A brief overview reveals a very attractive, relatively compact book with ten chapters. The tables and figures are generally very clear, sharp, and easy to understand. Especially outstanding are the schematic diagrams of arrhythmias, QRS morphology, and anatomy that are superior to those in most cardiac arrhythmia text books available. However, some of the figures of electrocardiograms and arrhythmias from patients were poorly reproduced by the publisher. Each chapter begins with a table of abbreviations and ends with a limited number of references.

Chapter 1 provides a brief overview of incidence and outcomes related to problems associated with arrhythmias and pacemakers during the perioperative period. Chapter 2 covers the anatomy of the conduction system and related mechanisms for cardiac arrhythmias. This mechanistic information, which can be overwhelming to many perioperative physicians, is covered in a relatively simple, direct style that is easily understandable. This chapter establishes a level of basic knowledge necessary for management decisions and is one of the better written chapters in the book.

Chapter 3 basically lists all potential causes of arrhythmias, from autonomic imbalance and drug toxicity to specific patient conditions associated with arrhythmias, such as amyloidosis and mitral valve prolapse syndrome. This chapter may have benefitted from a more complete discussion of the more common causes of arrhythmias while listing the more esoteric causes in tabular form.

Chapter 4 nicely covers basic electrocardiography including how to obtain an electrocardiography and normal P-QRS-T wave interpretation. Numerous examples of variations of the standard electrocardiogram, including accessory pathways, aberrant conduction, and fusion beats, are presented. Chapter 5, structurally similar to Chapter 3, lists all antiarrhythmics and includes the pharmacokinetics, adverse effects, and administration information for each drug.

Chapters 6–8 cover cardiac pacemakers, temporary pacing, electrical cardioversion, and automatic implantable cardioverter defibrillators (AICDs). The strength of these chapters is in chapter 7, which addresses temporary and emergency cardiac pacing. This is a comprehensive discussion and a highlight of the book. Chapter 8 discusses practical aspects of perioperative management of patients with pacemakers and AICDs. This chapter should have included important information on management of the newer rate-adaptable pacemakers that may change heart rate with changes in chest wall impedance (*e.g.,* hyperventilation), dP/dt of the right ventricle, mixed venous oxygen saturation, among others and may have important adverse physiologic consequences during the perioperative period.

Chapters 9 and 10 complete the book by addressing diagnosis and management of supraventricular and ventricular arrhythmias. The quality of the reproduced electrocardiograms could have been improved, although most are interpretable. The sections on accessory pathways have excellent illustrations and is completely covered. In general, most of the necessary information is covered in these chapters, but at times, it is difficult to retrieve. For example, the main diagnostic criteria of wide QRS tachycardia can be extracted from the text, but a table would have made it easier for the reader to obtain this information.

In summary, ***Arrhythmias and Pacemakers*** covers the essentials of modern perioperative care of patients with arrhythmias and pacemakers. It is brief and concise, with numerous illustrations and only the most important references. I believe this book is superior to the author's previous works, especially to most busy practicing anesthesiologists and other physicians who want a text from which they can quickly obtain information concerning perioperative problems related to the day-to-day management of patients with arrhythmias and pacemakers.

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Critical Care Simulator: Hemodynamics, Vasoactive Infusions, Medical Emergencies. Version 1.0. By HA Schwid and D O'Donnell. Issaquah, Anesoft Corporation, 1995. Price: $99.00.

The Critical Care Simulator is a software program that purports to educate the user about the basic intensive care unit management of a variety of critical illnesses using a dynamic, real-time graphic interface. It is available in Macintosh (System 7.0 or greater) and MS Windows (3.1 or greater) versions, easy to install, and straightforward to use. The manufacturer recommends at least a 486 processor operating at 25 MHZ for the Windows program and at least a Mac II for the Macintosh program. Both require about 5 MB of hard disk space and 4 MB of RAM. The 57-page instruction manual includes information on installation, basic operation, the learning objectives for each of the 20 included patient scenarios, and the pharmacologic and physiologic models used to determine how various interventions will affect one's hypothetical computer patient.

