Respiratory Medicine
Series Editor: Sharon I.S. Rounds

Atul Mehta
Prasoon Jain
Editors

Interventional Bronchoscopy

A Clinical Guide

Humana Press

Respiratory Medicine
Series Editor: Sharon I.S. Rounds

Atul Mehta
Prasoon Jain
Editors

Interventional Bronchoscopy

A Clinical Guide

Humana Press

Respiratory Medicine

Series Editor:
Sharon I.S. Rounds

For further volumes:
http://www.springer.com/series/7665

Atul C. Mehta · Prasoon Jain
Editors

Interventional Bronchoscopy

A Clinical Guide

Humana Press

Editors
Atul C. Mehta, MBBS, FACP, FCCP
Respiratory Institute
Lerner College of Medicine
Cleveland Clinic, Cleveland, OH, USA

Prasoon Jain, MBBS, MD, FCCP
Pulmonary and Critical Care
Louis A Johnson VA Medical Center
Clarksburg, WV, USA

ISBN 978-1-62703-394-7 ISBN 978-1-62703-395-4 (eBook)
DOI 10.1007/978-1-62703-395-4
Springer New York Heidelberg Dordrecht London

Library of Congress Control Number: 2013934706

Printed on acid-free paper

Humana Press is a brand of Springer
Springer is part of Springer Science+Business Media (www.springer.com)

"..to today's students and tomorrows bronchoscopists."

Atul C. Mehta

"..to my mother and father."

Prasoon Jain

Preface

A revolution is taking place in the field of bronchoscopy. The strides made over the past decade in this field have exponentially improved the diagnostic as well as therapeutic capability of flexible bronchoscopy. It is now possible to see beyond the bronchial wall using endobronchial ultrasound and navigate to small peripheral lesions using virtual bronchoscopy and electromagnetic navigational bronchoscopy. The therapeutic role of bronchoscope is no longer limited to palliate symptoms of advanced lung cancer. There are exciting developments in the potential role of bronchoscopy in the treatment of bronchial asthma, chronic obstructive pulmonary disease (COPD), and bronchopleural fistula.

The advances in bronchoscopic techniques and refinement of knowledge in this field could not have come at a better time. We are in the midst of a worldwide lung cancer epidemic. With lung cancer screening we are expected to encounter increasing numbers of patients with lung nodules that are too small to reach with conventional bronchoscopic methods. Bronchial asthma and COPD continue to threaten the well-being of a significant proportion of the population around the globe. It is our belief that advanced bronchoscopy techniques have an important current and future role in diagnosis and management of many these patients.

In this book, we invited some of the world's leading experts to critically review the important diagnostic and therapeutic bronchoscopic techniques that have emerged over the past decade. The book is written for pulmonologists, pulmonary fellows in training, and for all those who perform diagnostic and therapeutic bronchoscopy. We provide a balanced view of the current status, limitation, and the future of the new bronchoscopic techniques that have been adopted in mainstream practice over the past few years.

Rapid growth in any medical field raises many pertinent questions. Bronchoscopy is no exception. One must ask whether the new techniques are more effective in providing diagnosis or in improving outcome than the existing techniques. The safety issues as well as limitations of the new procedure must be understood. As most of the new bronchoscopic techniques are expensive, the cost issues must be addressed. Presently, the economic implication of adopting any expensive technique cannot be overlooked. Society and third-party payers alike are increasingly demanding economic justification for choosing a more expensive technique over an existing less expensive technique. In the global arena, many of the emerging techniques are simply out of

reach of resource-poor societies. Throughout the book the authors have addressed some of these issues to guide the reader to make informed and judicious decisions in adopting new techniques and make sound decisions regarding allocation of health care resources.

We strongly and unapologetically feel that the emergence of new techniques in bronchoscopy does not imply that existing and conventional bronchoscopic techniques such as transbronchial lung biopsy and conventional transbronchial needle aspiration have become obsolete and should be abandoned. In fact, the emergence of new techniques provides a unique opportunity to refine and redefine the clinical role of the existing techniques. We firmly believe that the intelligent and effective use of time-tested conventional bronchoscopic methods still has and will continue to have an important role in routine bronchoscopy practice. It is essential for every bronchoscopist to have a sound understanding of the fundamental principles of the conventional procedures before embarking upon more advanced techniques. Due to this reason, considerable sections have been devoted to the conventional bronchoscopic techniques in this book.

