■ REVIEWS OF EDUCATIONAL MATERIAL

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Acid-Base Disorders and Their Treatment. Edited by F. John Gennari, Ph.D., Horacio J. Adrogue, M.D., John H Galla, M.D., and Nicolaos E. Madias, M.D. Boca Raton, Taylor and Francis, 2005. Pages: 856. Price: $199.95.

This 856-page book has been edited by, and has contributions from, some of the best known authors in contemporary clinical acid–base chemistry. Before proceeding, however, I have several confessions: First, I work outside the United States; second, I use (standard) base excess; and third, based on the current evidence, I use the (Fencl-) Stewart approach to acid–base disorders. But before I am dismissed as an acid–base fringe dweller, I point readers to the latest edition of *Miller's Anesthesia*.[1]

In *Acid-Base Disorders and Their Treatment*, in the first chapter, "Acid-Base Chemistry and Buffering," Drs. Gennari and Galla analyze the Stewart approach but conclude that the bicarbonate-centered approach, derived from the Henderson-Hasselbalch equation, ". . . provides all the information needed for acid-base assessment and is a far superior tool for clinical application." The Fencl modification of Stewart's approach for clinical work (the Fencl-Stewart approach) does not get a mention. Similarly, in chapter 26, "Measurement of Acid-Base Status," Drs. Adrogue and Madias conclude that standard base excess has ". . . failed to gain substantial acceptance" while they champion bicarbonate and the rules of thumb: another riposte in the "The Great Trans-Atlantic Acid-Base Debate."

This book has very detailed analyses of many aspects of the range of acid–base disorders: respiratory alkalosis and acidosis, metabolic acidosis and alkalosis, and mixed disorders, as well as chapters on specific disorders such as lactic and ketoacidosis. Included are items that are hard to find, such as how pH and carbon dioxide electrodes work and assays for total carbon dioxide. Another highlight, particularly for critical care physicians, is chapter 12, "Toxin-Induced Metabolic Acidosis," by Drs. Oh and Halperin. Given the central role of the kidney, the book has several chapters on renal dysfunction as well as two on the acid–base effects of renal replacement therapies. However, I think that the international appeal of this book (and others) would be enhanced if authors, editors, and publishers allowed for the fact that most laboratories outside the United States use micromoles per liter or millimoles per liter for most biochemical variables including creatinine, urea, and glucose. Further, there is no mention that many laboratories include potassium in the anion gap calculation. A discussion of the two approaches to the anion gap, with and without potassium, would have been interesting. There is, however, discussion of Figge's correction of the anion gap for decreased albumin.

The final section of the book is 17 illustrative cases that examine assorted disorders and road-test the bicarbonate rules of thumb. I would have been interested to see the authors attempt to demonstrate that bicarbonate rules of thumb are superior to standard base excess in this section, given that we are talking about robust clinical tests rather than precise physiologic experiments. To me, the rules of thumb seem remarkably hard work that provides little, if any, gain over standard base excess in bedside (or operating table side) medicine. Of the case studies, many are set in the emergency room and would lead to patients being admitted under internal medicine specialists or the intensive care unit. These case studies may appeal to anesthesiologists with an interest in the internal medicine side of perioperative medicine. One illustrative case is set in the postoperative period and discusses the role of nasogastric suctioning and metabolic alkalosis, but fails to mention how concurrent intravenous fluid therapy may affect the situation. Further, none of the case studies involve trauma, the intraoperative period, or major hemorrhage.

As an anesthesiologist, my main concern is that there is virtually no mention of the acid–base effects of intravenous fluids, particularly the hyperchloremic acidosis associated with normal saline, even though there is a whole chapter on nonrenal causes of hyperchloremic acidosis. There are now many publications on acid–base changes with intravenous fluid therapy, looking not only at saline but also lactated Ringer's solution (Hartmann's solution) and various colloids. Nor in this book is there much on acid–base disorders in resuscitation situations such as major trauma. I believe another omission, given that there are chapters such as "Evolutionary Perspectives on the Acid-Base Effects of Diet," is no mention of hypothermia and the alkalosis seen every day with cardiopulmonary bypass and the subsequent α-stat, pH-stat debate.

