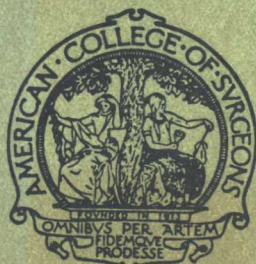


MANUAL OF PREOPERATIVE and POSTOPERATIVE CARE

Second Edition

BY THE COMMITTEE ON
PRE AND POSTOPERATIVE CARE



AMERICAN
COLLEGE
OF
SURGEONS

Editorial Subcommittee

JOHN M. KINNEY, M.D., *Chairman*

RICHARD H. EGDAHL, M.D.

GEORGE D. ZUIDEMA, M.D.

MANUAL OF PREOPERATIVE and POSTOPERATIVE CARE

Second Edition

BY THE COMMITTEE ON
PRE AND POSTOPERATIVE CARE



AMERICAN
COLLEGE
OF
SURGEONS ;

Editorial Subcommittee

JOHN M. KINNEY, M.D., *Chairman*

RICHARD H. EGDAHL, M.D.

GEORGE D. ZUIDEMA, M.D.

W. B. SAUNDERS COMPANY · PHILADELPHIA · LONDON · TORONTO

W. B. Saunders Company: West Washington Square
Philadelphia, Pa. 19105
12 Dyott Street
London, WC1A 1DB
1835 Yonge Street
Toronto 7, Ontario

Manual of Preoperative and Postoperative Care

ISBN 0-7216-5440-1

© 1971 by W. B. Saunders Company. Copyright 1967 by W. B. Saunders Company. Copyright under the International Copyright Union. All rights reserved. This book is protected by copyright. No part of it may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without written permission from the publisher. Made in the United States of America. Press of W. B. Saunders Company. Library of Congress catalog card number 75-158397.

Print No.: 9 8 7 6 5 4 3 2

COMMITTEE ON PRE AND POSTOPERATIVE CARE

*JAMES D. HARDY, Chairman
Jackson, Mississippi

*WALTER F. BALLINGER,
Vice Chairman
St. Louis, Missouri

*WILLIAM A. ALTEMEIER
Cincinnati, Ohio

W. GERALD AUSTEN
Boston, Massachusetts

IVAN W. BROWN, JR.
Lakeland, Florida

DOUGLAS P. BRYCE
Toronto, Ontario, Canada

JOHN F. BURKE
Boston, Massachusetts

GEORGE H. A. CLOWES, JR.
Boston, Massachusetts

WILLIAM R. COLE
St. Louis, Missouri

WILLIAM F. COLLINS, JR.
New Haven, Connecticut

FRANCIS J. COX
San Francisco, California

WILLIAM R. CULBERTSON
Cincinnati, Ohio

JOHN H. DAVIS
Burlington, Vermont

THEODORE DRAPANAS
New Orleans, Louisiana

WILLIAM R. DRUCKER
Toronto, Ontario, Canada

RICHARD H. EGDAHL
Boston, Massachusetts

*BEN EISEMAN
Denver, Colorado

WILLIAM B. KIESEWETTER
Pittsburgh, Pennsylvania

*JOHN M. KINNEY
New York, New York

*JOHN W. KIRKLIN
Birmingham, Alabama

STANLEY M. LEVENSON
Bronx, New York

ROBERT A. L. MACBETH
Edmonton, Alberta, Canada

LLOYD D. MACLEAN
Montreal, Quebec, Canada

JAMES V. MALONEY, JR.
Los Angeles, California

WALTER H. MORAN, JR.
Morgantown, West Virginia

*GEORGE L. NARDI
Boston, Massachusetts

ERLE E. PEACOCK, JR.
Tucson, Arizona

BASIL A. PRUITT, JR.,
LT. COL., MC, USA
Fort Sam Houston, Texas

BENJAMIN F. RUSH, JR.
Newark, New Jersey

WILLIAM R. SANDUSKY
Charlottesville, Virginia

JORGEN U. SCHLEGEL
New Orleans, Louisiana

G. TOM SHIRES
Dallas, Texas

RUPERT B. TURNBULL, JR.
Cleveland, Ohio

*Executive Committee.

