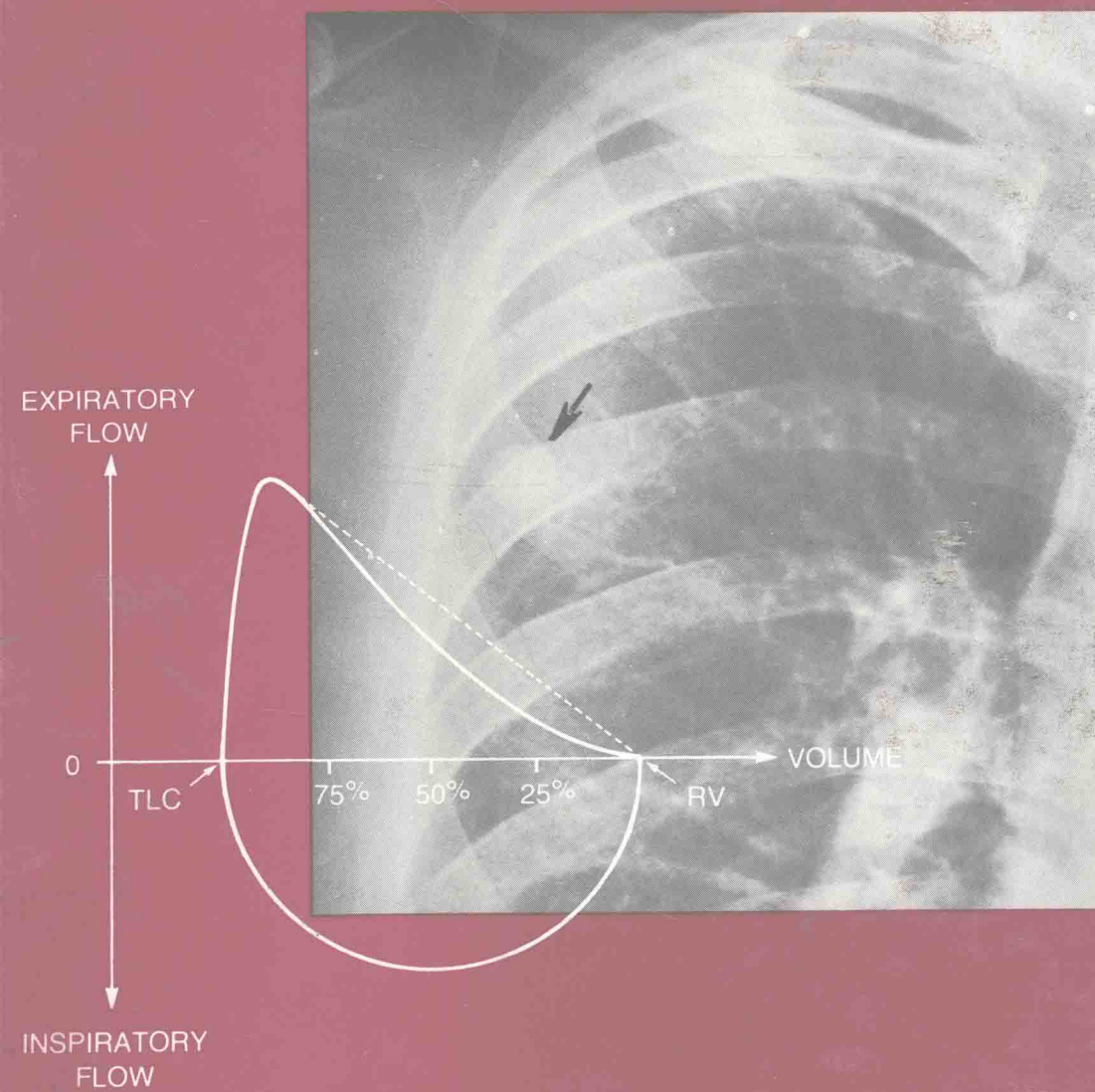
Problems in Pulmonary Medicine for the Primary Physician



ROBERT H. POE

ROBERT H. ISRAEL

Problems in Pulmonary Medicine for the Primary Physician

ROBERT H. POE, M.D.
Associate Professor of Medicine
University of Rochester School of Medicine and Dentistry
Director, Pulmonary Disease Unit
Highland Hospital
Rochester, New York

ROBERT H. ISRAEL, M.D.
Associate Professor of Medicine
University of Rochester School of Medicine and Dentistry
Director, Pulmonary Disease Unit
St. Mary's Hospital
Rochester, New York

Lea & Febiger
Philadelphia
1982

Lea & Febiger
600 Washington Square
Philadelphia, PA 19106
U.S.A.

