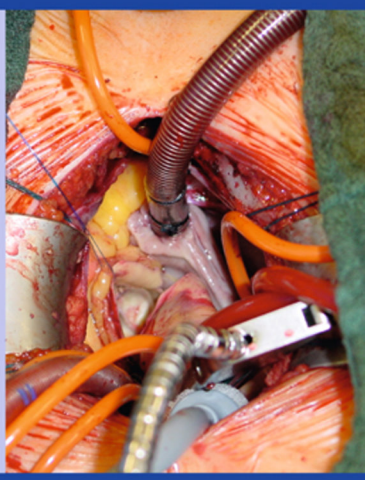
B. K. Podesser • D. J. Chambers *Editors*

New Solutions for the Heart



An Update in Advanced Perioperative Protection

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Prof. Dr. Bruno K. Podesser
Department of Cardiac Surgery
Landesklinikum St. Pölten
Propst Führerstr. 4
3100 St. Pölten
Austria
bruno.podesser@meduniwien.ac.at

Dr. David J. Chambers
Cardiac Surgical Research
The Rayne Institute (King's College London)
St. Thomas Hospital
Westminster Bridge Road
London SE1 7EH
United Kingdom
david.chambers@kcl.ac.uk

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Foreword (by Lawrence H. Cohn)

This interesting volume on advanced perioperative protection during cardiac surgery is an excellent compilation of past, present and future science of this very important and fundamental topic for every cardiac surgeon.

The Editors, Dr. Chambers and Podesser have assembled an all star cast of excellent clinicians and scientists, experts in the general fields of basic cardiac research, cardioplegia research and clinical outcomes research. After an initial excellent historical chapter the various authors present much of the basic science of myocyte physiology, myocardial protection, subjects that have not been well understood. These basic concepts have been summarized beautifully in this book for clinicians and basic science investigators alike.

The next section discusses much of what is currently known about the clinical and physiological effect of cardioplegia on the beating and arrested heart, the optimal protection for the transplanted heart, specific recommendations for right heart protection and a variety of modalities to achieve optimal protection in these situations.

Finally, there are several chapters about the potential future of improved protective cardiac strategies during surgery for an increasing number of patients, particularly the elderly, who will require cardiac surgery over the next decades. The authors have done an excellent job in putting together the best of science and clinical practice of a subject which is critical to successful cardiac surgery and which was put into effect only 30 years ago with the institution of hyperkalemic cardioplegia. Cardioplegia has become a scientific and clinical requirement for excellence in heart surgery.

The results in heart surgery are superb today compared with yesterday and a book like this is very important to stimulate even better results as we operate on more and more elderly patients and patients in extreme heart failure. The editors are to be congratulated on a superb job of getting the best and the brightest authors and investigators in the area of myocardial protection and insisting that we not stand on our laurels, but look to even better physiologic and clinical pathologic correlations for the best protection of hearts during open heart surgery.

Department of Cardiac Surgery
The Brigham & Women's Hospital
Harvard Medical School
Boston, MA, USA

Lawrence H. Cohn

Foreword (by Ernst Wolner)

Myocardial protection has been an integral part of cardiac surgery for the last 40 years after cardiac surgeons have realized in the early days that operations without protection of the heart lead to complications and fatalities. However, the story is not over yet. New chal lenges are waiting for surgeons and scientists. On the one hand, our surgical population is changing and we are today operating on older patients with often multiple co morbidities; on the other hand, we are performing more complex operations than ever before.

