

Practical Applications of Mechanical Ventilation. Shaila Shodhan Kamat MBBS DA MD. First published New Delhi, India: Jaypee Brothers Medical Publishers, 2009. New York: McGraw-Hill Professional, 2010. Soft cover, 592 pages, \$79.95.

To the uninitiated, mechanical ventilation for intensive care unit (ICU) patients can be rather mysterious, with its many technical aspects and confusing terminology. Understanding mechanical ventilation requires an appreciation for the integration of human physiology and pathophysiology with bioengineering principles yielding effective mechanized gas exchange. From a practical perspective, it means safely ventilating critically ill patients through recovery from respiratory failure. In **Practical Applications of Mechanical Ventilation**, Shaila Shodhan Kamat sets out to create a “theoretical as well as practical guide for beginners.” Dr Kamat is an Associate Professor in the department of anesthesiology at the Goa Medical College in Bambolim, Goa, India. It is clear from the 2 forewords written by Drs Muralidhar K and Pramila Bajaj, as well as the author’s preface, that Dr Kamat is a dedicated and skilled educator and expert regarding mechanical ventilation. Dr Kamat has completed a herculean undertaking, writing a 558-page book on a highly complex topic as a solo writer. Nearly all such books are written by multiple contributors, and perhaps for good reason. While she specifically targets resident physicians confronting mechanical ventilation in the ICU for the first time, she adds that the book has been written as a practice guide for the people working in an ICU, who I take to mean respiratory therapists and ICU nurses. She adds that faculty physicians and critical care fellows may find the book helpful as well. Her stated aims are to fill a gap with a clear, concise, and easy to understand text that supplements rather than replaces the textbooks already available. She achieves some but not all of her goals.

The book is organized into 6 parts, starting with respiratory physiology, and concluding with ventilatory strategies. Parts II through V include sections entitled “Effects of Controlled Ventilation,” “Know Your Ventilator,” “Ventilatory Parameter,” and

“Modes of Ventilation.” The structure of the book brings distinct positive and negative features. An exceptional strength of the book is the use of numerous line drawings to illustrate physiologic principles, ventilation modes, and other concepts. By my count, there are more than 300 illustrations. Further, Dr Kamat has selected particularly important figures and reproduced these in 16 color plates at the beginning of the book. At 558 pages, the book can be in no way be considered “concise” as intended. Many of the words that fill the pages are well invested to simplify complex concepts. However, there are many redundancies, some with conflicting information that often confuses rather than clarifies basic principles and contributes to the sense of meandering prose. The most striking limitation of the book is the absence of any references. Inclusion of selected readings or a list of key references, at a minimum, would have added considerable value to the book.

The book starts out strongly, with a comprehensive review of respiratory physiology. The 11 chapters in Part I constitute 111 pages and present an approach that harkens to West’s longstanding basic text on respiratory structure and function. These chapters are liberally populated with figures that serve to emphasize key points. Although there are inaccuracies (eg, “the trachea measures . . . 11–12.5 mm in diameter in an adult”), the overall presentation is sound for both basic physiology and advanced concepts.

Part II transitions effectively from respiratory physiology to mechanical ventilation, starting with a chapter that compares and contrasts spontaneous ventilation to controlled respiration. This is followed by 2 chapters that address harmful effects of controlled ventilation, including potential detrimental impact on non-pulmonary organ function, and how this might be prevented.

Parts III, IV, and V build the reader’s knowledge of mechanical ventilation in a logical fashion, starting with the basic physical components and process of gas delivery in the comprehensive chapter entitled “Ventilator: At a Glance.” Part IV gives a detailed discussion of ventilator parameters, including $F_{I_{O_2}}$, tidal volume, inspiratory flow and pressure, breathing cycle, ventilator alarms, waveforms, and monitoring of

lung mechanics. These are the building blocks that the modes chapters are built upon. Although patient-ventilator synchrony is discussed within the chapter on pressure-support ventilation, illustration and discussion of the more common patient-ventilator dyssynchronies, such as ineffective triggering and double-triggering, in the section on monitoring or waveforms, would have been useful—a surprising absence in this illustration-rich book.

The largest part of the book—Part IV, “Modes of Ventilation”—begins with a discussion of “What is Mode?” This important chapter provides a framework for understanding modes and is a “must-read” chapter for students. It is followed by highly detailed discussions of various conventional and advanced modes, such as pressure regulated volume control. The chapters on modes include factual descriptions of the key ventilatory parameters and useful illustrations to reinforce these concepts, followed by statements of advantages and disadvantages, and indications and contraindications for each mode. Most of these statements reflect widely held beliefs, but many seem to reflect the author’s particular experience or bias. For example, the discussion of synchronized intermittent mandatory ventilation (SIMV) states that “muscle relaxants are absolutely contraindicated.” Further, the list of SIMV contraindications includes “hemodynamically unstable patients” and “patients with minute ventilation requirements > 10 L/min.” In order to be truly comprehensive, a chapter about high-frequency ventilation options, particularly high-frequency oscillatory ventilation should be included, but discussion was limited to several lines in the chapter on acute respiratory distress syndrome (ARDS). While noninvasive ventilation is discussed in the chapters on pressure-support ventilation, COPD, et cetera, organizing that discussion into one chapter would be welcomed.

The final part, “Ventilatory Strategy,” begins with a general discussion of ventilation in respiratory failure and proceeds to review management and strategies for ventilatory management of patients with severe asthma, COPD, ARDS, head/brain injury, and neuromuscular diseases. I found the discussions of severe asthma and COPD in-

sightful, including emphasis on recognizing and minimizing dynamic hyperinflation and intrinsic PEEP. Several illustrations help the reader to understand these concepts.

