

Peter Slinger *Editor*

Randal S. Blank · Javier Campos  
Jens Lohser and Karen McRae  
*Associate Editors*

# Principles and Practice of Anesthesia for Thoracic Surgery

*Second Edition*

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 Springer

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*The Editor would like to thank the members of his family for their never-ending support and patience.*

*Photo Left to right:*

*Back row: Colin (son-in-law), Eric (baby, grandson), Lee (daughter), Peter (editor), Rusty (wife), Robyn (daughter-in-law), Luke (son).*

*Front row: Reagan (grand-daughter,) Jake (grandson), Bruce (Luke's dog)*



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## Preface

It has been 8 years since the Associate Editors (Randall Blank, Javier Campos, and Karen McRae) and I assembled the first edition of *Principles and Practice of Anesthesia for Thoracic Surgery*. In this time period, there has been considerable evolution in the anesthetic management of patients requiring anesthesia for non-cardiac intrathoracic diagnostic and therapeutic procedures. We felt that it would be useful to update and expand the original text for practitioners of thoracic anesthesia at all levels including Staff Anesthesiologists, Residents, Fellows, Nurse Anesthetists, Nurse Practitioners, Anesthesia Assistants, and other Allied Health Professionals. We welcome the addition of Jens Lohser, from the University of British Columbia, as an Associate Editor for this second edition.

Among the major advances that we address in this new edition, we include the expanded role of ultrasound beyond transesophageal echocardiography (Chap. 30): Lung ultrasound has evolved from a curious pattern of artifacts to an essential clinical role in chest trauma and management of pleural effusions (Chap. 28). Ultrasound is now an established tool for the placement of many types of central and peripheral vascular access (Chap. 29). And, ultrasound has permitted the development of several new regional anesthetic blocks (e.g., serratus anterior and erector spinae, Chap. 59) that are useful modalities for management of postoperative pain.

Also new in this edition is the role of extracorporeal membrane oxygenation (ECMO) (Chap. 27) in thoracic anesthesia. Venovenous ECMO is becoming an established therapeutic option for management of intraoperative hypoxemia in complex types of lung and airway surgery and in whole lung lavage. Venous ECMO is rapidly replacing cardiopulmonary bypass as the main method of extracorporeal lung support in lung transplantation (Chap. 47).

There have been major advances in postoperative pain management for thoracic surgery in this decade. In addition to the new blocks mentioned above, the book covers the expanded use of paravertebral blocks and the use of long-acting local anesthetics (Chap. 60). Also, there have been a variety of new bronchial blockers and modified double-lumen tubes developed that facilitate lung isolation in patients with difficult airways (Chaps. 16, 17, and 18).

We would like to welcome the first Authors of new chapters.

Among these are:

- Daniel Sellers (University of Toronto, Intraoperative Extracorporeal Lung Support for Pulmonary and Airway Surgery, Chap. 27)
- Rebecca Klinger (Duke University, Perioperative Fluid Management in Thoracic Surgery, Chap. 21)
- Danielle Shafiepour (McGill University, Trouble-Shooting One-Lung Ventilation, Chap. 26)
- Nathan Ludwig (University of Western Ontario, Lung Ultrasound, Chap. 28)
- Natalie Silverton (University of Utah, Ultrasound for Vascular Access, Chap. 29)
- Alexander Huang (University of Toronto, Pulmonary Resection in the Patient with Pulmonary Hypertension, Chap. 34)
- Helen Lindsay (New Zealand, Anesthesia for Open Descending Thoracic Aortic Surgery, Chap. 41)

- Andrew Levin (Stellenbosch University, Cape Town, South Africa, Bronchopleural Fistula, Chap. 43)
- Maureen Cheng (Cambridge University, Anesthesia for the Patient with a Previous Lung Transplant, Chap. 48)
- Emily Teeter (University of North Carolina, Enhanced Recovery After Thoracic Surgery, Chap. 52)
- Hadley Wilson (University of North Carolina, Trouble-Shooting Chest Drains, Chap. 58)
- Wendell H. Williams III (MD Anderson Cancer Center, Long-Acting Local Anesthetics for Post-Thoracotomy Pain, Chap. 60)