Library of Congress Cataloging in Publication Data
Main entry under title:

Problems in pulmonary medicine for the primary physician.

Bibliography: p.
Includes index.
1. Lungs—Diseases—Treatment—Decision making.
2. Medical logic. I. Poe, Robert H. II. Israel, Robert H. [DNLM: 1. Lung diseases. WF 600 P962]
RC756.P76 616.2'4 82-8972
ISBN 0-8121-0829-9 AACR2

PRINTED IN THE UNITED STATES OF AMERICA

Print No. 3 2 1

Problems in Pulmonary Medicine for the Primary Physician

To
Our Wives and Children
SONJA, MICHAEL, JENNIFER, AND MARK POE
MERILYN, MICHAEL, AND DAVID ISRAEL
for their patience and understanding throughout this endeavor

FOREWORD

DONALD F. TREAT, M.D.

Associate Professor of Family Medicine
in Medicine, in Pediatrics, in Preventive Medicine, and in Community Health;
Chairman, Division of Family Medicine Department of Preventive, Family and Rehabilitation Medicine.
University of Rochester School of Medicine and Dentistry,
Rochester, New York

A book that brings together the latest useful information about some of the most common problems encountered in the practice of primary care, namely respiratory diseases, is a welcome addition to the practitioner's library. Both the prevalence of pulmonary problems and their attendant costs are eye-opening. In this country today, respiratory diseases cost the nation over 20 billion dollars annually, and cause at least 80,000 deaths each year. According to reports from The National Institutes of Health, approximately 47 million Americans, or about 1 in every 5 persons, reports some chronic respiratory disease.[1] An even more disturbing observation comes from epidemiologic studies that indicate that the mortality rate from obstructive lung disease is rising at a faster rate than the other 10 leading causes of death in the United States.[1]

Primary physicians are well aware of the prevalence of respiratory disease in their daily practices. Data from The National Ambulatory Medical Care Survey show that 14% of all office visits over a two-year period were for acute and chronic respiratory disease.[2] The problems are ubiquitous and affect all population groups to some extent. Although the average patient will have several limited respiratory infections during a lifetime, a few will develop chronic lung disease as a result of repeated infections or structural abnormalities within the pulmonary system. Many more will develop functional disabilities as the result of exposure to cigarette smoke and other air pollutants. As the "first contact" physician, the family physician, general internist or pediatrician has an unparalleled opportunity not only to recognize early evidence of serious pulmonary disease, but to practice primary prevention through patient education and appropriate immunization and secondary prevention through judicious use of screening, respiratory therapy, and prophylactic antibiotics when indicated.

As primary care physicians have noted many times, patients seldom present initially with established diagnoses. Rather, patients present with problems usually characterized by a symptom or two and perhaps an

[1]Epidemiology of Respiratory Diseases—Task Force Report. N.I.H. Publication No. 81-2019, Oct., 1980.
[2]National Ambulatory Medical Care Survey. N.C.H.S. Series 13, No. 42 (6).

objective physical finding. Often, it is with such meager data that the primary care physician must approach the challenges of diagnosis and treatment. The authors of this book, each of whom cares for patients with pulmonary problems in a variety of settings, have adhered to the problem-oriented approach in presenting their topics. The usefulness of this approach has been further enhanced by algorithms to display a branching, logical approach to decision making and by the generous use of selected illustrations, charts, graphs, and tables. In the interest of clarity and brevity, the book contains minimal theoretical material.

