seconds, except for specific interventions such as placement of an advanced airway or use of a defibrillator (Class IIa)”¹. The European Resuscitation Council also stresses this concept in their Guidelines².

Recommendations for Defibrillation During LUCAS Treatment

Defibrillation can be accomplished without removing LUCAS from the patient. Use the defibrillator, in manual or AED mode, according to the manufacturer’s instructions. Follow AED prompts and agency protocols.

Self-adhesive defibrillation pads should be used as these make it easier to work with LUCAS. Position the defibrillator electrodes and wires so they are not under the suction cup. If pads are applied after LUCAS is in place, orient the pads in a way so the pads and wires are not under the suction cup (see photo below). If electrodes are already on the patient, consider applying new electrodes if the pad(s) and/or wires will be under the suction cup.

During a rhythm check with a manual defibrillation or analysis with an AED, stop compressions by turning the operation knob on LUCAS to LOCK. Compressions can interfere with the ability of the rescuer or defibrillator algorithm to analyze the ECG analysis. Make the interruption as short as possible to minimize interrupting compressions. Turn the operation knob to ACTIVE to resume compressions.

After the shock is delivered it is important to verify the position of the suction cup to see it has not moved out of place. This is easier to do if an ink marker line was drawn when LUCAS was originally positioned on the patient. Readjust as necessary.

Recommendations for Oxygenation with Ventilation During LUCAS Treatment

To supply adequate concentrations of oxygen in the blood, ensure the patient is properly ventilated. Ventilations should be provided in conjunction with mechanical chest compressions. Interruptions to chest compressions should be minimized to maintain the level of oxygen delivered to tissues. During the first few minutes of sudden cardiac arrest, chest compressions to improve blood flow appear to be more important than ventilations because oxygen blood levels remain high initially³.
The optimal method of managing the airway during cardiac arrest will vary depending on the provider experience, emergency medical services (EMS) or healthcare system characteristics, and the patient’s condition.

Impedance threshold devices (ITDs), such as ResQPOD®, are compatible for use with LUCAS chest compressions. Refer to the ITD manufacturer’s instructions for use, indications, contraindications, warnings, precautions, and potential adverse events.

Note: Never tighten the support cushion straps on the stabilization strap so much so that this impairs the ventilation of the patient.

**Patients Without an Advanced Airway:**

With an unprotected/unsecured airway (non-intubated), ventilations can be performed using:
- mouth-to-mouth breathing
- mouth-to-facemask breathing
- bag-valve-facemask

In this case, turn the operation knob on LUCAS to **LOCK** after compressions to pause the device operation and quickly deliver ventilations. Turn the operation knob to **ACTIVE** to resume compressions.

Follow your protocol regarding ventilations for patients without an advanced airway. The current Guidelines recommend providing rescue breaths over 1 second each, with enough volume to produce visible chest rise. A compression-ventilation ratio of 30:2 is recommended. The risk of gastric regurgitation and aspiration can be considered the same for LUCAS as with manual CPR.

**Patients With an Advanced Airway:**

With a protected/secured airway (intubated), ventilation can be performed by an advanced care provider using:
- esophageal-tracheal tube, (e.g. Combitube)
- laryngeal mask airway (LMA)
- endotracheal intubation (ETT)

In this case, ventilation and chest compressions do not need to be synchronized and ventilations can be provided without pausing for compressions. LUCAS can work continuously and no interruptions in circulation are created.

Follow your protocols regarding ventilations for patients with an advanced airway in place. The Guidelines recommend 8 to 10 ventilations per minute and limited tidal volume to achieve chest rise. Avoid rapid or forceful breaths.

References:

Note:
Before using the LUCAS Chest Compression System, become familiar with the components and symbols on the device. Refer to the LUCAS Instructions for Use for complete directions for use, indications, contraindications, warnings, precautions, and potential adverse events. Manual compressions can alternatively be provided to the patient to support circulation. Please refer to your medical protocols for instructions on ventilating and defibrillating a patient as part of the overall medical care required to resuscitate a cardiac arrest patient. All patients treated with LUCAS should receive assistance with ventilation.