

Portable Emergency Cardiopulmonary Bypass Device

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Technology description

Background

The development of external cardiopulmonary-cerebral resuscitation (CPCR) was initiated by one of the University of Pittsburgh co-inventors, Dr. Peter Safar. This breakthrough revolutionized the then embryonic field of critical care medicine by allowing anyone anywhere to initiate life-saving procedures. Since its introduction, it has been taught worldwide and used innumerable times on victims of cardiac arrest. It is standard procedure worldwide in treating victims of heart arrest, asphyxiation or other lethal emergencies. There are, however, limits to the application of standard CPCR because sternal compression cannot reliably produce enough blood flow to maintain viability of vital organs. Moreover, prolonged life support (PLS) after restoration of a heartbeat has its limits without the availability of artificial circulation and oxygenation. This need led to the development of emergency cardiopulmonary bypass (CPB). CPB permits the control of flow, pressure, temperature and oxygenation of the blood. It is known that periods of no-blood flow to the brain can seriously effect brain function. Therefore, the key element in resuscitation is to start life-saving procedures as quickly as possible after onset of cardiac arrest. The known machines to accomplish CPB are not portable and are not easily used where a cardiac arrest or trauma victim is located.

Technology

This invention relates to a portable and modular cardiopulmonary bypass apparatus and one that can be used to effectively treat patients in suspected terminal states or clinical death. The invention also includes an associated aortic balloon catheter and an associated method. The device consists of:

- (i) a first cannula assembly means for withdrawing blood from a patient,
- (ii) a pump means connected to the first cannula assembly means for receiving the withdrawn blood and for moving the blood through the apparatus,
- (iii) a first tubing means connected to the pump means to transport the patient's blood away from the pump means.
- (iv) oxygenator means for receiving blood from the first tubing means and for oxygenating the blood
- (v) second cannula assembly means connected to the oxygenator means for returning the oxygenated blood to the patient.

Application area

- * Emergency cardiopulmonary bypass procedureAdvantages
- * Enables emergency life saving procedures to be initiated quickly
- * Easily useable in many trauma/accident locations
- * Device is easily portable and transportable by emergency personnel
- * Device can be adapted to accomodate other emergency modules for blood loss and trauma

Advantages

The device is portable so that it can be used by medical personnel anywhere. In addition, it is adapted to include one or more modules for conditioning the blood, such as modules that include a heat exchanger, blood purifier, plasma and blood cell apheresis device and others. An aortic balloon catheter is also provided.

Institution

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