INTRODUCTION TO BRONCHOSCOPY

Bronchoscopy is one of the most commonly performed medical procedures and also defines the procedural practice of chest physicians. In most training programs, however, there is little structured education, and trainees learn by watching and doing. This book is intended as a road map for any physician looking to master or improve skills in this important area. It outlines what the authors, who are all experts in the field, think a standard approach to common procedures should be and covers everything from anatomy and equipment care to how to set up a bronchoscopy unit. Step-by-step descriptions and abundant illustrations provide the reader with detailed instructions for performing diagnostic procedures such as bronchial washing and lavage, lung biopsy, and transbronchial needle aspiration. The book also covers bronchoscopy in the intensive care unit and lung transplant patients. Advanced diagnostic bronchoscopy and basic therapeutic techniques are reviewed in the final two chapters.

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Introduction to Bronchoscopy

Edited by

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Flexible bronchoscopy in many ways defines the procedural component of pulmonary medicine. Unfortunately, in many fellowship programs, little attention is directed toward a structured educational effort to attain the necessary skills to become a solid endoscopist. Often a “see one, do one, teach one” approach is taken, which does not lend itself to educating bronchoscopists in the best possible environment and frequently leaves little time to discuss components of the procedure at hand. Additionally, it is difficult to teach more advanced, less common procedures in this setting.

The specifics of particular procedures are rarely a matter of discussion, and neither is the maintenance of bronchoscopes. Even though pulmonologists are frequently in charge of or medically direct bronchoscopy units, the lack of this knowledge puts the new trainee in a difficult position.

It should also not come as a surprise that even basic minimally invasive procedures such as transbronchial needle aspiration are performed by only a minority of pulmonologists – reflecting the aforementioned significant shortcomings in procedural education.

In 2000, we introduced a standardized introduction to bronchoscopy for all pulmonary medicine trainees of the Harvard Medical School–associated teaching hospitals. It included a half-day of lectures, followed by hands-on training in basic techniques as well as simulation practice. It was enthusiastically embraced and quickly expanded to include Fellows from many training programs around New England. As a matter of fact, similar courses are now being introduced around the country, hopefully contributing to a better learning experience for pulmonary trainees on a larger scale. This course also provides an overview of necessary sedation guidelines and principles of bronchoscope maintenance.

This book is based on the curriculum of this course, and I am indebted to the lecturers who agreed to expand on their presentations and include them as full chapters and to all Fellows who have participated in these courses and whose feedback continues to improve this educational offering.

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ABBREVIATIONS/ACRONYMS

2D – two-dimensional
3D – three-dimensional
ACCP – American College of Clinical Pharmacy; American College of Chest Physicians
ACLS – Advanced Cardiac Life Support
ACMI – American Cystoscope Makers, Inc.
AFB – acid-fast bacilli
AFB – autofluorescence bronchoscopy
APC – argon plasma coagulation
ASA – American Society of Anesthesiologists
ATS – American Thoracic Society
BAL – bronchoalveolar lavage
BD – balloon dilation
BIPAP – bilevel positive airway pressure
BOS – bronchiolitis obliterans syndrome
BT – brachytherapy
BTS – British Thoracic Society
BW – bronchial washing
CCD – charge-coupled device
CDSS – Continuum of Depth of Sedation Scale
CFU – colony-forming unit
CIS – carcinoma in situ
CNS – central nervous system
COX-1 – cyclooxygenase-1
CPAP – continuous positive airway pressure
CT – computed tomography
CTF – computed tomography fluoroscopy
CTZ – chemoreceptor trigger zone
DFA – direct fluorescence antibody
EBBX – endobronchial biopsy
<table>
<thead>
<tr>
<th>Abbreviations/Acronyms</th>
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<tr>
<td>EBUS – endobronchial ultrasound</td>
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<tr>
<td>EC – electrocoagulation</td>
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<td>EDTA – ethylene diamine tetraacetic acid</td>
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<td>EEG – electroencephalogram</td>
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<td>ELISA – enzyme-linked immunosorbent assay</td>
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<tr>
<td>ENB – electromagnetic navigational bronchoscopy</td>
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<td>EOCT – endoscopic optical coherence tomography</td>
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<td>ERS/ATS – European Respiratory Society/American Thoracic Society</td>
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<td>ETT – endotracheal tube</td>
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<td>EUS-FNA – endoscopic ultrasound – fine needle aspiration (endoscope)</td>
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<td>FB – flexible bronchoscope</td>
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<td>FEV&lt;sub&gt;1&lt;/sub&gt; – forced expiratory volume in 1 second</td>
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<tr>
<td>FiO&lt;sub&gt;2&lt;/sub&gt; – fraction of inspired oxygen</td>
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<tr>
<td>FISH – fluorescence in situ hybridization</td>
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<td>GABA – γ-aminobutyric acid</td>
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<td>GM – galactomannan</td>
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<td>HPD – hematoporphyrin derivative</td>
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<td>ICU – intensive care unit</td>
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<td>IV – intravenous, intravenously</td>
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<td>JSB – Japan Society for Bronchology</td>
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<tr>
<td>LIP – licensed, independent practitioner</td>
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<td>LLL – left lower lobe</td>
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<td>LUL – left upper lobe</td>
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<tr>
<td>MDCT – multidetector computed tomography</td>
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<td>MPAP – mean pulmonary arterial pressure</td>
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<td>NBI – narrow band imaging</td>
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<td>Nd:YAG – neodymium-doped yttrium aluminum garnet (laser)</td>
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<td>NIH – National Institutes of Health</td>
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<td>NPO – nil per os (nothing by mouth)</td>
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<td>NSAID – nonsteroidal antiinflammatory drug</td>
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<td>NSCLC – non-small cell lung cancer</td>
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<td>OAAAS – Observers Assessment of Alertness/Sedation Scale</td>
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<td>PAD – postanesthesia discharge</td>
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<td>PAP – pulmonary alveolar proteinosis</td>
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<td>PAR – postanesthesia recovery</td>
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<td>PAS – periodic acid-Schiff</td>
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<td>pBAL – protected bronchoalveolar lavage</td>
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<td>PCR – polymerase chain reaction</td>
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<td>PDT – photodynamic therapy</td>
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<tr>
<td>PSB – protected specimen brush</td>
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<td>PTX – pneumothorax</td>
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Abbreviations/Acronyms

RGB – red, green, blue
RLL – right lower lobe
RML – right middle lobe
ROSE – rapid on-site evaluation
RUL – right upper lobe
SDI/DVI – serial digital interface/digital video interface
SLN – superior laryngeal branch of the vagus nerve
S-video – super video
TBB – transbronchial lung biopsy
TBBx – transbronchial lung biopsy
TBLB – transbronchial lung biopsy
TBNA – transbronchial needle aspiration
TVC – true vocal chord
UIP – usual interstitial pneumonia
VAP – ventilator-associated pneumonia
WAB – World Association for Bronchology
WCB – World Congress for Bronchology