Sudden Cardiac Arrest Association
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Increasing sudden cardiac arrest survival rates through auto-transfusion

According to the American Heart Association, more than 380,000 out-of-hospital sudden cardiac arrests occur each year. Approximately 92 percent of those SCA victims do not survive.

Can we improve the survival rate? The answer is yes.

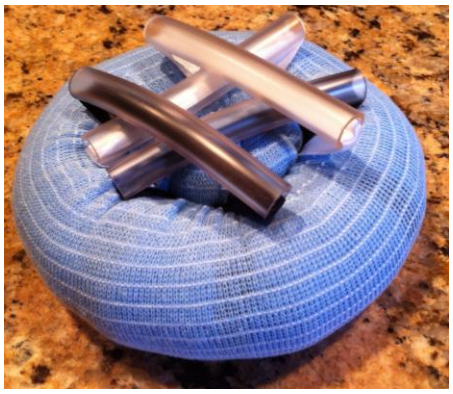
After the first five minutes, in the circulation phase of the arrest, the most important tool is high quality compressions, even more than respirations. A new tool already in use to augment the coronary blood flow during CPR is a device called the EED or Extremity Exsanguination Device. The EED performs two functions. First is moving the blood out of an extremity into the core circulation, also known as increasing venous return. The second and possibly more important function is blocking blood flow back into the extremities and allowing the cardiac output from CPR to stay in the vital organs.

Even in the early days of CPR, physician leaders in the field envisioned diversion of venous blood to the core for the preservation of life. Throughout the years many devices have come and gone, failing to prove useful in increasing survival from SCA, the biggest annual killer of American men and women. Currently we know that defibrillation in the first five minutes is the most important tool we have and has led to strategic placement of AEDs in accessible places.

Increase in coronary profusion pressure, carotid blood flow and the end tidal CO2 levels have proven extremely successful in CPR with the EED. These markers are highly correlated with ROSC (return of spontaneous circulation), survival to discharge, and preservation of brain.

The mechanism of exsanguinating the legs has been used in orthopedic surgery for over 150 years, having first been developed by Dr. Wilhelm Esmarch for leg amputations. It is in common use today for knee, ankle and arm surgery using the Esmarch Tourniquet and a pneumatic tourniquet. Estimated daily use of these types of devices is 16,000 with zero known mortality and morbidity for use under two hours is zero. Unlike the vital organs that cannot withstand loss of oxygen supply for more than a few minutes, the tissue of the limbs maintain their vitality if ischemia does not last for more than two hours. This limit is well established from the standard of care using tourniquets in orthopedics and in emergency medicine. While performing CPR, the traditional bandages are problematic to put on quickly and with minimal manpower.

The EED is simple to place on an extremity; one can put it on a leg in as little as 12 seconds. Resembling a large doughnut, the EED is made up of three simple components; a silicon inner ring wrapped within a stocking of stretch fabric with two rubber handles used to pull the EED up the extremity (see photo). The EED is a Class 1 listed device and can be sold to the general public. It is inexpensive, single use, disposable, has no moving, computer or electronic parts.



So why is this device improving survival rates in sudden cardiac arrest?

The perfusion of the legs of an adult person constitutes about 40 percent of the cardiac output per unit of time. Therefore if the cardiac output is limited, it is beneficial to shunt that blood to vital organs. The venous volume of the legs at any time is estimated to be about 500 cc per leg. As such, squeezing most of this out of the legs and into the central circulation is equivalent to nearly instantaneous transfusion of more than two units of the patient's own fresh whole blood; increasing venous return.

The EED is an efficient, simple, and safe way to apply external counter pressure to the legs. Its unique design, materials and method of application allow circumferential pressure to be applied sequentially, starting from the feet and ankles to the upper thigh, thus permitting translocation of life-saving blood to the vital organs. Once on the upper extremity, the EED acts as a tourniquet shunting cardiac output back to the vital organs.

The EED's ability to auto-transfuse one's own blood back into the central circulation within seconds is dramatically improving the effectiveness of CPR and defibrillation providing the game changing optimal bridge to survival.

For further information on the EED, further indications in CPR and Trauma, case studies and supporting documentation for this article, plus how to obtain EEDs for use to increase effectiveness of AEDs and CPR contact the Global Protection Medical Group at 760-346-4764 or email us at rdibble@thegpmg.com. Find us online at www.theeed.com

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