We would also like to welcome several new first Authors of previous chapters, including Drs. Amanda Kleiman (University of Virginia, Non-respiratory Functions of the Lung, Chap. 7), Javier Lasala (MD Anderson Cancer Center, Intravenous Anesthesia for Thoracic Procedures, Chap. 12), Lorraine Chow (University of Alberta, Anesthesia for Patients with Mediastinal Masses, Chap. 14), Daniel Tran (Yale School of Medicine, Lung Isolation in Patients with Difficult Airways, Chap. 18), Jennifer Macpherson (University of Rochester, Intraoperative Ventilation Strategies for Thoracic Surgery, Chap. 22), Florin Costescu (McGill University, Anesthesia for Patients with End-Stage Lung Disease, Chap. 31), George Kanellakos (Dalhousie University, Thoracic Surgery for Morbidly Obese Patients and Patients with Obstructive Sleep Apnea, Chap. 33), Valerie Rusch (Memorial Sloan Kettering Cancer Center, Pancoast Tumors and Combined Spinal Resections, Chap. 37), Swapnil Parab (Tata Memorial Hospital, Mumbai, India, Thoracic Anesthesia in the Developing World, Chap. 42), Timothy Maus (UC San Diego, Anesthesia for Pulmonary Thromboendarterectomy, Chap. 49), Michael Hall (University of Pennsylvania, Anesthetic Management of Post-Thoracotomy Complications, Chap. 53), and Wendy Smith (UC San Francisco, Postoperative Respiratory Failure and Treatment, Chap. 54).

New to the second edition is the incorporation of video. Relevant video clips will be available online to readers of the print text. For the online text, streaming video clips will allow the reader to point and click to see techniques as they are described. This is particularly useful for ultrasound-guided procedures and lung isolation.

Personally, I would like to thank the returning Authors and Coauthors from the first edition for the thorough updates of their previous chapters. Thank you to the Associate Editors for their hard work and support. And, thank you to the Editors at Springer Clinical Medicine, Daniel Dominguez and Becky Amos, for their encouragement.

Toronto, ON, Canada  
March 2018

Peter Slinger

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# Contents

## Part I Introduction

- 1 History of Thoracic Anesthesiology** ..... 3  
Ian Conacher

## Part II Preoperative Evaluation

- 2 Preanesthetic Assessment for Thoracic Surgery** ..... 13  
Peter Slinger and Gail Darling
- 3 Thoracic Imaging** ..... 43  
Javier Campos and Kalpaj R. Parekh

## Part III Thoracic Anatomy, Physiology, and Pharmacology

- 4 Essential Anatomy and Physiology of the Respiratory System and the Pulmonary Circulation** ..... 65  
J. Michael Jaeger, Brian J. Titus, and Randal S. Blank
- 5 Physiology of the Lateral Decubitus Position, Open Chest, and One-Lung Ventilation** ..... 93  
Sean R. McLean and Jens Lohser
- 6 Clinical Management of One-Lung Ventilation** ..... 107  
Travis Schisler and Jens Lohser
- 7 Nonrespiratory Functions of the Lung** ..... 131  
Amanda M. Kleiman and Keith E. Littlewood
- 8 Pharmacology of the Airways** ..... 151  
Cassandra Bailey, Paul J. Wojciechowski, and William E. Hurford
- 9 Pharmacology of the Pulmonary Circulation** ..... 165  
Cara Reimer and John Granton
- 10 Perioperative Lung Injury** ..... 181  
Peter Slinger

## Part IV Diagnostic and Therapeutic Procedures of the Trachea and Airways

- 11 Bronchoscopic Procedures** ..... 197  
Gordon N. Finlayson, Tawimas Shaipanich, and Chris Durkin
- 12 Intravenous Anesthesia for Thoracic Procedures** ..... 219  
Javier D. Lasala and Ron V. Purugganan