The format and operation of the Critical Care Simulator (CCS) are identical to those of the Anesthesia Simulator Consultant (ACS) marketed by the same company and extensively reviewed in the December 1995 issue of ANESTHESIOLOGY. The user enters the program by choosing one of the 20 patient scenario options, ranging from a teenager comatose from a presumed overdose to a multiple trauma victim with a LeFort fracture and chest trauma. The first four patient options allow one (and only one) of nine "critical incidents" (such as cardiac arrest, ST segment changes, bronchospasm, and esophageal intubation) to be programmed for random occurrence during the case if the user so chooses. The remaining 16 patient options are subdivided into four groups of four cases, with the cases in each subgroup focused on a specific pathophysiologic area (rhythm disturbances, common cardiovascular disorders, cardiac valvular lesions, and a miscellaneous subgroup). These latter scenarios either present a difficult clinical situation or have a preprogrammed critical incident automatically chosen for the user. A summary of the patient's pertinent history, physical examination, and laboratory data (all of which cannot be accessed again during management of the case) follows. The user initiates the case and is presented with real-time monitors (electrocardiogram lead II, noninvasive blood pressure, and pulse oximetry in all cases; capnography, two invasive pressure monitors, and two intravenous infusions are available at the discretion of the user) and a still picture of the patient (which changes based on the airway management option selected). Physical findings, additional laboratory evaluation, and therapeutic interventions are initiated *via* a mouse-driven menu bar along the top of the screen. The Critical Care Simulator menu options (patient, monitor, fluid, airway, ventilation, drug,

resuscitate, and consultant) and various submenus are similar to those of the ASC and are well described in the latter's review. After completion of the case, a "case log" documenting the user's performance may be printed either for review by appropriate faculty or for CME credit.

Within 5 min of starting each case, it became quite clear that the CCS inadequately reproduced the typical clinical presentation in numerous areas. Oxygen cannot be administered *via* face shield or nasal cannula. Laboratory test options are extremely limited given the diversity of critical illness, and we were unable to measure the blood alcohol concentration or order a computed tomography scan in the comatose overdosed patient or obtain a 12-lead electrocardiogram in the middle-aged man with chest pain. Variables related to ventilation are limited to tidal volume, respiratory rate, inspired oxygen concentration, and positive end-expiratory pressure, with no access to inspiratory flow rates, I:E ratios, or inspiratory waveform patterns. We also were not given the option to place an intracranial pressure monitor or consult a neurosurgeon in the patient with closed head injury and presumed intracranial hypertension. All drugs available can be administered freely without obtaining intravenous access. The patient picture displayed does not change dynamically (other than with airway management) to demonstrate clinically relevant information such as seizures or cyanosis. Despite having 67 drugs at one's disposal for administration, some agents commonly used in the intensive care unit (such as ranitidine, diltiazem, haloperidol, potassium, or any of the ACE inhibitors) are not options, whereas some drugs rarely used in the critically ill (d-tubocurare, methadone, scopolamine) are available. Furthermore, the maximum single doses of certain agents were limited to clinically inadequate levels, whereas astronomic amounts of other medications could be administered without patient deterioration. For example, the maximal single dose of naloxone in the overdose case was 1 mg (requiring us to immediately repeat the dose to give the standard coma dose of 2 mg), whereas the maximal single furosemide dose was only 40 mg, an amount most critical care physicians know is inadequate in many circumstances. However, we were able to administer five ampules of sodium bicarbonate repetitively and drive the arterial *p*H to a physically impossible 23.0 with no apparent adverse impact on the patient. It also was disappointing that some current advanced cardiac life support interventions (high-dose epinephrine, transcutaneous pacing) were not options for treating cardiac arrest despite being included in the case's learning objectives. Although the consultant option is supposedly available to remind the user of the case's learning objectives, specific drug actions, and recommended doses, we found it to be of limited use. In a scenario involving complex acid-base disturbances, choosing the consultant merely displayed a nomogram for *p*H, Pa_{CO_2}, and HCO_3 concentrations without accompanying explanatory text, whereas consulting this same menu item in the case of closed head injury and intracranial hypertension displayed a complex differential diagnosis of *intraoperative* hypertension. The "infomercial" reviews of drugs, airway management techniques, and hemodynamic monitoring summarized information commonly known to most physicians involved in critical care and were unreferenced. An abbreviated bibliography at the end of each review would have been a useful addition for those desiring more in-depth education on the selected topic. Furthermore, some cases had a marked discrepancy between the stated learning objectives and the user's ability to fulfill them adequately given the program's limited menu options. For example, the second learning objective in the overdose scenario is to "describe general management of drug overdose," yet the user cannot administer syrup of ipecac, perform gastric lavage, or administer activated charcoal and cathartics. Learning objectives for the case of traumatic intracranial hypertension include "describe the Glasgow Coma Scale" and "tests for oculocephalic and oculovestibular reflexes," but the menu does not offer the option of making these assessments during case performance.

In summary, the Critical Care Simulator contains a plethora of deficiencies that seriously restrict its utility as a teaching tool. Although various parts of certain cases may prove useful to selected trainees (such as inexperienced medical students, critical care nurses, respiratory therapists, and paramedics), most health-care providers interested in expanding their critical care knowledge base would be better served spending their money on a standard, up-to-date critical care textbook.

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