WILLIAM R. WADDELL

Denver, Colorado

CARL W. WALTER

Boston, Massachusetts

W. DEAN WARREN

Miami, Florida

WARREN A. WILSON

Los Angeles, California

***EDWARD R. WOODWARD**

Gainesville, Florida

ROBERT W. ZEPPA

Miami, Florida

GEORGE D. ZUIDEMA

Baltimore, Maryland

Senior Members

TILDEN C. EVERSON

Skokie, Illinois

JOHN M. HOWARD

Philadelphia, Pennsylvania

DAVID M. HUME

Richmond, Virginia

DOUGLAS B. KENDRICK, JR.

Atlanta, Georgia

WILLIAM V. McDERMOTT, JR.

Boston, Massachusetts

HENRY T. RANDALL

Providence, Rhode Island

BEN J. WILSON

Grand Junction, Colorado

BERNARD ZIMMERMANN

Morgantown, West Virginia

*Executive Committee.

Contributors

CURTIS P. ARTZ, M.D., F.A.C.S. Professor of Surgery and Chairman of Department, Medical University of South Carolina. Chief of Surgery, Medical University Hospital, Charleston, South Carolina.

W. GERALD AUSTEN, M.D., F.A.C.S. Professor of Surgery, Harvard Medical School. Chief of Surgery, Massachusetts General Hospital, Boston, Massachusetts.

WALTER F. BALLINGER, M.D. Bixby Professor of Surgery and Head of the Department, Washington University School of Medicine. Surgeon-in-Chief, Barnes and Allied Hospitals, St. Louis, Missouri.

MARSHALL K. BARTLETT, M.D. Clinical Professor of Surgery Emeritus, Harvard Medical School. Board of Consultation, Massachusetts General Hospital, Boston, Massachusetts.

OLIVER COPE, M.D., (D. Hon. Causa), F.A.C.S. Professor of Surgery Emeritus, Harvard Medical School. Board of Consultation, Massachusetts General Hospital, Boston, Massachusetts.

STANLEY J. DUDRICK, M.D. Associate Professor of Surgery, University of Pennsylvania School of Medicine. Attending Surgeon, Hospital of the University of Pennsylvania; Chief of Surgery, University of Pennsylvania Division, Philadelphia Veterans Administration Hospital; Assistant Attending Surgeon, Philadelphia General Hospital, Philadelphia, Pennsylvania.

STANLEY R. FRIESEN, M.D., Ph.D. Professor of Surgery, University of Kansas School of Medicine. Staff, Department of Surgery, University of Kansas Medical Center, Kansas City, Kansas.

DAVID V. HABIF, M.D. Professor of Surgery, Columbia University College of Physicians and Surgeons. Attending Surgeon, Presbyterian Hospital, New York, New York.

JAMES D. HARDY, M.D. Professor and Chairman of Department of Surgery, The University of Mississippi Medical Center. Surgeon-in-Chief, University Hospital, University of Mississippi Medical Center, Jackson, Mississippi.