<b>13</b>	<b>Tracheal Resection and Reconstruction</b> .....	231
	Karen McRae	
<b>Part V Diagnostic and Therapeutic Procedures of the Mediastinum</b>		
<b>14</b>	<b>Anesthesia for Patients with Mediastinal Masses</b> .....	251
	Lorraine Chow	
<b>15</b>	<b>Thymic Surgery and Paraendocrine Syndromes</b> .....	265
	Daniel Sellers and Karen McRae	
<b>Part VI Anesthetic Management for Intra-Thoracic Surgery</b>		
<b>16</b>	<b>Lung Isolation</b> .....	283
	Javier Campos	
<b>17</b>	<b>Fiberoptic Bronchoscopy for Positioning Double-Lumen Tubes and Bronchial Blockers</b> .....	311
	Javier Campos	
<b>18</b>	<b>Lung Isolation in Patients with Difficult Airways</b> .....	323
	Daniel Tran and Wanda M. Popescu	
<b>19</b>	<b>Intraoperative Patient Positioning and Neurological Injuries</b> .....	337
	Cara Reimer and Peter Slinger	
<b>20</b>	<b>Intraoperative Monitoring</b> .....	343
	Gabriel E. Mena, Karthik Raghunathan, and William T. McGee	
<b>21</b>	<b>Fluid Management in Thoracic Surgery</b> .....	357
	Rebecca Y. Klinger	
<b>22</b>	<b>Intraoperative Ventilation Strategies for Thoracic Surgery</b> .....	375
	Jennifer A. Macpherson	
<b>23</b>	<b>Anesthesia for Open Pulmonary Resection: A Systems Approach</b> .....	389
	E. Andrew Ochroch, Gavin Michael Wright, and Bernhard J. C. J. Riedel	
<b>24</b>	<b>Anesthesia for Video-Assisted Thoracoscopic Surgery (VATS)</b> .....	413
	Edmond Cohen and Peter Slinger	
<b>25</b>	<b>Anesthesia for Non-intubated Thoracic Surgery</b> .....	425
	Peter Slinger	
<b>26</b>	<b>Troubleshooting One-Lung Ventilation</b> .....	429
	Danielle Sophia Shafiepour	
<b>27</b>	<b>Intraoperative Extracorporeal Life Support for Thoracic and Airway Surgery</b> .....	437
	Daniel Sellers, Karen Lam, and Karen McRae	
<b>Part VII Applications of Ultrasound in Thoracic Anesthesia</b>		
<b>28</b>	<b>Pulmonary Ultrasound</b> .....	457
	Nathan Ludwig and Ahmed F. Hegazy	
<b>29</b>	<b>Ultrasound for Vascular Access</b> .....	471
	James P. Lee, Joshua M. Zimmerman, and Natalie A. Silverton	
<b>30</b>	<b>Intraoperative Transesophageal Echocardiography for Thoracic Surgery</b> .....	483
	Massimiliano Meineri	

**Part VIII Specific Patient Consideration**

- 31 Anesthesia for Patients with End-Stage Lung Disease** ..... 509  
Florin Costescu and Martin Ma
- 32 Thoracic Surgery in the Elderly** ..... 535  
Maria D. Castillo, Jeffrey Port, and Paul M. Heerdt
- 33 Thoracic Anesthesia for Morbidly Obese Patients and Obese Patients with Obstructive Sleep Apnea** ..... 545  
George W. Kanellakos and Jay B. Brodsky
- 34 Pulmonary Resection in the Patient with Pulmonary Hypertension** ..... 561  
Alexander Huang and Katherine Marseu