We sincerely thank all the contributing authors who share their expertise in this book. With their assistance, we have done our best to provide a balanced and state-of-the art review of this rapidly expanding field. We hope the readers will find the information thought provoking, practical, and readily applicable in their clinical practice. We are excited about the advances in the field of bronchoscopy, but we truly believe that it is only the beginning. The best is yet to come.

Cleveland, OH, USA — Atul C. Mehta
Clarksburg, WV, USA — Prasoon Jain

Contents

Contributors

Fumihiro Asano, M.D., F.C.C.P. Department of Pulmonary Medicine, Gifu Prefectural General Medical Center, Gifu, Japan

John F. Beamis Jr., M.D. Department of Pulmonology, Hawaii Permanente Medical Center, Honolulu, HI, USA

Prashant N. Chhajed, M.D., D.N.B., D.E.T.R.D., F.C.C.P. Lung Care and Sleep Centre, Fortis Hiranandani Hospital, Navi Mumbai, Maharashtra, India

Cliff K. C. Choong, M.B.B.S., F.R.C.S., F.R.A.C.S. Department of Surgery (MMC), The Valley Hospital, Monash University, Melbourne, VIC, Australia

Joseph Cicenia, M.D. Respiratory Institute - Department of Advanced Diagnostic Bronchoscopy, Cleveland Clinic, Cleveland, OH, USA

Yaser Abu El-Sameed, M.B.B.S. Respirology Division, Medicine Institute, Sheikh Khalifa Medical City, Abu Dhabi, UAE

Erik Folch, M.D., M.Sc. Division of Thoracic Surgery and Interventional Pulmonology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA

Thomas R. Gildea, M.D., M.S. Bronchoscopy, Cleveland Clinic, Respiratory Institute, Cleveland, OH, USA

Sarah Hadique, M.D. Pulmonary and Critical Care Medicine, West Virginia University, Morgantown, WV, USA

Edward F. Haponik, M.D. Pulmonary and Critical Care Medicine, Wake-Forest School of Medicine, Winston-Salem, NC, USA

Cheng He, M.B.B.S., B.Med.Sc., P.G.Dip.Surg.Anat. Department of Surgery (MMC), Monash Medical Center, Monash University, Clayton, VIC, Australia

Prasoon Jain, M.B.B.S., M.D., F.C.C.P. Pulmonary and Critical Care, Louis A Johnson VA Medical Center, Clarksburg, WV, USA

Arvind H. Kate, M.D., F.C.C.P. Lung care and sleep centre, Fortis Hiranandani Hospital, Navi Mumbai, Maharashtra, India

Sumita B. Khatri, M.D., M.S. Asthma Center, Cleveland Clinic, Respiratory Institute, Cleveland, OH, USA

Noriaki Kurimoto, M.D., F.C.C.P. Department of Chest Surgery, St. Marianna University, Kawasaki, Kanagawa, Japan

Pyng Lee, M.D. Yong Loo Lin School of Medicine, National University of Singapore, Singapore

Division of Respiratory and Critical Care Medicine, National University Hospital, Singapore, Singapore

A. Lukas Loschner, M.D. Section of Pulmonary, Critical Care, Environmental and Sleep Medicine, Carilion Clinic, Virginia Tech Carilion School of Medicine, Roanoke, VA, USA

Adnan Majid, M.D., F.C.C.P. Division of Thoracic Surgery and Interventional Pulmonology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA

Praveen M. Mathur, M.B.B.S. Pulmonary/CCM Department, Indiana University Hospital, Indianapolis, IN, USA

Atul C. Mehta, M.B.B.S. Respiratory Institute, Lerner College of Medicine, Cleveland Clinic, Cleveland, OH, USA

Sonali Sethi, M.D. Respiratory Institute - Department of Interventional Pulmonary, Cleveland Clinic, Cleveland, OH, USA

Santhakumar Subramanian, M.D., F.C.C.P., I.D.C.C. KG Hospital, Arts College Road, Coimbatore, Tamilnadu, India

Part I

Introduction