NUTRITION IN CLINICAL SURGERY

Editor
Mervyn Deitel, M.D.

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Nutrition in Clinical Surgery

Foreword

This book is a welcome sign that awareness of the importance of the patient's nutritional status and the technology to improve that status have matured simultaneously. This awareness, as well as the techniques clearly defined in the book, can only be described as the state of the art. "Non-volitional" nutritional support has at last achieved its rightful place in the armamentarium of the practicing surgeon.

Indeed, this book was written not to promote a concept, but to meet a need, and because it contains "need to know" information that every surgeon who cares for sick patients will draw upon frequently, it should become a widely used reference in institutional and personal libraries. An ever-increasing body of irrefutable data testifies that the patient's ability to respond to stress and therapy depends to a large degree upon his nutritional status. Nutritional assessment, based on readily available measurements and laboratory tests, should be considered as important as a preoperative complete blood count, especially in patients who have experienced an involuntary weight loss, chronic illness, previous surgery or cancer therapy. It has always been known that patients with severe nutritional deficits are in a high-risk category. They more frequently suffer complications and have mortality rates 10 to 20 times greater than well nourished patients with the same disease undergoing the same therapy. What is new and what this book so clearly presents is the surgeon's ability to move a patient from a high-risk to a lower-risk category before or after operation. Where a procedure is elective or semi-elective, time and money are well spent in restoring a patient to a favorable risk category and avoiding time-consuming, costly and potentially lethal complications such as anastomotic leaks, abscess formation, fistulas, wound dehiscence and so on, not to mention the increased costs associated with a prolonged hospital stay, management in an intensive care unit, antibiotic, ventilatory and dialysis support and, occasionally, the cost of a funeral.

Hyperalimentation, however, does not work *unexpected* wonders. Where malnutrition or energy deficits impact on outcome, the results of non-volitional feeding are excellent. Where this is not the case, it will not. In addition to chapters devoted to techniques of enteral and parenteral hyperalimentation, specific chapters detail the use and expectations of non-volitional feeding in short-bowel syndrome, intestinal complications of radiation therapy and its applications in severe esophageal disease, inflammatory bowel disease, pancreatitis, etc. However, if the patient is dying of malnutrition plus a disease, and the surgeon eliminates malnutrition as a confounding variable, the patient will go on to die of his disease unless it can be treated effectively.

This book, then, does not direct the surgeon to "hyperaliment" a patient who obviously has an anastomotic leak and an intra-abdominal abscess, beyond the point where good surgical judgment dictates that the patient should be brought back to the operating room and the abscess drained. Likewise, hyperalimentation cannot cure cancer, set a fracture, harvest and replace a skin graft, or drain a pseudocyst. It is a tool—a clinical support system not unlike blood replacement, ventilatory or dialysis

support, which has specific indications and expectations. Just as all surgeons have learned to order blood and blood products, intubate and use a ventilator, so too they seek a working knowledge of nutritional support. This book provides that.

Nutrition in Clinical Surgery was written by clinicians who, like you (the reader), are "in the trenches." They do not consider themselves specialists in nutrition. The principal charge to the authors was to keep each chapter practical. Therefore, this book does not have to be read from start to finish; each chapter stands on its own and can be consulted as needed.

The importance of this work, then, is that it is designed to serve the practitioner. It reflects a change not only in the knowledge base regarding contemporary clinical nutrition, but also in the expectations of good medical practice in light of developments over the past decade.

The sections on fiber and obesity are also valuable. Obesity is certainly a disease; and surgery for obesity is a last resort. Indeed, surgery reinforces behavior modification and is only the beginning of a responsibility assumed by the surgeon to make available to the patient nutrition, behavior modification, fitness and health counseling.

In short, this book is full of "need to know" information presented clearly for those who care for patients by those who also care for patients. The editor and authors can be proud of a job well done.

MITCHELL V. KAMINSKI, JR., M.D.
Chicago, Illinois

Preface

The organization of this book was prompted by two considerations: first, the need of surgical residents for a clinical textbook on surgical nutrition that does not overwhelm them with biochemistry; second, the timely presentation of a seminar on surgical nutrition as part of a postgraduate course for general surgeons at the University of Toronto, which served as a core for the book. With this as a base, the text was supplemented for completeness with chapters covering further areas of clinical nutrition, contributed by acknowledged experts in their fields. It is our belief that this has resulted in a practical textbook for the clinical surgeon.

