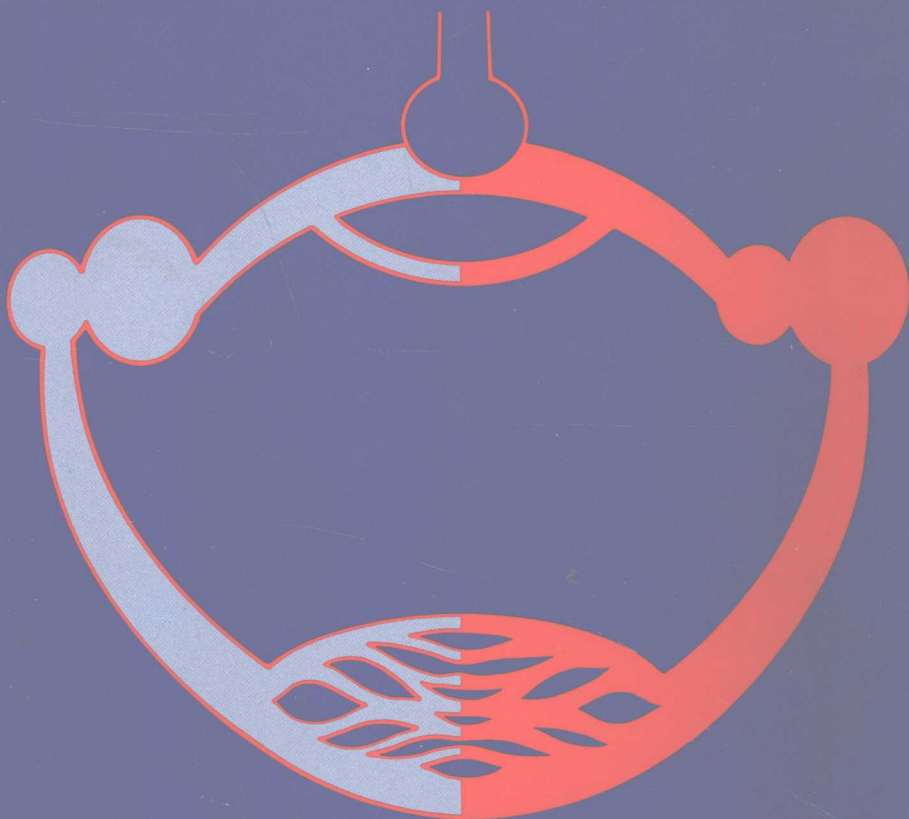


PULMONARY PHYSIOLOGY IN CLINICAL PRACTICE

The Essentials for Patient Care and Evaluation

Lawrence Martin



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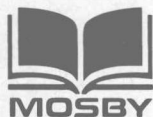
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with 222 illustrations

The C. V. Mosby Company

ST. LOUIS • WASHINGTON, D.C. • TORONTO 1987



A TRADITION OF PUBLISHING EXCELLENCE

Editor: Dennis Carson
Assistant editor: Elizabeth Raven
Project editor: Patricia Gayle May
Book design: Nancy Steinmeyer
Cover design: Gail Morey Hudson
Production: Marilyn K. Wynd

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Printed in the United States of America

The C.V. Mosby Company
11830 Westline Industrial Drive, St. Louis, Missouri 63146

Library of Congress Cataloging in Publication Data

Martin, Lawrence

Pulmonary physiology in clinical practice.

Includes bibliographies and index.

1. Lungs. 2. Respiration. 3. Lungs—Diseases.

I. Title. [DNLM: 1. Lung—physiology. 2. Respiration

Disorders—physiopathology. WF 600 M3806p]

QP121.M367 1987 616.2 86-18105

ISBN 0-8016-3192-0

GW/VHP/VHP 9 8 7 6 5 4 3 2 1 01/A/003

PULMONARY PHYSIOLOGY IN CLINICAL PRACTICE

The Essentials for Patient Care and Evaluation

To my wife
Ruth
and my children
Joanna, Rachel, and Amy
and to my parents
Harry and Sadie

Preface

A generation ago, care of patients with lung disease required tools no more sophisticated than a stethoscope and chest x-ray. Blood gases, pulmonary function tests, hemodynamic monitoring, and artificial ventilation were available, but not widely utilized or understood by practicing physicians. Today, blood gas and spirometry have achieved equal footing with the ECG, blood count, and serum electrolytes as basic tools in patient care and evaluation. In addition, artificial ventilation and hemodynamic monitoring are now employed in all critical care areas.

