

BOOK REVIEW

The Physiology of Adequate Perfusion, Edward C. Berger, Index, Three Appendices, Glossary, Bibliography, 48 Illustrations, 157 pages, C. V. Mosby, 1979.

Edward Berger has compiled a lengthy monograph "meant primarily as a guideline for those with a fledgling interest in perfusion." The text is comprised of five parts: Oxygenation, Tissue Metabolism, Hematological Considerations, Hemodynamic Considerations and Effects of Perfusion. Five appendices are included: Bibliography, Glossary, Table of Normal Values, Drugs and Use of Monitored Physiologic Parameters. The book is well indexed but lacks direct referencing to the limited bibliography for the novice.

Berger relates well personal patient and device experience such as his smelling the sour milk odor of lactic acidosis venting from the oxygenator gas path in a patient with chronic low cardiac output (p. 45), however similar examples are too few.

In his exposé, Berger tends to stray from his primary thoughts and often time reduces terms to their simplest analogy yet in the next phrase requires the reader to reach for the dictionary. To the unaware, comprehension may be difficult.

In the treatment of Poiseuille's Law, calculation of NaHCO_3 requirements and predicting the initial bypass hematocrit, he assumes the perfusionist is not a mathematician. Units of measure are usually absent except from the page of useful formulae (p. 136) or misrepresented (e.g. dynes/sec/cm⁻⁵ for dynes-sec-cm⁻⁵, p. 111 and 136.)

Page 12, paragraph 1 contradicts page 11, paragraph 3 on gas diffusion rate where he claims that the "more soluble a gas . . . the faster it will diffuse." Page 37, paragraph 2 claims increased blood flow decreases secondary flow and boundary layers form where actually, if velocity of flow increases, the incidence of turbulence (secondary flow) is increased and flow laminae (boundary layers), especially along the surface, decrease thickness.

Berger has a tendency to coin terms differently from established sources (e.g. "selective ischemia," p. 131, for Galletti's "selective redistribution" and Berger's Part I definitions of ventilation, oxygenation and respiration, p. 1, vary from Guyton).

There is minimal redundancy in the text except for the concepts of steroid therapy, D.I.C., respiratory control of blood gases and blood bank usage. The text presents as a proponent of clinical corticosteroid therapy. Some concepts perhaps lack adequate qualification and would benefit from the inclusion of clinical data (i.e., sequestration of blood and A-V shunting during bypass). The reader must also take care not to easily equate some theoretical capillary or cellular level occurrences as matters of fact.

The literary style moves from a simplified, analytical summary of physiological concepts fundamental to blood oxygenation, carbon dioxide removal and assessing the adequacy of perfusion to painting a dismal, nonphysiological cellular level picture of possible sludging and clotting during bypass to impress on the reader the necessity of maintaining adequate perfusion.

Some readers may label this text as Berger's "pump-side philosophy", however, the careful reader will realize that it is a responsible compendium of theory, fact and over 20 years of experience to introduce the basic challenge to adequate perfusion and the sequelae of inadequate perfusion.

The Physiology of Adequate Perfusion is a simple mixture of physiology, pharmacology, biophysics and a bit of mathematics that accomplishes the task of providing "a sufficient introduction to perfusion physiology." In addition, Berger provides a superb skeleton for the experienced, well read professional to synthesize an individual, abstract sixth sense of adequate perfusion, because of this, the text is must reading for the practicing perfusionist.

Berger summarizes that "adequate perfusion is yet an art rather than an exact science." Here lies the future challenge; to apply theory and measurement systems to *quantitate* the physiological response to adequate perfusion.

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