I think that this book would appeal most to my mirror image: a US-based physician, using bicarbonate rules of thumb, and a bicarbonate-centered approach to disorders. The book should interest internal medicine specialists, particularly nephrologists, as well as critical care physicians. Given the highly detailed analyses of many, but not all, acid–base phenomena, I believe that this book belongs in hospital libraries. To individual anesthesiologists, I provide that often-given advice: Have a look in *Miller*.[1]

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1. Neligan PJ, Deutschman CS: Perioperative acid-base balance, Miller's Anesthesia, 6th edition. Edited by Miller R. Philadelphia, Elsevier, 2005, pp 1599–615

A Practical Approach to Transesophageal Echocardiography on PDA: Powered by Skyscape, Inc., CD-ROM. Edited by Paul G. Barash, M.D., Albert C. Perrino, M.D., Scott T. Reeves, M.D., Sue Garwood, M.B., Ch.B., and Murali Sivarajan, M.B.B.S. Philadelphia, Lippincott Williams & Wilkins, 2005. Price: $79.95.

As the popularity of personal digital assistants (PDAs) grows among physicians, the number of medically oriented software programs designed for use on PDAs continues to increase. The ability to store large amounts of easily accessible information, perform complex mathematical calculations, and display high-resolution digital images makes PDAs an attractive option for physicians who practice transesophageal echocardiography (TEE). Physicians who perform TEE must differentiate normal from abnormal values for many diverse cardiovascular measurements such as fractional area change, pulmonary vein flow velocities, and prosthetic valve pressure gradients. In addition, these physicians frequently calculate valve areas, cardiac chamber pressures, and the size of regurgitant orifices. Referencing and calculations such as these represent tasks easily performed by PDAs. Indeed, many anesthesiologists who practice TEE have already entered echocardiographic data into their own PDAs for easy reference in the operating room or intensive care unit.

Personal digital assistant software programs dedicated to echocardiography are becoming commercially available. One of these, *A Practical Approach to Transesophageal Echocardiography on PDA*, has recently been released. This program, which is an adaptation of the 2003 textbook *A Practical Approach to Transesophageal Echocardiography*, retains book-like organization with topics divided into 20 chapters in addition to appendices and an index. Chapters cover familiar TEE subjects such as principles of ultrasound image formation, Doppler echocardiography, ventricular function, mitral regurgitation, prosthetic valves, and congenital heart disease. In addition to text

information, the program contains numerous TEE images (more than 100), color drawings, tables, and several graphs. Although many PDAs are equipped with media players, this program does not include any video content.

Users of *A Practical Approach to Transesophageal Echocardiography on PDA* will find it compatible with most personal computers (Macintosh or PC) and newer PDAs. The program, which is contained on a single CD-ROM, is first installed on a desktop or laptop computer, a process that requires 20 megabytes (MB) of memory. After installation on a desktop or laptop computer, the user must register the product on-line at www.skyscape.com, a Web site that markets numerous medically oriented PDA programs. During registration, one piece of information that is solicited (but fortunately not required for product activation) is the physician's individual Drug Enforcement Administration number. This bold request is even more remarkable when one realizes that on-line registration occurs on a nonsecure Web page. Since I registered at www.skyscape.com, I have received numerous promotional e-mails in addition to a pop-up that periodically appears on my laptop computer to inquire whether I would like to view Web site updates. Transfer of the program to the PDA is achieved *via* the synchronization software that is generally packaged with the handheld device. PDAs that use Palm® (Palm, Inc., Sunnyvale, CA) or Pocket PC/Windows CE® (Microsoft Corporation, Redmond, WA) operating systems will be able to run this program, provided that 3.7 MB of memory is available on the device. I installed the program on my newer Dell Axim (Dell Computer Corporation, Round Rock, TX) handheld device, where it functions flawlessly. For the sake of interest, I also installed this program on my 5-yr-old Handspring Visor Edge (Palm, Inc.), which features a black-and-white LCD screen. Although the text is easily readable on this older device, the lack of a color screen (or any real gray scale) rendered the TEE images and other figures essentially useless.