Another major change has been the expansion of medical personnel involved in patient care and evaluation. It used to be that only the physician and nurse were involved in direct patient care. Today, respiratory patients are also likely to have contact with respiratory therapists, chest physical therapists, pulmonary technicians, and, at teaching hospitals, medical and nursing students.

It should be evident that the better anyone—nurse or doctor, therapist or student—understands pulmonary physiology, the better care he or she can give patients. Hence the need for this book. Though there are many excellent physiology texts, few explain pulmonary physiology as it relates directly to patient care and patient evaluation. This book is based on extensive experience in teaching pulmonary physiology to medical personnel, at all levels of training. This experience has shown that

it is artificial to teach one type of physiology to medical students, and another to nurses, respiratory therapists, or pulmonary technicians. There is a fundamental, basic core of pulmonary physiology, and it is the same regardless of the intended audience. This basic core, as it directly relates to patient care, is the subject of this book.

Pulmonary Physiology in Clinical Practice is not a general review of pulmonary physiology, but rather covers only the essentials for clinical practice; anyone studying to care for respiratory patients should find it useful and rewarding. Several aspects of physiology covered in larger or more basic texts will not be found here. Those wishing a comprehensive or basic science review of pulmonary physiology are referred to one of the several excellent texts listed in Appendix G.

Although many students find respiratory physiology difficult to grasp at first, all agree the effort is ultimately worthwhile. In no other field of medicine is an understanding of physiology so directly relevant to patient care. Management is often closely based on blood gas values, spirometric results, hemodynamic measurements, etc. Adequate care of patients in respiratory failure, especially those receiving artificial ventilation, is simply not possible without knowledge of basic pulmonary physiology.

Included with each chapter are clinical problems to enhance your understanding; detailed answers

are provided in Appendix A. It is highly recommended that you work through each problem before reviewing the answer. A summary is provided near the end of each chapter. Finally, at the end of each chapter is a list of ten true-false questions; if you can easily answer them, chances are good you understand the material.

Several additional appendices are provided to complement the chapters and provide additional

information. Those readers who have access to IBM-compatible microcomputers may wish to sample computer programs we have written in the area of cardiopulmonary medicine. Information about these freely available programs can be found in Appendix H.

Lawrence Martin, M.D.

Cleveland

Acknowledgments

This book grew out of syllabus material originally written for medical students at Case Western Reserve University. I have since used chapters from the book to teach many other groups, including house staff, respiratory therapists, and nurses. Without students to teach, there would be no book, and to them I am particularly indebted. I would also like to acknowledge those many students—too numerous to list—who brought to my attention typographical or factual errors while the manuscript was in draft form.

I would like to offer a special thank you to the following people:

Jose Katz, M.D., Shaul Margalio, M.D., and Linda Haacke, R.R.T., M.D., for their meticulous and thorough reviews; Lawrence McCastle,

R.R.T., for his review of Chapter 10; Robert Martin, M.D., for his review of Chapter 10; Brian Jeffreys, R.C.P.T., for his invaluable assistance in developing computer software (listed in Appendix H); Barbara Zaremsky, for her cheerful and unstinting secretarial assistance; Nancy Heim, for her wonderful illustrations; Elizabeth Raven of The C.V. Mosby Company, for her guidance and understanding during the book's preparation; Gayle May, of The C.V. Mosby Company, for her detailed editing and cheerful handling of my numerous changes; Alan Salm, M.D., Brian Jeffreys, and Kristina Suchy, for their able photographic assistance; and Stephen Reich, M.D., for the Mencken quote used in Chapter 7. Finally, I want to thank Matthew Levy, M.D., whose recommendation of this book to the publisher started the whole project.

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