I must admit, however, to being dissatisfied with the chapter on ventilatory strategy for ARDS. Following lengthy discussion of the definition, clinical manifestations, and pathophysiology of ARDS, the discussion of ventilatory support begins with sections entitled “indications,” “general objectives,” and “general guidelines.” Among the 7 “general objectives for ventilatory support” and the 9 items listed under “general guidelines for ventilatory management in ARDS,” the importance of using low-tidal-volume ventilation is never once mentioned. When tidal volume is mentioned in various subsequent sections of the chapter, there is inconsistency in the recommendations, failure to note that tidal volume should be based on predicted body weight rather than actual body weight, and no mention of the pivotal ARDS Network clinical trial that showed improved survival with use of lower tidal volume. I was acutely aware of the lack of an evidence-based approach in this chapter. Concluding comments superficially address the role of adjunctive therapy for ARDS, such as prone positioning, corticosteroids, and inhaled nitric oxide—sections that would benefit from inclusion of current references.

The final chapter tackles weaning from mechanical ventilation. While many factors related to weaning success and options for weaning approaches are discussed, this is in a rambling fashion, and final explicit recommendations are lacking. There seems to be equal weighting of modern approaches of identifying when a patient can be successfully removed from the ventilator and extubated using a structured team-based approach and of outdated approaches of gradual weaning using SIMV or pressure-support ventilation.

This book represents a very personal and comprehensive review of mechanical ventilation by an experienced clinician and dedicated teacher. The liberal use of illustrations enhances the exchange of knowledge to the reader and is a clear strength. Highly motivated students and resident physicians will find the chapters on respiratory physiology, the ventilator, ventilator parameters, and what is unique about various ventilation modes instructive. The student reader should beware, however, this is not a “basics of...” text, as complex concepts are

presented in considerable detail. In contrast, the discussion regarding the clinical application of the various ventilation modes, and some of the recommendations regarding mechanical ventilation for specific disorders—particularly ARDS—cannot be recommended and detract from the value of the book as a whole. These seem to have been driven more by local practice than by evidence: a conclusion accentuated by the complete absence of references in the book. This book’s “Achilles heel” is perhaps related to the intense dedication of Dr Kamat to the task of writing a large textbook all by oneself. The involvement of additional authors would probably have strengthened the book considerably by including more evidence and citing the appropriate current and classic references, by tempering the opinion of one with the opinions of other experts from other institutions, and by aggressively editing for clarity and brevity.

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Adventures of an Oxy-Phile 2, 2nd edition. Thomas L Petty MD, with Robert McCoy RRT FAARC, Louise Nett RN RRT FAARC, and Kay Bowen. Denver: Snowdrift Pulmonary Conference. 2010. Soft cover, 208 pages, \$19.99

In December of 2009, with the passing of Thomas L Petty MD, the world of pulmonary medicine lost a true icon. Beginning with his graduation from medical school in 1958, *Dr Tom* (as many patients and colleagues affectionately knew him) enjoyed a career that spanned more than 5 decades. Fortunately for patients around the world, Dr Petty’s career is rich with contributions advancing the art and science of pulmonary and critical care medicine.

Dr Petty has been credited variously as “the father of pulmonary medicine,” “the father of LTOT” (long-term oxygen therapy), and “the father of pulmonary rehabilitation.” Starting in 1965, when he first dis-

covered the possibilities that new liquid-oxygen portable systems offered to those needing home and ambulatory oxygen, Petty elevated and promoted the medical management of COPD like no other before him or since. Additionally, in a paper that appeared in the fall 1967 issue of the *Lancet*, he and his surgical partner Dr David Ashbaugh were the first to describe the sequelae of ARDS. The face of critical care medicine and the provision of mechanical ventilation have not been the same since.

In the early 2000s, Dr Petty experienced health issues of his own—issues that in his words placed him on *the other end of the stethoscope*. This was Dr Petty’s way of letting everyone know that he too was now a regular user of supplemental oxygen. Once again, another legacy was established: that of LTOT patient advocacy. As a result, today’s LTOT users are much more aware of their numerous options for supplemental oxygen. There too is a growing awareness that for optimum effect, LTOT must prevent arterial desaturation (unintended or otherwise) not just some of the time, but all of the time. Success, in Dr Petty’s opinion, depended upon knowledgeable LTOT users able to maximize their LTOT delivery options to maintain effective oxygenation under all conditions of use.

To nurture this growing patient-centric movement, in 2004 Dr Petty published his first book on the subject, *Adventures of an Oxy-Phile*,¹ in which he proudly stated in the preface, “This book is written for and by patients who have learned to adapt to the need for supplemental oxygen. I hope it will serve thousands of patients and their families, as well as other students of oxygen.” I couldn’t agree more. (Although the first edition of *Adventures of an Oxy-Phile* is out of print, a free copy can be downloaded from the Web site: www.drtpetty.org.)

The writing of the second edition, **Adventures of an Oxy-Phile 2**, commenced in full fervor by Dr Petty in August of 2009, during an extended period of wellness. Fortunately, the book was mostly complete by the time of his passing, and was easily brought to its final form by 3 life-long colleagues and close friends.

As with the first edition, **Adventures of an Oxy-Phile 2**, is more about LTOT users, although there is ample attention directed at the underlying science of continuous supplemental oxygen therapy. However, with the second edition—208 pages versus 96 for the first—there is considerably more ma-