

CASE REPORT

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# Out-of-hospital cardiac arrest treated with prehospital double sequential external defibrillation during eCPR in refractory VF — a case report

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## Abstract

**Background** Double sequential external defibrillation (DSED) has demonstrated increased survival with good neurological outcome in a recent randomized controlled trial. DSED has not been studied in patients with extracorporeal cardiopulmonary resuscitation (eCPR).

**Case** We present the first case of prehospital eCPR with ongoing refractory ventricular fibrillation (VF), terminated by DSED. After six shocks, return of spontaneous circulation was initially achieved; however, the patient went into recurrent VF. ECPR was performed prehospital, with VF still refractory after three more shocks. DSED successfully terminated VF and showed a further increase in  $\text{etCO}_2$  and near-infrared spectroscopy cerebral oximetry values.

**Conclusion** DSED can be a sufficient strategy for patients in refractory VF while on eCPR and should be evaluated in further studies.

**Keywords** Resuscitation, Extracorporeal cardiopulmonary resuscitation, Double sequential external defibrillation, Advanced life support, Case report

## Background

Out-of-hospital cardiac arrest (OHCA) affects about 60/100,000 persons in Europe/year, with 20% having an initial shockable rhythm [1]. Initial shockable rhythm is significantly associated with return of spontaneous circulation and survival to hospital discharge with good neurological outcome [2, 3].

Refractory ventricular fibrillation (VF) is defined by current guidelines as ongoing VF after three defibrillations [4]. Patients with refractory VF represent a typical

cohort included in recent extracorporeal cardiopulmonary resuscitation (eCPR) trials [5]. Recent meta-analyses of randomized controlled trials (RCTs) have found increased survival in selected patients undergoing eCPR [6]. If eCPR is not available the concept of early double sequential external defibrillation (DSED) has demonstrated an increase in termination of VF and survival with good neurological outcome [7].

After an intensive literature search, there is no published report on the prehospital use of DSED during ongoing eCPR in refractory VF. In accordance with the CARE guidelines [8], we present the case of a 63-year-old patient, suffering from OHCA with refractory/recurrent VF. Pre-hospital eCPR was performed, guided by transesophageal echocardiography. Ongoing refractory VF during eCPR was successfully terminated using DSED.

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# EmtD Prehospital Defibrillation

**H Kauffman**



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Textbook of Coronary Thrombosis and Thrombolysis R. C. Becker, 2008-01-21 Teleologically the hemostatic mechanism is among the most fundamental yet complex physiologic processes in humans Early scientists and physicians were knowledgeable from a dedicated group of scientists and fascinated by the blood's ability to remain in a liquid state only to clot in response to vascular injury The book is divided into four distinct sections Part 1 Scientific Principles lays down the basics of their delicate interactions are still being unraveled supporting foundation Part 2 Clinical Application followed today As is so often the case an in depth of Scientific Principles places the knowledge base in appreciation of physiologic hemostasis representing a working perspective directly applying science to basic life sustaining sequence of events paved the patient care Part 3 New Dimensions provides a way for understanding abnormal hemostasis or glimpse of tomorrow Steering the field clear of self pathologic thrombosis Aristotle Malpighi and proclaimed victory and the dangers of complacency as Osier representing but a few of the founding fathers we move into the 21st century Part 4 Evolution of the field would undoubtedly be honored to see Thrombocardiology focuses

on laboratory standards their observations form the template for lifesaving clinical trials and drugs in development