As a practical guide to the management of common pulmonary problems, this book should appeal especially to medical students and house officers, who often ask questions such as the following: How should the surgical risk for my patient with pulmonary disease be evaluated? Is I.P.P.B. the preferred way to deliver bronchodilators? When and how should steroids be used in asthmatic patients? When should a patient with possible pulmonary emboli be advised to have angiography? Should smokers be monitored by office spirometry? Should everyone with hemoptysis be bronchoscoped? What is the role of chemotherapy today in the treatment of lung cancer? What signs and symptoms are suggestive of the sleep apnea syndromes? How should one proceed in the differential diagnosis of dyspnea?

Through the efforts of the authors, answers to these questions and a great many more are available to the reader. Although much remains to be learned about the diagnosis and treatment of pulmonary disease, sufficient progress has been made to warrant presenting the "state of the art" in a form that the primary physician will find useful.

PREFACE

This book describes the common clinical problems in pulmonary medicine that are encountered in the practice of the primary care physician. We attempt to discuss subjects that have either been the stimulus for questions from our primary care colleagues or have presented the impetus for seeking consultation from the pulmonary disease specialist. In some cases, the problem is clearly that of a symptom, such as dyspnea or cough, which is of uncertain cause or has persisted beyond expectations of both patient and physician; while in others, the problem focuses on a specific disorder, circumstance, or therapeutic modality that has been repeatedly puzzling for the physician. Recent advances in the state of the art of pulmonary medicine, as evidenced by the appearance of several excellent comprehensive textbooks of pulmonology, have contributed to the latter.

We hope the problem orientation of this book will facilitate its use by the general physician, student, and house officer. The book approaches everyday problems in a practical fashion with chapters devoted to clarifying a symptom, sign, or circumstance, rather than the conventional taxonomic method, which often includes considerably more information on the physiologic and biochemical aspects of disease. The primary physician must plan his or her management within a reasonable time frame. Practical questions need immediate answers to optimize patient care. We believe a problem-oriented book facilitates this approach.

It is most appropriate that a book such as this originate from the community of Rochester, New York. The University of Rochester School of Medicine and Dentistry is the sponsor of three programs that form the educational basis of primary care medicine in the community. The University of Rochester Family Medicine Program, organized in July, 1968, was one of the first such programs dedicated to the training of family physicians in the United States. The University of Rochester Associated Hospitals Program, organized by Dr. Lawrence E. Young in July, 1974, was one of the first programs in internal medicine to successfully integrate a university hospital, community hospitals, and ambulatory care facilities into a single educational program placing emphasis on outpatient medicine. This program provides a unique experience for its trainees, while at the same time contributing to the community's health care. The University of Rochester's General Medicine Unit, the third of the University's programs, is dedicated to training physicians for an academic career in primary internal medicine through its fellowship program and its encouragement of clinical research. The

Pulmonary Disease Unit of the University of Rochester School of Medicine and Dentistry embraces pulmonary medicine at six community hospitals. This has resulted in a fully integrated program in pulmonary medicine enhancing the role of the University in the community. All the pulmonary specialists hold appointments at the University and interface with one or more of the primary care medicine programs. This book represents the combined efforts of physicians associated with the Pulmonary Disease Unit, together with some of its alumni, and in two instances, physicians representing other specialties at the University, but nonetheless, clinicians concerned with pulmonary problems and dedicated to the same educational process and programs.

By design, our approach is not meant to be all-inclusive of the state of knowledge of pulmonary medicine nor to address all problems encountered in the practice of the specialty. At the same time, we have not intended to underestimate the complexities of the patient with pulmonary disease nor the difficulties that can be associated with diagnosis and management. We have tried to use a practical approach, using the current state of knowledge and our collected experience to instruct the primary physician in how to better manage the pulmonary patient and how to use the consultant's services in a timely and meaningful fashion.