The editors of *A Practical Approach to Transesophageal Echocardiography on PDA* have clearly chosen to focus this product on perioperative TEE. For example, topics such as mitral valve repair and echocardiography in the intensive care unit are each covered in separate chapters, whereas subjects such as endocarditis and cardiac masses receive relatively little attention. Nonetheless, after reading through all 20 chapters, I was impressed that this program presents a fairly comprehensive review of perioperative TEE. Topics are discussed in some detail and are often accompanied by relevant TEE images, tables, or other images. For example, the chapter discussing the two-dimensional, comprehensive TEE examination provides quick links to an appendix containing images and drawings of standard views. Also, techniques for distinguishing true from false ventricular aneurysms are presented along with TEE images of each. Readers of the literature will also recognize figures that have been reproduced from journal articles, such as those that demonstrate the TEE imaging planes used to localize specific pathologic mitral valve segments. Imaging artifacts are also discussed and presented along with numerous examples. Chapters contain current information such as the quantification of mitral regurgitation using the proximal isovelocity surface area technique. Also, the chapter on diastolic function includes information related to tissue Doppler interrogation of the mitral annulus.

In addition to presenting current concepts in perioperative echocardiography, another definite strength of this program relates to its efficient organization. By tapping on an *I* or *O* in the upper corner of the screen, the user can view chapter material in either the Information or Outline format. The Outline format essentially compresses chapter material into a list of subheadings, which allows the user to quickly find information of interest. Selecting the desired subheading with the stylus then expands the given topic into the Information format. In reality, all text information is presented in outline form; the Information format represents an expanded outline. Other nice organizational features include an icon that allows the table of contents to be viewed with one tap of the stylus. An interactive index allows any topic to be accessed quickly; simply write or type the first few letters of a word, and the index automatically scrolls to the desired location. Abbreviations are underlined, highlighted, and linked to a reference list; when the user taps on an abbreviation, the appropriate section of this reference list immediately appears.

An extensive interactive calculation appendix represents another useful aspect of this program. Separate calculation algorithms are included for a wide variety of derived echocardiographic measurements such as stroke volume, mitral valve area by pressure half-time, left atrial pressure, and aortic valve area. For each calculation, blanks are provided for the required variables. When the user enters the necessary measurements, the result automatically appears. Obviously, the software packages of most ultrasound machines are designed to perform such calculations, but the inclusion of this function in *A Practical Approach to Transesophageal Echocardiography on PDA* makes off-line calculations simple and actually serves as a good learning tool, demonstrating how altering any given measurement could lead to significant changes in the derived value.

A Practical Approach to Transesophageal Echocardiography on PDA does possess some shortcomings. For example, the chapter devoted to left ventricular systolic function indicates that continuous-wave Doppler should be used to measure the time–velocity integral of the left ventricular outflow tract. Clearly, this information is incorrect because pulsed-wave Doppler should be used for this purpose. Furthermore, this program provides insufficient information regarding normal prosthetic valve gradients. The program does include a graph of expected peak gradients for aortic valve prostheses and indicates that a peak mitral prosthetic gradient of 4 mmHg is acceptable. In reality, mean aortic prosthetic gradients are probably more commonly reported than peak gradients, and mean gradients of 4 mmHg (and higher) are often measured across normal mitral prostheses in the operating room. Ideally, this program would have included tables of normal mean gradients for a variety of prosthetic valves, especially because this information is so readily available in textbooks.

Although not perfect, *A Practical Approach to Transesophageal Echocardiography on PDA* is an excellent program. Most topics relevant to perioperative TEE are presented in sufficient detail and accompanied by numerous echocardiographic images. Although it is not marketed as such, this program would actually serve as a decent board review product if one were to read through all 20 chapters as I did. The editors and publisher have done a superb job of creating internal links within the program that allow the user to move back and forth between text, images, tables, and calculations with only a few taps of the stylus. Information about a specific topic can be located very quickly using the expandable table of contents and interactive index, making this program an ideal portable reference.

In summary, users of PDAs who practice TEE are likely to find this product valuable. By providing detail, organization, and ease of use, the editors have created a program combining textbook information with computer speed all contained in a palm-sized package.

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