**Strategies to Improve Cardiac Arrest Survival** Institute of Medicine, Board on Health Sciences Policy, Committee on the Treatment of Cardiac Arrest: Current Status and Future Directions, 2015-09-29 Cardiac arrest can strike a seemingly healthy individual of any age race ethnicity or gender at any time in any location often without warning Cardiac arrest is the third leading cause of death in the United States following cancer and heart disease Four out of five cardiac arrests occur in the home and more than 90 percent of individuals with cardiac arrest die before reaching the hospital First and foremost cardiac arrest treatment is a community issue local resources and personnel must provide appropriate high quality care to save the life of a community member Time between onset of arrest and provision of care is fundamental and shortening this time is one of the best ways to reduce the risk of death and disability from cardiac arrest Specific actions can be implemented now to decrease this time and recent advances in science could lead to new discoveries in the causes of and treatments for cardiac arrest However specific barriers must first be addressed **Strategies to Improve Cardiac Arrest Survival** examines the complete system of response to cardiac arrest in the United States and identifies opportunities within existing and new treatments strategies and research that promise to improve the survival and recovery of patients The recommendations of **Strategies to Improve Cardiac Arrest Survival** provide high priority actions to advance the field as a whole This report will help citizens government agencies and private industry to improve health outcomes from sudden cardiac arrest across the United States *Workbook for EMT Prehospital Care - Revised Reprint* Mark C. Henry, Edward R. Stapleton, Eric Niegelberg, 2006-11-08 The Revised Reprint is now updated to reflect the new 2005 emergency cardiac care guidelines It includes approximately 1 950 questions in a variety of formats multiple choice true false matching fill in the blank case studies in every chapter to help you picture yourself as a street EMT complete coverage of the cognitive objectives of the U S DOT EMT Basic Curriculum to give you the knowledge and critical thinking skills you need for success in exams and in the field anatomy labeling questions crossword puzzles and a CPR Review to make reviewing convenient and fun and National Registry Skill Sheets in an appendix to aid in skills review and practice **Comprehensive Guide to Pre-hospital Skills** Alexander M. Butman, 1995 The most comprehensive prehospital care skills reference on the market It definitively describes and graphically illustrates how and why to perform every prehospital skill required for both basic and advanced life support Summary skills sheets review the more complex multi part skills *Cambridge Textbook of Accident and Emergency Medicine* David V. Skinner, 1997-03-27 An important reference text to fulfil the information requirements of a rapidly growing speciality From prehospital care through to the smooth hand over to the continuing care specialist this volume provides a complete dossier of essential information pertaining to the conditions regularly encountered in an emergency situation Its three distinct sections cover in turn practical issues of assessment and broad general principles detailed management of specific trauma conditions and finally the specialist s insight into considerations of pathophysiology

and epidemiology ranges of clinical manifestations and potential complications *Rural Emergency Medical Services* Maria Elizabeth Hewitt, 1989 **An Introduction to Clinical Emergency Medicine** S. V. Mahadevan, Gus M. Garmel, 2012-04-10 Fully updated edition of this award winning textbook arranged by presenting complaints with full color images throughout For students residents and emergency physicians **Clinical Calculations - E-Book** Joyce LeFever Kee, Sally M. Marshall, Mary Catherine Forrester, Kathryn Woods, 2020-06-12 NEW Updated information on Antidiabetic Agents orals and injectables has been added throughout the text where appropriate NEW Updated content on Anticoagulant Agents is housed in an all new chapter NEW Colorized abbreviations for the four methods of calculation BF RP FE and DA appear in the Example Problems sections NEW Updated content and patient safety guidelines throughout the text reflects the latest practices and procedures NEW Updated practice problems across the text incorporate the latest drugs and dosages **EMS** Judith E. Tintinalli, Peter Cameron, James Holliman, 2010 This is a resource for EMS services worldwide edited by an international team of experts It helps EMS professionals plan and prepare for their role in saving lives Cardiovascular Therapeutics Elliott M. Antman, 2007-01-01 Manage cardiovascular problems more effectively with the most comprehensive resource available A trusted companion to Braunwald's Heart Disease Cardiovascular Therapeutics 4th Edition addresses pharmacological interventional and surgical management approaches for each type of cardiovascular disease This practical and clinically focused cardiology reference offers a balanced complete approach to all of the usual and unusual areas of cardiovascular disease and specific therapies in one concise volume equipping you to make the best choices for every patient Understand current approaches to treating and managing cardiovascular patients for long term health for complex problems and for unusual cardiac events Benefit from the substantial experience of Elliott M Antman MD Marc S Sabatine MD and a host of other respected authorities who provide practical evidence based rationales for all of today's clinical therapies Expand your knowledge beyond pharmacologic interventions with complete coverage of the most effective interventional and device therapies being used today Easily reference Braunwald's Heart Disease 9th Edition for further information on topics of interest Make the best use of the latest genetic and molecular therapies as well as advanced therapies for heart failure Cut right to the answers you need with an enhanced focus on clinically relevant information and a decreased emphasis on pathophysiology Stay current with ACC AHA ESC guidelines and the best ways to implement them in clinical practice Get an enhanced visual perspective with an all new full color design throughout Access the complete contents online and download images at [www.expertconsult.com](http://www.expertconsult.com)

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