**Part IX Complex Thoracic Surgical Procedures**

- 35 Surgery of the Chest Wall and Diaphragm** ..... 583  
Peter Slinger
- 36 Extrapleural Pneumonectomy** ..... 587  
Ju-Mei Ng
- 37 Pancoast Tumors and Combined Spinal Resections** ..... 597  
Valerie W. Rusch, Ilya Laufer, Mark Bilsky, Alexandra Lewis, and David Amar
- 38 Anesthesia for Esophageal Surgery** ..... 609  
Randal S. Blank, Stephen R. Collins, Julie L. Huffmyer, and J. Michael Jaeger
- 39 Anesthesia for Robotic Thoracic Surgery** ..... 651  
Javier Campos
- 40 Anaesthesia for Combined Cardiac and Thoracic Procedures** ..... 661  
Marcin Wąsowicz
- 41 Open Thoracoabdominal Aortic Aneurysm Repair** ..... 675  
Helen A. Lindsay, Coimbatore Srinivas, and Maral Ouzounian

**Part X Anesthetic Management of Uncommon Pulmonary Procedures**

- 42 Thoracic Anesthesia in the Developing World** ..... 699  
Swapnil Yeshwant Parab and Sheila Nainan Myatra
- 43 Bronchopleural Fistulae** ..... 717  
Andrew Ian Levin
- 44 Massive Hemoptysis** ..... 733  
Jean S. Bussi eres and Marili Frenette
- 45 Whole Lung Lavage** ..... 747  
Jean S. Bussi eres and Etienne J. Couture

**Part XI Anesthesia for Surgical Procedures for End-Stage Lung Diseases**

- 46 Lung Volume Reduction** ..... 761  
Erin A. Sullivan
- 47 Lung Transplantation** ..... 773  
Andrew Roscoe and Rebecca Y. Klinger

<b>48</b>	<b>Anesthesia for the Patient with a Previous Lung Transplant</b> .....	791
	Maureen Cheng	
<b>49</b>	<b>Anesthesia for Pulmonary Thromboendarterectomy</b> .....	797
	Timothy M. Maus and Dalia Banks	
<b>Part XII Anesthesia for Pediatric Thoracic Surgical Procedures</b>		
<b>50</b>	<b>Anesthesia for Pediatric Thoracic Surgery</b> .....	815
	Robert Schwartz and Cengiz Karsli	
<b>Part XIII Trauma</b>		
<b>51</b>	<b>Anesthetic Management of Thoracic Trauma</b> .....	845
	Stephen V. Panaro and Tzonghuei Herb Chen	
<b>Part XIV Post-operative Management</b>		
<b>52</b>	<b>Enhanced Recovery After Surgery (ERAS) for Thoracic Surgery</b> .....	873
	Emily G. Teeter, Gabriel E. Mena, Javier D. Lasala, and Lavinia M. Kolarczyk	
<b>53</b>	<b>Anesthetic Management of Post-thoracotomy Complications</b> .....	885
	Michael A. Hall and Jesse M. Raiten	
<b>54</b>	<b>Postoperative Respiratory Failure and Treatment</b> .....	895
	Wendy Smith, Alan Finley, and James Ramsay	
<b>55</b>	<b>Postoperative Management of Respiratory Failure: Extracorporeal Ventilatory Therapy</b> .....	925
	Vera von Dossow, Maria Deja, Bernhard Zwissler, and Claudia Spies	
<b>56</b>	<b>Cardiovascular Adaptations and Complications</b> .....	939
	Alessia Pedoto and David Amar	
<b>57</b>	<b>Post-thoracic Surgery Patient Management and Complications</b> .....	953
	Jean Y. Perentes and Marc de Perrot	
<b>58</b>	<b>Troubleshooting Chest Drains</b> .....	969
	Hadley K. Wilson, Emily G. Teeter, Lavinia M. Kolarczyk, Benjamin Haithcock, and Jason Long	
<b>59</b>	<b>Pain Management After Thoracic Surgery</b> .....	981
	Stephen H. Pennefather, Clare Paula-Jo Quarterman, Rebecca Y. Klinger, and George W. Kanellakos	
<b>60</b>	<b>Long-Acting Local Anesthetics for Analgesia Following Thoracic Surgery</b> .....	1029
	Wendell H. Williams III, Jagtar Singh Heir, and Anupamjeet Kaur Sekhon	
<b>61</b>	<b>Chronic Post-thoracotomy Pain</b> .....	1045
	Peter MacDougall	
<b>Index</b> .....		1059