The book begins with the history and basic principles of surgical nutrition. This is followed by the delivery of liquid diets, since they have been somewhat overshadowed, and yet may be used reasonably if the gut is functioning. Next, the practical principles of intravenous hyperalimentation are described, and the organization of hyperalimentation under various hospital settings is discussed. Major applications in specific disease conditions are presented. More theoretical considerations such as the new work with amino acid solutions for trauma or for hepatic, renal or cardiac decompensation are not specifically covered, because of their lack of application presently to the clinical surgeon. The role of dietary fiber is outlined. Finally, the surgery in patients with *overnutrition* (obesity) is included, because of the risk and challenge these patients present.

At this time I would like to thank surgeons who have helped me during my career—Drs. Leon Ginzburg, William I. Wolff, Robert A. Mustard, William R. Drucker, G. Thomas Shires, Donald R. Wilson, Neil A. Watters and J. Alexander McIntyre. I am grateful to the late Mr. Daniel S. McLaughlin, the Chairman of the St. Joseph's Hospital (Toronto) Research Foundation, for his encouragement, and the Sisters of St. Joseph for their confidence.

I am most grateful to the contributing authors for their cooperation and enthusiasm, and for the pleasant associations. My wife Frances and our sons Kevin and Wayne have been very understanding and supportive through the entire venture. Particular thanks are due to Medi-Edit Limited of Toronto for assisting immensely with the organization, arrangements and editing of the text.

Clinical nutrition has attained its rightful importance in the past decade, particularly due to the stimulus given this work by Dr. Stanley J. Dudrick. Progressive malnutrition can be reversed and survivals achieved in situations previously associated with high mortality. With these goals in mind and in the name of the contributors, we offer this book as a contribution to clinical surgery.

MERVYN DEITEL, M.D.
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Contents

SECTION 1

Basic principles and techniques

1

History of Nutrition in Surgery

Ian Sanderson

It would have been impossible to contemplate infusing nutrients, fluids or drugs intravenously prior to 1616, when William Harvey first described the circulation of blood.[1] However, once the nature of the circulatory system had become established, it was not long before scientists began to investigate the possibilities (Table 1.1).

In 1656, when he was Savilian Professor of Astronomy at Oxford, Sir Christopher Wren (better known as the architect of St. Paul's Cathedral in London) infused ale and wine into the veins of dogs, using a goose quill attached to a pig's bladder.[2,3] These substances were known to be safe to ingest and to have some nutritional value. He also infused opium, which stupefied the dog but did not kill him, and *Crocus mettalorum*, which caused the dog to "vomit up life and all." This was probably the first instance of an intravenously administered medication. This experiment was repeated at Pisa by Carolo Fracassato in 1658, with similar results.[3] Wren was also reported to have tried to infuse vinum emeticum into the vein of an inferior servant of a European prince. The patient apparently swooned and the experiment had to be abandoned.

In 1662, Richard Lower, working in Oxford, reported to the Royal Society his work on intravenous infusion and blood transfusion in animals.[4] In the same year, Johann Major, working independently in Europe, also reported on his work on blood transfusion in animals, and apparently successfully injected a man, but gave no details of the operation.[3,5]

In 1664, Caspar Scotus administered wine and purgatives intravenously to dogs.[3,6] In the following year, Escholtz published a book containing an account of the new method of intravenous infusion plus details concerning three patients he had treated with intravenous medications.[3,7] M. Hoffman of Altdorf is said by several writers to have been the inventor of infusion, but his experiments seem to have been contemporaneous with those of Escholtz.[3] In 1666, Lower performed the first successful transfusion of blood from an animal to man,[3] and in 1667 Jean Baptiste Denis of Montpelier, while physician to Louis XIV, performed a blood transfusion from a lamb to a man.[1,3,8] He transfused three paid volunteers; the third died as a result of the infusion, and Denis suffered for years because of litigation by an ungrateful widow.

In 1670, techniques of intravenous entry and infusion were described in a book entitled *Clysmatica Nova*, published in Holland. During 1678 and 1679, William Courten of Montpelier injected numerous substances (olive oil, sugar, vinegar, wine, purgatives, opium, urine and salt solutions) intravenously into animals and diligently recorded his results.[9] Many others followed, injecting a variety of substances with variable consequences, and the subject was comprehensively reviewed by Fortescue-Brickdale in 1904.[3]

Considering how little was known about