We are grateful to each author for his willingness to cooperate in this joint venture. Special appreciation is extended to Richard W. Hyde, M.D. and William J. Hall, M.D., whose enthusiastic leadership in the "pulmonary community" make the system work. We also wish to express our gratitude to Francis M. Kelley, M.D. and John D. Kennedy, M.D. of the Radiology Department, Highland Hospital, for their assistance in acquiring the roentgenograms that appear in Chapters 4 and 5. Others making special contributions to this book are Gerald Cooper and Leon Schwartz of the University of Rochester Photography and Illustration Service and Ms. Mary Cooros, Medical Photographer at Highland Hospital, who assisted in the preparation of the illustrations that appear in the text. We thank Ms. Debbie Odell for typing several of the chapters. We want to express special appreciation to Ms. Brenda Allison for her dedication, stamina, and understanding in preparing virtually the entire manuscript in its final form. Finally, the cooperation of everyone at Lea & Febiger has made the task of writing and editing a pleasant and rewarding experience.

Rochester, New York

Robert H. Poe
Robert H. Israel

CONTRIBUTORS

Robert C. Dale, M.D.
Clinical Instructor in Medicine
University of Rochester School of Medicine and Dentistry
Pulmonary Disease Unit
Rochester General Hospital
Rochester, New York

Anthony J. Fedullo, M.D.
Assistant Professor of Medicine
University of Rochester School of Medicine and Dentistry
Medical Director
Medical Intensive Care Unit
Rochester General Hospital
Rochester, New York

Michael M. Finigan, M.D.
Clinical Associate Professor of Medicine
University of Rochester School of Medicine and Dentistry
Director, Pulmonary Disease Unit
The Genesee Hospital
Rochester, New York

Kuddusi Gazioglu, M.D.
Former Associate Professor of Medicine
University of Rochester School of Medicine and Dentistry
Professor of Medicine
Head, Pulmonary Disease Department
Faculty of Medicine
University of Istanbul, Turkey

Donald W. Greenblatt, M.D.
Assistant Professor of Medicine
University of Rochester School of Medicine and Dentistry
Pulmonary Disease Unit
St. Mary's Hospital
Rochester, New York

William J. Hall, M.D.
Associate Professor of Medicine and of Pediatrics
University of Rochester School of Medicine and Dentistry
Associate Dean for Continuing Medical Education
Strong Memorial Hospital
Rochester, New York

Richard W. Hyde, M.D.
Professor of Medicine and of Radiation Biology and Biophysics
University of Rochester School of Medicine and Dentistry
Head, Pulmonary Disease Unit
Strong Memorial Hospital
Rochester, New York

Robert H. Israel, M.D.
Associate Professor of Medicine
University of Rochester School of Medicine and Dentistry
Director, Pulmonary Disease Unit
St. Mary's Hospital
Rochester, New York

Irwin G. Karron, M.D.
Clinical Assistant Professor of Medicine
University of Rochester School of Medicine and Dentistry
Director, Pulmonary Disease Unit
Monroe Community Hospital
Rochester, New York

Matthew G. Marin, M.D.
Associate Professor of Medicine and Assistant Professor of Radiation Biology and Biophysics
University of Rochester School of Medicine and Dentistry
Pulmonary Disease Unit
Strong Memorial Hospital
Rochester, New York

Carlos R. Ortiz, M.D.
Assistant Professor of Medicine
University of Rochester School of Medicine and Dentistry
Director, Intensive Care Unit
The Genesee Hospital
Rochester, New York

Robert H. Poe, M.D.
Associate Professor of Medicine
University of Rochester School of Medicine and Dentistry
Director, Pulmonary Disease Unit
Highland Hospital
Rochester, New York

Raman Qazi, M.D.
Associate Professor of Oncology in Medicine
University of Rochester School of Medicine and Dentistry
Associate Director, Hematology Oncology Unit
Highland Hospital
Rochester, New York

Alvani D. Santos, M.D.
Assistant Professor of Medicine
University of Rochester School of Medicine and Dentistry
Director, Non-invasive Cardiology Laboratory
St. Mary's Hospital
Rochester, New York

W. George Swalbach, M.D.
Clinical Associate Professor of Medicine
University of Rochester School of Medicine and Dentistry
Former Director, Division of Tuberculosis Control
Monroe County Department of Health
Rochester, New York

Andrew J. Swinburne, M.D.
Assistant Professor of Medicine
University of Rochester School of Medicine and Dentistry
Director, Pulmonary Disease Unit
Rochester General Hospital
Rochester, New York