- DAVID M. HUME, M.D., F.A.C.S. Professor and Chairman, Department of Surgery, Medical College of Virginia, Richmond, Virginia.
- WILLIAM B. KIESEWETTER, M.D., F.A.C.S. Professor of Pediatric Surgery, University of Pittsburgh School of Medicine. Surgeon-in-Chief, Children's Hospital of Pittsburgh, Pittsburgh, Pennsylvania.
- JOHN M. KINNEY, M.D., F.A.C.S. Professor of Surgery, Columbia University College of Physicians and Surgeons. Attending in Surgery, Presbyterian Hospital, New York, New York.
- JOHN W. KIRKLIN, M.D., F.A.C.S. Professor and Chairman, Department of Surgery, School of Medicine, University of Alabama in Birmingham. Surgeon-in-Chief, University of Alabama Hospitals and Clinics, Birmingham, Alabama.
- LLOYD D. MACLEAN, M.D., F.A.C.S. Professor and Chairman, Department of Surgery, McGill University. Surgeon-in-Chief, Royal Victoria Hospital, Montreal, Quebec, Canada.
- FRANCIS D. MOORE, M.D., F.R.C.S. (Hon.), F.A.C.S. Moseley Professor of Surgery, Harvard Medical School, Surgeon-in-Chief, Peter Bent Brigham Hospital, Boston, Massachusetts.
- GEORGE L. NARDI, M.D., F.A.C.S. Associate Clinical Professor of Surgery, Harvard Medical School. Visiting Surgeon, Massachusetts General Hospital, Boston, Massachusetts.
- ERLE E. PEACOCK, JR., M.D., F.A.C.S. Professor and Chairman, Department of Surgery, University of Arizona College of Medicine. Chief of Surgery, University of Arizona Medical Center, Tucson, Arizona.
- SAMUEL R. POWERS, JR., M.D., D.Sc. (Med.) Professor of Surgery, Albany Medical College. Attending Surgeon, Albany Medical Center Hospital; Consultant Surgeon, Veterans Administration Hospital, Albany, New York.
- HENRY THOMAS RANDALL, M.D., M.Sc.D. Professor of Medical Science (Surgery), and Section Head, Section of Surgery, Division of Biological and Medical Sciences, Brown University. Surgeon-in-Chief, Rhode Island Hospital, Providence, Rhode Island.
- PAUL S. RUSSELL, M.D. John Homans Professor of Surgery, Harvard Medical School. Visiting Surgeon, Massachusetts General Hospital, Boston, Massachusetts.
- EDWIN W. SALZMAN, M.D. Associate Professor of Surgery, Harvard Medical School, and Senior Research Associate, Massachusetts Institute of Technology. Associate Director of the Surgical Service, Beth Israel Hospital, Boston, Massachusetts.
- WILLIAM R. SANDUSKY, M.D., F.A.C.S. Professor of Surgery, University of Virginia School of Medicine. Surgeon, University of Virginia Hospital, Charlottesville, Virginia.

- SEYMOUR I. SCHWARTZ, M.D. Professor of Surgery, University of Rochester School of Medicine and Dentistry. Surgeon, Strong Memorial Hospital, Rochester, New York.
- G. TOM SHIRES, M.D. Professor and Chairman, Department of Surgery, The University of Texas Southwestern Medical School at Dallas. Surgeon-in-Chief, Surgical Services, Parkland Memorial Hospital; Consultant Surgeon, St. Paul Hospital, Methodist Hospital, Baylor University Medical Center, Children's Medical Center, Dallas Veterans Administration Hospital, Gaston Episcopal Hospital, and Presbyterian Hospital of Dallas, Dallas, Texas.
- D. EMERICK SZILAGYI, M.D., F.A.C.S. Clinical Professor of Surgery, University of Michigan. Chairman, Department of Surgery, Henry Ford Hospital, Detroit, Michigan.
- RUPERT B. TURNBULL, JR., F.A.C.S. Head, Department of Colon and Rectal Surgery, Cleveland Clinic Foundation, Cleveland, Ohio.
- HOWARD ULFELDER, M.D., F.A.C.S. Joe V. Meigs Professor of Gynecology, Harvard Medical School. Chief of Staff, Vincent Memorial Hospital, Boston, Massachusetts.
- CARL W. WALTER, M.D., F.A.C.S. Clinical Professor of Surgery, Harvard Medical School. Surgeon, Peter Bent Brigham Hospital, Boston, Massachusetts.
- W. DEAN WARREN, M.D., F.A.C.S. Professor of Surgery, University of Miami School of Medicine. Surgeon, Jackson Memorial Hospital, Miami, Florida.
- CLAUDE E. WELCH, M.D., F.A.C.S. Clinical Professor of Surgery, Harvard Medical School. Visiting Surgeon, Massachusetts General Hospital, Boston, Massachusetts.
- EDWARD R. WOODWARD, M.D., F.A.C.S. Professor and Chairman, Department of Surgery, University of Florida College of Medicine, Gainesville, Florida.