The current book, edited by Podesser and Chambers, gives an excellent overview on the achievements in myocardial protection of the past, the current clinical strategies and the future direction of science in this important field of cardiac research. Both Dr. Podesser and Dr. Chambers have dedicated most of their experimental and clinical work during the last 25 years towards improvement of myocardial protection and helped us to understand basic concepts of ischemia and reperfusion in normal and failing hearts. The editors have assembled the "crème de la crème" of scientists around the world that work in this field of research. The result is a compendium of excellent contributions that cover the historic development of cardioplegic arrest. Then a systematic overview of the sites of injury, where injury happens, is presented. A special focus is placed on age and the possible influence of gender on myocardial protection strategies. Additionally, due to increasing clinical relevance, a spotlight is placed on protection of the right, the failing, and the transplanted heart. In the last section of the book, new approaches and technologies are discussed. The importance of the endothelium as the first line of injury and defense, followed by the effects of cardioplegia on the vascular system and the influence of radical scavengers are presented. Finally, alternative solutions to arrest the heart are discussed and new technologies to deliver cardioplegia and/or cell therapies, to improve perfusion of the explanted heart and to visualize cardioplegia are proposed to the reader.

I would like to congratulate all authors on their valuable contributions and, once again, the two editors for the tremendous work they have put into this book. The last comparable compendium is more than 15 years old. Therefore, this update in advanced perioperative protection is urgently needed. The results and strategies presented in this book will expand our knowledge on injury and protection of the heart and thereby can improve the outcome of our daily work. I think it is a valuable book for both cardiac surgeons and scientists.

Department of Cardiothoracic Surgery
Allgemeines Krankenhaus der Stadt Wien
Medizinische Universität Wien, Vienna, Austria

Ernst Wolner

Preface

If I have seen a little further it is by standing on the shoulders of Giants.
Sir Isaac Newton (1643 1727), February 5, 1676, in a letter to Robert Hooke.

The mere formulation of a problem is far more essential than its solution, which may be merely a matter of mathematical or experimental skills. To raise new questions, new possibilities, to regard old problems from a new angle requires creative imagination and marks real advances in science.
Albert Einstein, (1879 1955)

Routine work can be accomplished easily and quickly by all who are willing to do so. However, almost everybody has to undergo a tiresome training to carefully and systemati cally reflect on complex processes.
Theodor Billroth, (1829 1894) "Über das Lehren und Lernen der medicinischen Wissenschaften an den Universitäten der Deutschen Nation" Vienna, 1876.

The idea for this book was conceived by Bruno Podesser in 2006, after realizing that there had been no comprehensive summary of myocardial protection during cardiac surgery since a book edited by HM Piper and CJ Preusse in 1993 (Ischemia Reperfusion in Cardiac Surgery). It became more of a reality when I was invited to give a lecture at the Medical University, Vienna. Afterwards, we were chatting in a traditional Kaffeehaus in the old town of Vienna and I was persuaded (against my better judgement) to become part of the project as a Co Editor (and author). This involved help in deciding a structure, and co opting/ persuading a number of eminent clinicians and scientists in the field of myocardial protection associated with cardiac surgery to write a chapter relevant to their expertise. It also became apparent that there was an expectation to write not one, but two, chapters (hence my reservations). Fortunately, the work involved in editing the other chapters was made relatively easy by the erudition of our authors.

That we have been successful in our endeavour can be seen within the book that has now been published. We hope this will be seen as a stepping stone for continuing research in this field, and as an aid for the challenges that are before those of us involved in moving cardiac surgery forward as a modern and exciting specialty in medicine.

The quotes above encapsulate how we feel about our Authors and about how we hope that the book will be viewed. If it could act as a basis for future studies and stimulate more research in this field, we would be pleased with the achievement and consider the work involved worthwhile. The quest for new "solutions" to optimize protection in all aspects of

cardiac surgery is a worthy goal, and one that is done primarily to benefit the patients who have to undergo such surgery.

We thank all the authors involved in this project, for agreeing to write for us and for the time and effort they have devoted to bringing the project to fruition. We appreciate that without their efforts this would not have been possible. Finally, we thank our families for putting up with the time spent away from home whilst working to finalize the end result.

