HeartSine®

TechNote

CPR Advisor™ Revolutionary ICG Technology

Overview

CPR Advisor™ for the HeartSine® samaritan® PAD 500P (SAM 500P) automated external defibrillator provides real-time visual and audible feedback to the rescuer on the quality of CPR chest compressions during a sudden cardiac arrest (SCA) resuscitation.

Because Cardiopulmonary Resuscitation, commonly known as CPR, is crucial to deliver oxygenated blood to the body's vital organs, CPR Advisor helps the rescuer perform CPR at the force and rate recommended by the ERC/AHA guidelines.

To measure the quality of compressions, other AEDs require a third sensor (or puck) to be placed on the patient's chest. With its revolutionary technology, HeartSine's proprietary CPR Advisor detects the force and rate of applied CPR via the defibrillator electrodes, without the addition of accelerometers (or pucks) commonly used in other AED solutions.

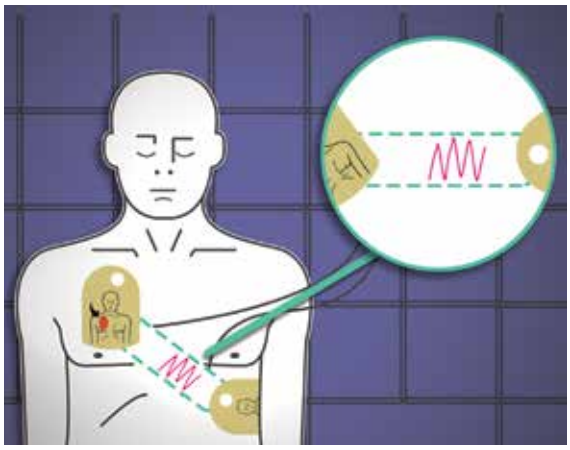

Figure 1. HeartSine's defibrillator detects changes in patient impedance.

How CPR Advisor Works

When a patient collapses and a rescuer performs CPR, the compressions applied by the rescuer cause the patient's chest to change shape and result in a change to the patient's ICG (impedance cardiogram) waveform.

CPR Advisor captures the change in the ICG waveform which it uses to count the number of compressions a rescuer administers and identify the quality of the compressions being applied. By counting deflections in the ICG waveform, CPR Advisor determines the compression rate and advises the rescuer to "Push faster" if the compression per minute (CPM) rate is below that recommended by the ERC/AHA guidelines. Likewise, if the rescuer's CPM rate is greater than that recommended by the ERC/AHA guidelines, CPR Advisor will tell the rescuer to "Push slower".

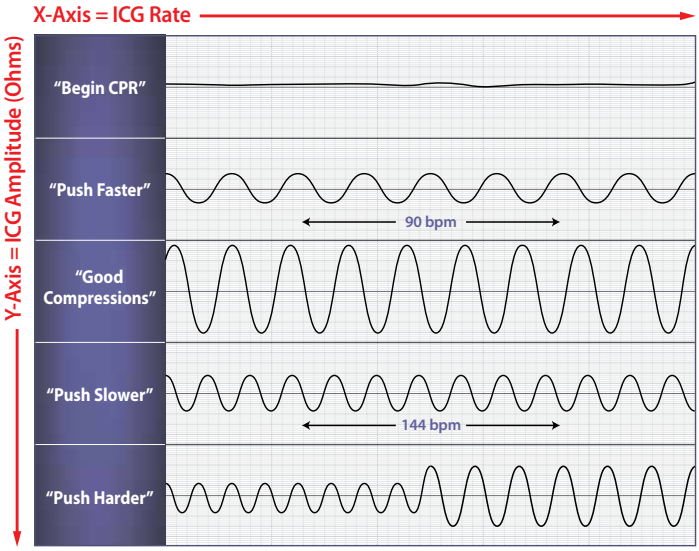

Figure 2. CPR Advisor determines compression quality to advise rescuer.

Real Time CPR Feedback

When the rescuer compresses the patient's chest, the amplitude of the deflection is reflected on the ICG waveform. The greater the amplitude, the greater the deflection. CPR Advisor measures the change in impedance and uses this to determine the appropriate feedback to the rescuer; advising the rescuer to "Push harder" or acknowledging "Good compressions".

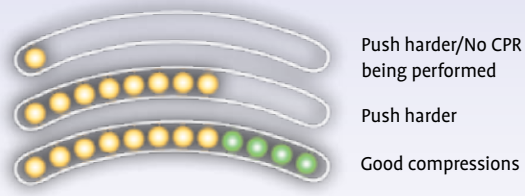

Figure 3. Visual indicators let the user know if effective CPR is being administered.

Figure 4. Voice prompts let the user know if chest compressions are being given correctly. Aural "clicks" help the user keep time.

This real-time feedback is important as even though most trained rescuers understand the need to push hard and push fast, rescuer fatigue may set in after as little as one minute, resulting in slower compression rates.[1] The SAM 500P provides feedback to the rescuer via both visual indicators on the SAM 500P user interface and audible voice prompts.

The industry standard for measuring efficacy, or effectiveness, of CPR is End Tidal CO_2; that is, measuring the amount of Carbon Dioxide exhaled by the patient. CPR Advisor has been demonstrated to correlate very well with the End Tidal CO_2 measurement, as well as other vital signs, demonstrating that this technology is an excellent indicator of CPR efficacy [2-6].

Improved CPR Efficacy

Effective CPR, provided alone or in conjunction with a lifesaving shock, can dramatically increase the chance of survival.[7] CPR Advisor, in conjunction with the metronome, is intended to help rescuers perform CPR as recommended by the ERC/AHA guidelines by monitoring their real-time CPR performance and helping to guide them toward the correct force and rate of compressions.

Integrated CPR Advisor helps improve compliance with resuscitation guidelines. And because CPR Advisor is integrated within the innovative HeartSine SAM 500P defibrillator, it also can deliver a shock if needed.

References

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2. Di Maio R, O'Hare P, McAllister A, et al. The correlation between the impedance cardiogram and end-tidal carbon dioxide during cardiopulmonary resuscitation in a porcine model of cardiac arrest. *Resuscitation*. 2014;85:1:S6.
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4. Di Maio R. The impedance cardiogram is an indicator of CPR effectiveness for out-of-hospital cardiac arrest victims. *Am J Cardiol*. 2010;55.A217.E2062.22
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7. Meaney PA, Bobrow BJ, Mancini ME, et al. Written on behalf of the CPR Quality Summit Investigators, the American Heart Association Emergency Cardiovascular Care Committee, and the Council on Cardiopulmonary, Critical Care, Perioperative and Resuscitation. CPR quality: improving cardiac resuscitation outcomes both inside and outside the hospital: a consensus statement from the American Heart Association. *Circulation*. 2013;128:1-19.

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CE 0120 The HeartSine products described in this brochure meet the European Medical Directive requirement.

UL Classified. See complete marking on product.

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The SAM 500P is not available for sale in the U.S.

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