Preface

The purpose of this manual is to provide the busy clinical surgeon and surgical resident with quick and concise access to recent advances in surgical metabolism, nutrition, fluid and electrolyte balance, clotting disorders, infection and shock, together with cardiac, ventilatory and renal pathophysiology. It is intended to provide a useful outline of the modern management of problems of pre- and postoperative patients undergoing both elective and emergency operation. The authors have, in the latter chapters of this book, described the approaches to the handling of pre- and postoperative care of patients undergoing operation on particular body systems, including the management of related complications. Other chapters include the management of multiple injuries and the treatment of burns. The appendix includes a table of normal laboratory values, a list of selected tests of various organ systems and a brief discussion of acid-base balance.

The manual does not attempt to be a text, and so technical details of operations have usually been omitted in the interest of maintaining a volume of modest size and cost. References to standard texts and important articles will be found at the end of most chapters, and from them additional information can be obtained. It is hoped that such a manual may serve as a ready reference for the surgeon who lacks the time to read more extensive material on a given subject, or who might appreciate an abbreviated discussion prior to a more extensive review of the literature.

The manual has been prepared as an activity of the Committee on Pre and Postoperative Care of the American College of Surgeons with the approval of the Regents of the College. Since the Committee's formation in 1959 under the chairmanship of Dr. Francis D. Moore of Boston, a major activity has been the sponsoring of teaching sessions in pre- and postoperative care. The manual is an outgrowth of the course in pre- and postoperative care given annually at the Clinical Congress of the American College of Surgeons.

The selection of the material for the second edition reflects certain

changes from the previous volume. There are fewer chapters, of somewhat longer length, new illustrative material and additional references. This editorial committee does not contend that methods or approaches other than the ones presented in this volume may not be successful in the management of surgical patients. What we have endeavored to do is provide a useful guide for the management of surgical patients, based upon the description of the metabolic and physiologic principles that must underlie successful treatment.

We wish to acknowledge the unusual time and effort that was spent by the members of the first edition's editorial committee in translating the multiple wishes of the parent committee into initial book form. Our appreciation for this goes to Dr. Henry T. Randall, Chairman, Dr. James D. Hardy and Dr. Francis D. Moore. The success of the first edition confirmed the need for such a volume and contributed greatly to the preparation of this second edition.

Particular thanks are due to Dr. William Adams of the American College of Surgeons and Mr. Robert Rowan of W. B. Saunders Company for continuing advice and encouragement. In addition, we wish to thank the many secretaries whose patient and careful work contributed to the preparation of this volume.

RICHARD EGDAHL
GEORGE ZUIDEMA
JOHN M. KINNEY, *Chairman*
Editorial Subcommittee

Contents

Part I GENERAL PRINCIPLES

Chapter 1	
WOUND HEALING AND CARE OF THE WOUND	3
<i>Erle E. Peacock, Jr.</i>	
Chapter 2	
CONVALESCENCE: THE METABOLIC SEQUENCE AFTER INJURY	19
<i>Francis D. Moore</i>	
Chapter 3	
FLUID AND ELECTROLYTE THERAPY.....	42
<i>G. Tom Shires</i>	
Chapter 4	
SURGICAL NUTRITION: PARENTERAL AND ORAL	75
<i>Henry T. Randall and Stanley J. Dudrick</i>	
Chapter 5	
INFECTION AND ANTIMICROBIAL AGENTS	109
<i>William R. Sandusky</i>	
Chapter 6	
BLOOD DONORS, BLOOD AND TRANSFUSION	139
<i>Carl W. Walter</i>	

Chapter 7	
HEMORRHAGIC DISORDERS	157
<i>Edwin W. Salzman</i>	
Chapter 8	
VENTILATION AND VENTILATORY FAILURE	172
<i>John M. Kinney</i>	
Chapter 9	
CIRCULATION AND CARDIAC FAILURE	195
<i>John W. Kirklin</i>	
Chapter 10	
THE PATIENT IN SHOCK	211
<i>Lloyd D. MacLean</i>	
Chapter 11	
RENAL FUNCTION AND RENAL FAILURE	233
<i>Samuel R. Powers, Jr.</i>	
Chapter 12	
TRANSPLANTATION	259
<i>Paul S. Russell</i>	
Chapter 13	
PROBLEMS OF INFANTS AND CHILDREN	280
<i>William B. Kieseewetter</i>	