Vienna and St. Pölten, Austria — Bruno K. Podesser
London, UK — David J. Chambers
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Contents

Contributors

Arezu Aliabadi Department of Cardiac Surgery, Medical University of Vienna, Währinger Gürtel 18 20, 1090 Vienna, Austria

Allanah Barker Papworth Everard, Cambridge, CB3 8RE, UK

Sarah Burki Department of Cardiac Surgery, Medical University of Vienna, Währinger Gürtel 18 20, 1090 Vienna, Austria

David J. Chambers Cardiac Surgical Research/Cardiothoracic Surgery, The Rayne Institute (King's College London), Guy's & St. Thomas' NHS Foundation Trust, St. Thomas' Hospital, London, SE1 7EH, UK, david.chambers@kcl.ac.uk

Frederick Y. Chen Division of Cardiac Surgery, Brigham and Women's Hospital, Harvard Medical School, 75 Francis Street, Boston, MA 02115, USA, fchen@partners.org

Wolfgang Dietl Department of Cardiac Surgery, Landesklinikum St. Pölten, Propst Führerstr, 4,3100 St. Pölten, Austria, The Ludwig Boltzmann Cluster for Cardiovascular Research, Medical University of Vienna, Vienna, Austria

Hazem B. Fallouh Cardiac Surgical Research/Cardiothoracic Surgery, The Rayne Institute (King's College London), Guy's and St. Thomas' NHS Foundation Trust, St. Thomas' Hospital, London, SE1 7EH, UK

Sigurd Gunnes Department of Cardiothoracic Surgery, St. Olavs University Hospital, Trondheim, Norway; Department of Circulation and Medical Imaging, Norwegian University of Science and Technology, 7006 Trondheim, Norway, sigurd.gunnes@ntnu.no

Seth Hallström Institute of Physiological Chemistry, Center of Physiological Medicine, Medical University of Graz, Graz, Austria

Per Jynge Department of Medicine and Health Sciences, Linköping University, 58185 Linköping, Sweden, per.jynge@liu.se

Stephen Large Papworth Everard, Cambridge, CB3 8RE, UK, stephen.large@ papworth.nhs.uk

Lawrence S. Lee Division of Cardiac Surgery, Brigham and Women's Hospital, Harvard Medical School, 75 Francis Street, Boston, MA 02115, USA

Sidney Levitsky Division of Cardiothoracic Surgery, Beth Israel Deaconess Medical Center, Harvard Medical School, 110 Francis Street, Suite 2A, Boston, MA 02115, USA, slevitsk@bidmc.harvard.edu

James D. McCully Division of Cardiothoracic Surgery, Beth Israel Deaconess Medical Center, Harvard Medical School, 33 Brookline Avenue, DA 0734, Boston, MA 02115, USA, james mccully@ hms.harvard.edu

Uwe Mehlhorn Department of Cardiothoracic and Vascular Surgery, University of Mainz, Mainz, Germany, uwe.mehlhorn@uni mainz.de

Dejan Milasinovic Department of Cardiac Surgery, Medical University of Vienna, Wäh ringer Gürtel 18 20, 1090 Vienna, Austria

Werner Mohl Department of Cardiac Surgery, Medical University of Vienna, Währinger Gürtel 18 20, 1090 Vienna, Austria, werner.mohl@meduniwien.ac.at

Jack A. T. C. Parker Department of Cardiothoracic and Vascular Surgery, University of Mainz, Mainz, Germany, jack.parker@ukmainz.de

Bruno K. Podesser Department of Cardiac Surgery, Landesklinikum St. Pölten, Propst Führerstr. 4, 3100, St. Pölten, Austria; The Ludwig Boltzmann Cluster for Cardiovascular Research, Medical University of Vienna, Vienna, Austria, bruno.podesser@meduniwien.ac.at

Michael P. Robich Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA 02215, USA

Gernot Seebacher Department of Cardiac Surgery, Medical University of Vienna, Wäh ringer Gürtel 18 20, 1090 Vienna, Austria

Frank W. Sellke Division of Cardiothoracic Surgery, Rhode Island Hospital and the Alpert Medical School of Brown University, APC 424, 593 Eddy Street, Providence, RI 02903, USA; Division of Cardiothoracic Surgery, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA 02215, USA, fsellke@lifespan.org

Neel R. Sodha Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA 02215, USA