
Principles of Pulmonary Protection in Heart Surgery

Edmo Atique Gabriel • Tomas A. Salerno
(Editors)

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This book is dedicated to God, to my parents Edmo Gabriel and Maria Lucia Atique Gabriel and my brother Sthefano Atique Gabriel.

This book is dedicated to my wife Helen Salerno, my children Mark and Kim Salerno and to my parents José and Silveria F. Salerno.

*Edmo Atique Gabriel
Tomas Salerno*

Preface

Over the past fifty years, advanced techniques and strategies have arisen in the field of myocardial protection. Meticulous trials, focusing on pulmonary protection during heart surgery requiring cardiopulmonary bypass (CPB), have been missing. This textbook is intended to serve as a useful tool to spread information on strategies for lung protection during heart surgery with CPB.

Emphasis on pulmonary protection will be turned to lung perfusion as an adjunct for minimizing the deleterious effects of pulmonary ischemia-reperfusion injury in heart surgery. Many renowned authors have contributed by presenting their experience on lung perfusion in basic research and clinical trials. Furthermore, they have enlightened the quality of this textbook with new ideas, concepts, and future perspectives.

The scope of this textbook is of interest to different professionals, such as cardiovascular surgeons, pulmonary surgeons, transplantation physicians, cardiothoracic anesthesiologists, intensive care physicians, cardiothoracic fellows, radiologists, basic sciences physicians, cardiologists, pulmonary medicine physicians, perfusionists, nurses, students, and researchers.

This textbook has 7 sections, aimed at addressing general and specific aspects of pulmonary protection during heart surgery with CPB. The first section on general concepts provides information about anatomic, physiologic, histologic, molecular, and radiologic considerations regarding the lungs.

The second section focuses on ischemia-reperfusion injury and is composed of several interesting chapters, addressing the basic science aspects of pulmonary protection, as well as experimental and clinical experiences from different heart surgery centers worldwide.

It would be unconceivable to comment on pulmonary protection without addressing regarding pulmonary hypertension. We dedicated the third section to describe pathologic mechanisms of pulmonary hypertension, types of pulmonary hypertension, surgical management of chronic thromboembolic pulmonary hypertension, Eisenmenger's syndrome, and disseminated intravascular coagulation. The final part of this section addresses new trends and perspectives for managing pulmonary hypertension.

The following three sections address underlying topics on lung protection, and the fourth section focuses on relationship between CPB and pulmonary injury. In this section, there is special interest emphasis on hemodynamic, gasometric, and inflammatory impact of CPB on pulmonary function. Furthermore, strategies such as ischemic preconditioning, hemofiltration, and ultrafiltration are covered in detail.

The main purpose of this textbook is to highlight the use of controlled lung perfusion during heart surgery with CPB, and this topic is covered in the fifth section. Techniques and principles of controlled lung perfusion are analyzed, based on recent research devised by Gabriel et al.¹ This section provides original discussions on extracorporeal circuit pathways for lung perfusion, how to determine lung perfusion pressure, lung perfusion using arterial and venous blood, and impact of controlled lung perfusion from hemodynamic, gasometric, inflammatory, and radiologic standpoint of view during heart surgery with CPB.

There are many controversial issues related to lung perfusion during heart surgery with CPB, that require new investigation. What is the best strategy: perfusing lungs continuously or intermittently during CPB? Are there indications for lung perfusion using arterial and venous blood? Can brain natriuretic peptide be used as a marker for hemodynamic performance of lung perfusion during CPB? How can we correlate lung perfusion with ECMO? These issues are partially answered in chapter six. This section also gives you an overall view on principles of pulmonary protection during heart surgery with CPB.

Finally, the seventh and last section covers experiences from heart surgery centers on lung perfusion in clinical heart-lung surgery.

We wish to thank all contributors who spent the time and effort to provide information on lung protection during heart surgery with CPB, by writing excellent chapters.

We disclose our gratitude to the publisher, Springer, for giving us this opportunity to write this book.

Reference

1. Gabriel EA, Locali RF, Matsuoka PK, et al. Lung perfusion during cardiac surgery with cardiopulmonary bypass: is it necessary? *Interact Cardiovasc Thorac Surg.* 2008;7:1089-1095.

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Edmo Atique Gabriel

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