EMERGENCY CARDIAC MANEUVERS

A RESCUER'S HANDBOOK

By
Carl E. Bartecchi, M.D.

Table of Contents

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Dedication

This book is dedicated to all rescuers, but especially to one group whose efforts I am most familiar with and admire greatly — the U. S. Army aeromedical "Dust Off" units of the Vietnam War.

Original
Illustrations
by
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Table of Contents

Preface

I define RESCUER as follows:

> An individual who, through sheer strength of mind and/or body, applies the essential activity that reverses an otherwise destructive course. This individual could be a trained physician inside or outside of an intensive care unit setting. More commonly, however, the term is used to indicate an individual other than such a specialist. Rescuers can be nurses, emergency room personnel, emergency medical technicians, policemen, firemen, plant safety officers, military personnel and bystanders of all backgrounds. In common to all these individuals is the will or desire to use specially acquired knowledge to reverse situations they see as ultimately destined for catastrophic outcomes.

Carl E. Bartecchi

1.

#1 The Need for Cardiac Rescue

Cardiovascular diseases are responsible for hundreds of thousands of deaths in the United States each year, with 500,000 of those deaths due to coronary heart disease. Deaths from coronary heart disease tend to occur suddenly, within 24 hours of the onset of symptoms, and an estimated 40 percent of victims of a fatal cardiac arrest die within one hour of the onset of symptoms.

Two-thirds of cardiac arrest deaths occur outside the hospital, with two-thirds of that number occurring in the home. The actual cause of death in approximately 70 percent of these cases is a cardiac rhythm disturbance, such as ventricular fibrillation or ventricular tachycardia.

Statistics such as these suggest that death from coronary artery occlusive disease is numerically the most prominent medical emergency in our society. But, because cardiac rhythm problems can be reversed if treated early, the potential for making major gains in this area of medicine is impressive.

The fact that most of these emergencies occur outside the hospital means that skilled medical personnel are not present when they are most needed, and, for that reason, the lay person — the bystander, family member, friend or fellow worker — is increasingly considered as the individual with the best opportunity to reverse the problem or to maintain the patient in a salvageable condition until medical help arrives.

Studies conducted in many centers in the U.S. and Europe indicate that initiation of cardiopulmonary resuscitation (CPR) by bystanders can lead to a significantly higher survival rate than that of victims whose CPR was delayed due to absence of bystander intervention.

Notes

2. Rescue — What Works

Educational programs designed to teach the lay person to maximize his or her timely proximity to the cardiac victim are already in place, and the combination of this bystander intervention with an efficient emergency medical service system which is backed by an advanced cardiac life support capability has improved survival rates for cardiac victims from five to 25 percent.

Complementing What Works

As an internal medicine and critical care specialist who has worked for 17 years with cardiac and cardiovascular emergencies, the author recognizes certain maneuvers, therapies and treatments which are especially useful in managing many cardiac emergency situations. These maneuvers, therapies and treatments require no equipment, no special place where they are to be performed and utilize no medications.

Origin of "Therapies"

Certain maneuvers which have proved effective in managing cardiac emergency situations come to mind. These therapies, discussed in detail in this book, were not developed by any single individual. In most cases, the therapies or concepts merely made sense to a rescuer who felt that the therapy might serve him in the future. If a maneuver worked, it was tried again and again, and successful therapies led to further reports in the literature.

Additionally, a professional who has experienced success with a specific therapy usually shares his knowledge of that therapy with colleagues and students in an effort to spread the good news. Repeated successes by the medical community lead to further interest in a therapy and a desire to know why and how it works, what modifications might allow it to work better and what side effects, if any, might be associated with its repeated use. Through this process, physicians collect effective therapies for specific situations.

The author has anthologized a collection of maneuvers, therapies and treatments which have proven beneficial to patients afflicted with cardiac or cardiovascular emergencies. All of the therapies outlined here can be performed without the aid of instruments, drugs or special devices, and all can be performed by the lay person (although those individuals who have some medical training should also find these concepts beneficial).

The goal in writing this text is to provide the lay person with basic knowledge of:

- The subject of cardiac and cardiovascular diseases
- The immediate therapies of such cases
- What each therapy can accomplish
- Why the therapy might not be effective in some cases

Most importantly, the knowledge of a procedure needs to be instilled in the lay person so that he or she may in certain cases employ that procedure without reservation.

Promoting Skill Enhancement

In addition to the instructions outlined here, it is recommended that the lay person learn the proper implementation of procedures in a "hands-on" setting from a skilled professional. The procedure descriptions outlined in this text should facilitate learning and ensure successful assimilation of the knowledge and implementation of the maneuver.

Patient Base

Often, family members are helpless in a cardiac emergency even though they know of the potential for one of their members to develop such a problem. Families need to be motivated to learn emergency cardiac maneuvers even if no threat of cardiac disease is presently apparent. Any person, whether or not he is aware of any cardiac disease, could benefit from the quick application (even self-application) of these simple therapies.

Need for Rapid Action

Not all medical therapies work all the time for all patients, but it is generally recognized that the therapies outlined here are more likely to work when they are quickly and knowledgeably applied as soon after the development of the cardiac emergency as possible and before the situation deteriorates and complicating factors begin to set in. This principle gives value to the need for the lay person's awareness of emergency therapies.

As has been shown statistically, the lay person will likely be the first and closest contact to a

cardiac arrest victim. Even though this text is not designed to give readers the skills to effectively treat cardiac emergency cases of all types and of varying complexities, it should make him better able to address such an emergency situation. One could postulate many situations, far removed from any hope of skilled medical care, where recall of a simple therapeutic intervention could save a life that would not have been salvageable minutes or hours later. Such emergencies develop on planes and boats, on fishing and hunting expeditions, along deserted country highways and in work places. The lay person may not be the best person to treat a cardiac victim, but he may be the only person available and with any ability to do so.

The pages that follow discuss the basics of cardiac function, problems which can develop in specific areas of the heart and circulatory system and how such problems might be managed.

#3 The Heart — Anatomy/Physiology

The heart is a unique pumping organ composed of:

- A large muscle mass
- A nervous system
- Its own circulatory system

The Heart as a Pump

In the four-chambered heart, the bulk of the muscle is found in the two major pumping chambers, the ventricles:

- The muscle of the left ventricular wall, whose task it is to pump oxygenated blood throughout the body, is much thicker than that of the right ventricle (Figure 1).
- The thinner-walled right ventricle pumps blood to the lungs, where it is oxygenated prior to returning to the left side of the heart.

The two ventricles, pumping in unison, each propel about two and one-half ounces of blood through their respective circulatory paths. The action of the pumps and their roles in the circulatory system (separated for clarity in the illustration) are shown in Figure 2.

Characteristics of the Pump

Valves within the heart keep the blood flowing in the proper direction. As blood enters the cardiac chambers, it stretches the muscular walls of the

chambers. The greater the degree of stretch of the muscle (dilitation of the chamber wall) by the incoming blood, the greater (within limits) will be the force of contraction by the chamber. When stretched, each chamber can move many times the amount of blood that it would have pumped in normal, or baseline, circumstances. Chambers that are incompletely distended or filled, however, will contract less vigorously (Figure 3).

The blood pumped into the systemic circulation by the powerful left ventricle can be monitored by feeling (palpating) pulses at certain prominent locations (Figure 4).