Part II SURGICAL CARE OF ORGANS AND SYSTEMS

Chapter 14	
LUNG, ESOPHAGUS AND MEDIASTINUM	299
<i>George L. Nardi</i>	
Chapter 15	
CARDIAC SURGERY	306
<i>W. Gerald Austen</i>	

Chapter 16	
THE STOMACH AND DUODENUM.....	336
<i>Edward R. Woodward</i>	
Chapter 17	
THE LIVER AND PORTAL VEIN.....	345
<i>Seymour I. Schwartz</i>	
Chapter 18	
THE BILIARY TRACT AND EXOCRINE PANCREAS	367
<i>Marshall K. Bartlett</i>	
Chapter 19	
SMALL INTESTINAL PROBLEMS.....	380
<i>W. Dean Warren</i>	
Chapter 20	
THE CARE OF INTESTINAL STOMAS	391
<i>Rupert B. Turnbull, Jr.</i>	
Chapter 21	
THE COLON AND RECTUM	411
<i>Claude E. Welch</i>	
Chapter 22	
THE GYNECOLOGIC PATIENT	425
<i>Howard Ulfelder</i>	
Chapter 23	
THE SPLEEN AND ITS DISORDERS.....	434
<i>Walter F. Ballinger</i>	
Chapter 24	
SURGERY OF THE PERIPHERAL ARTERIES: PRINCIPLES OF PREOPERATIVE, INTRAOPERATIVE, AND POSTOPERATIVE MANAGEMENT	444
<i>D. Emerick Szilagyi</i>	
Chapter 25	
THE THYROID GLAND	456
<i>Oliver Cope</i>	

Chapter 26	
THE PARATHYROID GLANDS.....	482
<i>Oliver Cope</i>	
Chapter 27	
THE BREAST	505
<i>David V. Habib</i>	
Chapter 28	
THE ENDOCRINE PANCREAS.....	514
<i>Stanley R. Friesen</i>	
Chapter 29	
SURGERY OF THE ADRENALS.....	529
<i>David M. Hume</i>	
Chapter 30	
THE PATIENT WITH MULTIPLE INJURIES.....	559
<i>James D. Hardy</i>	
Chapter 31	
CARE OF THE BURNED PATIENT.....	589
<i>Curtis P. Artz</i>	
APPENDIX	605
INDEX.....	627

Part I

GENERAL PRINCIPLES

WOUND HEALING AND CARE OF THE WOUND

ERLE E. PEACOCK, JR., M.D., F.A.C.S.

Healing—the most fundamental biological phenomenon in surgical biology—is affected significantly by pre- and postoperative care. Although most problems in wound healing are the result of local factors within the wound and immediate surrounding area, systemic factors are occasionally responsible for failure to heal, and some of these factors are amenable to pre- and postoperative manipulation. It is a good idea to remember, however, that the healing wound is dynamically very similar to a fetus, and like a developing embryo appears to have high priority when calling for the resources required for protein synthesis. Moreover, even though the entire body may be rather severely depleted of some fundamental building block, the relative amount of such a substance needed to heal a surgical incision is so small compared to the general body pool that it should not come as a surprise to learn that wound healing progresses remarkably well. Uremia, carcinomatosis, anemia, protein depletion, corticosteroid excess, and poorly controlled diabetes are but a few of the general metabolic disorders which have been implicated in the past as significantly retarding the gain of tensile strength in a healing wound. Of these, corticosteroid excess is the only one which has been shown so far to affect wound healing significantly in human beings, and then only to the extent of delaying gain in tensile strength—not preventing collagen synthesis and deposition. Other influences can be shown to inhibit gain of tensile strength in the wounds of laboratory animals, but the severity of the disorder and the clinical insignificance of the measured inhibition are of such an order that they are seldom important during management of a human patient. Addition of cartilage powder and zinc, for example, increases the rate of gain of burst strength to a mathematically significant degree in the healing wound of a laboratory animal; the effect of these agents is not great enough to be clinically significant in most patients, however.