

## REVIEWS OF EDUCATIONAL MATERIAL

James C. Eisenach, M.D., Editor

**High Altitude Medicine.** By Herbert N. Hultgren. Stanford, Hultgren Publications, 1997. Pages: 550. Price: \$59.95.

In medical practice, hypoxemia is a situation that most clinicians attempt to avoid; however, other persons voluntarily subject themselves to hypoxia of a greater degree than would be tolerated by most clinicians. When a New York City resident with normal pulmonary gas exchange arrives *via* airplane in La Paz, Bolivia (altitude 12,730 ft, 3,883 m), shortly after leaving the aircraft his arterial partial pressure of oxygen ( $P_{O_2}$ ) will be close to 50 mmHg. Oxyhemoglobin saturation will be near 80% and will drift even lower during sleep. Surprisingly, hypoxemia of this degree has few detrimental effects, at least initially. Physiological compensation is capable of offsetting the reduction in arterial oxygen content by an increase in blood flow, allowing tissue oxygen delivery to be maintained at rest or during light exercise. Within a few hours, the majority of visitors to such high altitudes will experience symptoms of acute mountain sickness, including nausea, vomiting, headache, and lethargy. Some will experience the more deadly forms of high-altitude pulmonary edema (HAPE) and cerebral edema (HACE).

If acute mountain illness is not severe enough to warrant descent to lower altitudes, the symptoms usually resolve and physical performance improves. Nearly 40 million people live comfortably at altitudes greater than 8,000 feet (2,440 m), and more than 1 million people live in La Paz. After several months or years at high altitude, only a few persons have altitude-related problems, particularly a syndrome of dyspnea, impaired mental function, and pulmonary hypertension known as chronic mountain sickness. In this condition, polycythemia is usually extreme, with hematocrit often approaching 90%.

Large numbers of hikers and skiers willingly subject themselves to mild hypoxemia, and mountain climbers experience severe hypoxemia during climbs to the summits of Mount Everest and other peaks where the  $P_{O_2}$  in the ambient air and arterial blood are only 55 and 30 mmHg, respectively. Physiological investigations of human performance at high altitude have been driven by interest in how people can survive in such seemingly adverse conditions. These studies of humans at altitude have provided a wonderful window into the mechanisms of compensation for and adaptation to hypoxia.

High-altitude physiology is beautifully described in this book, which provides an exhaustive review of altitude-related conditions and their management. There are chapters concerning respiration, the systemic and pulmonary circulations, red cell and plasma volume regulation, the central nervous system, endocrine system, nutrition, water, electrolyte and acid-base balance, sleep, exercise, and acclimatization to altitude. Especially well-done is the section about HAPE, an area in which Hultgren performed some of the first systematic clinical observations. A separate chapter is devoted to physiological and clinical conditions experienced at altitude in women. Clinical chapters include acute and chronic mountain sickness, systemic edema, thromboembolism, headache, pulmonary hypertension, retinal hemorrhage, and syncope, along with information of the effects of altitude on patients with pulmonary disease, congenital and valvular heart disease, hypertension, sickle cell disease, obesity, diabetes, epilepsy, and pregnancy. The effects of age on altitude performance are also discussed. It appears that elderly populations are more likely to experience subclinical pulmonary edema; however, the exploits of some elderly persons have been astounding, *e.g.*, Mount Fuji, with an altitude of 12,395 ft

(5,460 m), has been climbed by a centenarian!

Hultgren's writing style makes this book an easy read even for those whose interest in the subject is only casual. Numerous graphs, tables, and photographs provide ample illustration. To Hultgren's credit, the book is heavily referenced and has a detailed index. For the clinician who practices at altitude or who advises high-altitude travelers, and for anyone interested in learning the gamut of altitude physiology, this book is indispensable—and a steal at \$59.95.

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**Numb Toes and Aching Soles: Coping with Peripheral Neuropathy.** By John A. Senneff. San Antonio, MedPress, 1999. Pages: 336. Cost: \$29.95.

I read the first several chapters of this book before reading the preface and was surprised to find that the author is not a physician. John Senneff is a person with a long history of painful neuropathy who has had no medical training. His writing style and approach to his topic resembles that of a well-informed clinician writing a review article for professional colleagues.

The book is directed toward a sophisticated, nonmedical audience. I would not recommend the book to a patient who is content to trust a physician to make all his or her healthcare decisions. The book is for the person who would like to actively participate in the medical decision-making process. It is thorough, accurate, and relatively unbiased. Most recognized medical treatments for painful neuropathy are moderately effective at best, and the author presents examples of scientific studies with positive and negative results for each form of therapy.

In a document of this scope, it is impossible to provide a detailed assessment of every form of therapy. On a few occasions, such lack of detail may lead to misleading implications. For example, the author points to promising results with SNX-111 (ziconotide), but fails to inform the reader that the studies involved intrathecal administration of the drug via a surgically implanted device. Similarly, his positive comments regarding cyclooxygenase-2 inhibitors might lead one to believe that they are more effective than older nonsteroidal antiinflammatory drugs (NSAIDs) for neuropathic pain, which is unlikely. With few exceptions, Senneff's coverage of mainstream medical therapy for neuropathic pain, was thorough (although not exhaustive), accurate, and unbiased. His discussions of medical therapies that are not a part of my practice (*e.g.*, plasmapheresis, immunosuppressants, and IVIg) are most informative. His coverage of some new variations on the transcutaneous electrical nerve stimulation theme (*e.g.*, "microcurrent