Mark J. Utell, M.D.
Assistant Professor of Medicine
University of Rochester School of Medicine and Dentistry
Director, Medical and Respiratory Intensive Care Units
Strong Memorial Hospital
Rochester, New York

CONTENTS

Chapter 1

DYSPNEA

RICHARD W. HYDE

Dyspnea literally means "bad breathing." Shortness of breath, breathlessness, and difficulty breathing are synonyms used by patients to describe dyspnea. It commonly makes the patient seek medical advice, and despite a careful history and physical exam, the cause is frequently not readily apparent. Because dyspnea can be the harbinger of serious disease, it requires careful evaluation. Some patients will not complain of dyspnea, but its presence can be inferred on the basis of physical signs such as restlessness, fatigue on exertion, tachycardia, and tachypnea. In infants, children, and demented or obtunded adults, clues to dyspnea are flaring of the nostrils, gasping breaths, and intercostal retractions on inspiration and intercostal bulging on expiration.

Variants of dyspnea that may provide important diagnostic information are orthopnea, dyspnea on moving to the supine position; platypnea, dyspnea on sitting up; and trepopnea, dyspnea that is greater in one of the lateral positions.[1] Diagnoses associated with these forms of dyspnea are described in Table 1–1.

Abnormal or irregular breathing patterns may accompany dyspnea. Cheyne-Stokes respiration is a gradual crescendo-like hyperventilation that gradually merges into periods of hypoventilation or even apnea, varying from 10 seconds to several minutes. These patients complain of dyspnea during the periods of deep rapid breathing (hyperpnea). Elevated arterial carbon dioxide (Pa_{CO_2}) such as seen in many pulmonary disorders suppresses Cheyne-Stokes respiration. Cheyne-Stokes respiration is, therefore, more highly suggestive of cardiovascular disease than pulmonary disease. The underlying physiologic mechanism is the development of incomplete positive feedback in the respiratory control mechanisms.[2] The positive feedback frequently develops due to prolongation of lung-to-brain circulation time secondary to low cardiac output usually accompanied by dilatation of the chambers of the left heart. It is also caused by alterations in supramedullary brain function such as from hypoxia, stroke, and other neurologic disorders.

Kussmaul's breathing is simply rapid breathing such as is found with heavy physical exertion in normal persons. At rest, however, it suggests severe metabolic acidosis as is seen in uremia, diabetic ketoacidosis, and shock sufficiently severe to generate a lactic acidosis, or acute anxiety.

The time at which dyspnea occurs can be an important clue to the

TABLE 1–1

Positional Forms of Dyspnea

Type	Causes
Orthopnea (Dyspnea in supine position)	1. Increased pulmonary capillary pressure (left ventricular failure, mitral stenosis) 2. Severe asthma, emphysema, chronic bronchitis 3. Neuromuscular disease resulting in bilateral diaphragmatic paralysis
*Platypnea** (Dyspnea on sitting upright)	1. Neuromuscular diseases primarily involving chest wall musculature (cervical cord injuries, amyotrophic lateral sclerosis) 2. Atrial septal defects causing a right-to-left shunt in sitting position (postpneumonectomy) 3. Intrapulmonary shunts in lower lung fields (cirrhosis, pulmonary arterial–venous malformations) 4. Hypovolemia
Trepopnea (Dyspnea more marked in left or right lateral decubitus position)	1. Congestive heart failure

**Orthodeoxia* or oxygen desaturation developing on assuming the erect position may accompany platypnea.

diagnosis. Dyspnea from asthmatic attacks frequently follows exercise and exposure to cold air. Asthma is characteristically worse in the evening or in the early hours of the morning when vagal tone is at its peak and prescribed medications such as theophylline compounds may have reduced blood levels. Nocturnal asthma attacks can be confused with paroxysmal nocturnal dyspnea. Paroxysmal nocturnal dyspnea is a form of acute pulmonary edema from elevated pulmonary vascular pressures, frequently seen in patients with mitral stenosis and in many forms of left ventricular failure such as hypertensive cardiovascular disease, aortic insufficiency, or arteriosclerotic heart disease. It is attributed to reabsorption of dependent edema fluid that is redistributed to the lungs while sleeping, with resultant pulmonary congestion.

PATHOPHYSIOLOGY

The precise physiologic cause of dyspnea has defied detection, but a number of mechanisms are clearly associated with dyspnea (Figure 1–1). Identification of these mechanisms is frequently helpful in reaching a diagnosis. Dyspnea usually develops if a patient must ventilate at a rate that requires more than 40% of his maximum voluntary ventilation (MVV), defined as the maximum rate and depth of ventilation that can be voluntarily sustained for 12 to 15 seconds. Increased work of breathing such as required to expand a stiff chest cage in kyphoscoliosis or from forcing air through a narrow cancerous larynx causes dyspnea.

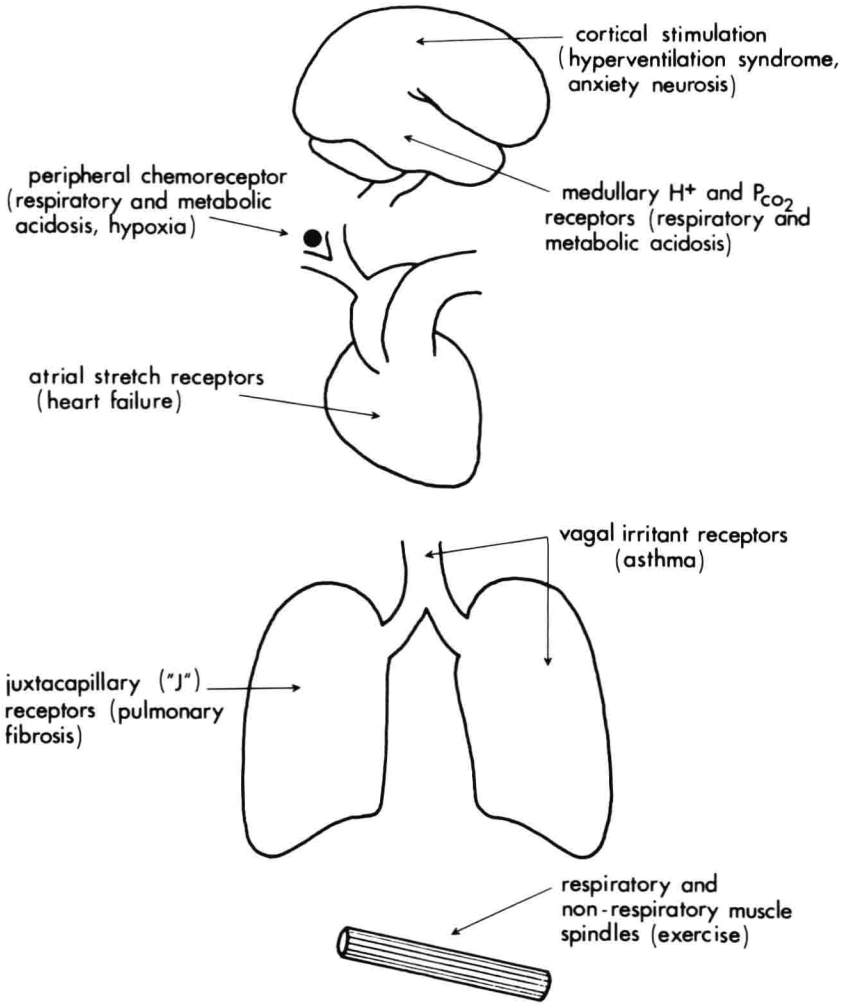


Figure 1–1. Diagram of sources of input into ventilatory drive. Stimulation of any of these factors has the potential to increase ventilation and thereby result in dyspnea.

Physiologic experiments suggest that these forms of dyspnea are most closely related to excessive tension in respiratory muscles per unit length of the muscle.[3] Poorer correlations are found with the amount of work performed by the muscle, with oxygen consumption of the muscle, and with a variety of other indices of muscle function.

Inability to maintain an adequate cardiac output during exertion, such as is seen with pulmonary stenosis, causes dyspnea at least in part from the resultant acute metabolic acidosis.