"東京省日東沿

Complications in Surgery and Their Management

HARDY

Complications in Surgery and Their Management

Fourth Edition

JAMES D. HARDY, M.D.

Professor and Chairman Department of Surgery University of Mississippi School of Medicine Jackson, Mississippi

With contributions by 50 authorities

W. B. Saunders Company: West Washington Square Philadelphia, PA 19105

1 St. Anne's Road

Eastbourne, East Sussex BN21 3UN, England

1 Goldthorne Avenue

Toronto, Ontario M8Z 5T9, Canada

9 Waltham Street

Artarmon, N.S.W. 2064, Australia

Library of Congress Cataloging in Publication Data

Main entry under title:

Complications in surgery and their management.

Fourth ed. of: Management of surgical complications.

 Surgery – Complications and sequelae. 1. Hardy, James II. Management of surgical complica-D., 1918tions. [DNLM: 1. Postoperative complications—Therapy. WO 184 C738]

RD98.C65 1981

617', 01

80-54380

ISBN 0-7216-4509-7

AACR2

Listed here is the latest translated edition of this book together with the language of the translation and the publisher.

Italian (3rd Edition) - Piccin Editore, Padova, Italy

Spanish (3rd Edition) - Nueva Editorial Interamericana S.A. de C.V., Mexico City, Mexico

Complications in Surgery and Their Management

ISBN 0-7216-4509-7

© 1981 by W. B. Saunders Company. Copyright 1960, 1967 and 1975 by W. B. Saunders Company. Copyright under the Uniform Copyright Convention. Simultaneously published in Canada. 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 80-54380.

5

CONTRIBUTORS

BENJAMIN L. AARON, M.D.

Associate Professor of Surgery and Director, Division of Thoracic Surgery, George Washington University School of Medicine and Health Sciences. Attending Surgeon (Thoracic), George Washington University Hospital, Washington, D.C.

Complications of Pulmonary Resection

PAUL C. ADKINS, M.D. (Deceased)

Former Professor and Chairman, Department of Surgery, George Washington University School of Medicine and Health Sciences. Former Attending Surgeon (Thoracic), George Washington University Hospital, Washington, D.C.

Complications of Pulmonary Resection

WILLIAM A. ALTEMEIER, M.D.

Christian R. Holmes Professor Emeritus of Surgery, University of Cincinnati College of Medicine. Attending Physician, Cincinnati General Hospital, Children's Hospital, Holmes Hospital, and Cincinnati Veterans Administration Hospital, Cincinnati, Ohio.

Complications of Appendectomy

JOSEPH D. ANSELY, M.D.

Assistant Professor of Surgery, Department of Surgery, Emory University School of Medicine. Chief of Vascular Surgery Service, Veterans Administration Hospital, Decatur, Georgia.

Complications of Portal-Systemic Shunt Surgery

OLIVER H. BEAHRS, M.D.

Professor of Surgery, Emeritus, Mayo Medical School, Rochester, Minnesota.

Complications of Surgery for Cancer of the Head and Neck

JOHN L. CAMERON, M.D.

Professor of Surgery, Johns Hopkins University. Consulting Surgeon, Loch Raven Veterans Administration Hospital. Consultant in Gastroentervi CONTRIBUTORS

ology, Naval Hospital, Bethesda, Maryland. Consultant in Surgery, Walter Reed Army Hospital, Washington, D.C.

Complications Following Operations Upon the Biliary Tract and Their Management

WILLIAM R. CULBERTSON, M.D.

Professor of Surgery, University of Cincinnati College of Medicine. Attending Physician, Cincinnati General Hospital, Children's Hospital, Holmes Hospital, and Cincinnati Veterans Administration Hospital, Cincinnati, Ohio.

Complications of Appendectomy

JOHN HERSCHEL DAVIS, M.D.

Professor and Chairman, Department of Surgery, and Associate Dean for Clinical Affairs, University of Vermont College of Medicine. Executive Director, University Health Center, Inc., University of Vermont College of Medicine, Burlington, Vermont.

Miscellaneous Complications in the Preoperative and Postoperative Periods

ALAN R. DIMICK, M.D.

Associate Professor of Surgery, University of Alabama School of Medicine. Director, Burn Center, and Staff Surgeon, University of Alabama Hospitals, Birmingham, Alabama.

Complications of Burns and Burn Treatment

CHARLES ECKERT, M.D.

Professor of Surgery, Albany Medical College of Union University. Attending Surgeon, Albany Medical Center Hospital; Consultant, Veterans Administration Medical Center and St. Peter's Hospital, Albany, New York.

Complications of Adrenal Surgery

F. HENRY ELLIS, JR., M.D., Ph.D.

Clinical Professor of Surgery, Harvard Medical School. Chief, Division of Thoracic and Cardiovascular Surgery, Lahey Clinic Medical Center, Burlington, Massachusetts, and New England Deaconess Hospital, Boston, Massachusetts.

Complications of Esophageal and Diaphragmatic Surgery

C. THOMAS FITTS, M.D.

Professor of Surgery, Medical University of South Carolina College of Medicine. Attending Surgeon, Medical University Hospital; Consultant, Charleston Naval Hospital and Charleston Veterans Administration Hospital; Staff Physician, Charleston County Hospital, Charleston, South Carolina.

Miscellaneous Complications in the Preoperative and Postoperative Periods

ROBERT J. FLEMMA, M.D.

Clinical Professor of Surgery, The Medical College of Wisconsin, Milwaukee, Wisconsin.

Complications of Surgery of the Heart and Adjacent Great Vessels

JOHN E. FORESTNER, M.D.

Assistant Professor, Department of Anesthesiology, Emory University School of Medicine. Attending Anesthesiologist, Henrietta Egleston Hospital for Children, Scottish Rite Hospital for Crippled Children, and Grady Memorial Hospital, Atlanta, Georgia.

Complications of Anesthesia

ALAN E. FREELAND, M.D.

Associate Professor of Surgery (Orthopaedic), University of Mississippi School of Medicine. Attending Physician, University of Mississippi Medical Center, Jackson, Mississippi.

Complications of Common Fractures and Dislocations

DONALD E. FRY, M.D.

Assistant Professor and Director, Price Institute of Surgical Research, University of Louisville School of Medicine. Attending Physician, Veterans Administration Hospital, University Hospital, Norton-Children's Hospitals, Jewish Hospital, and Audubon Hospital, Louisville, Kentucky.

Infection and Fever in the Surgical Patient

FRANK GLENN, M.D.

Professor of Surgery Emeritus, Cornell University Medical College. Attending Surgeon, The New York Hospital, New York, New York.

Complications Following Operations upon the Biliary Tract and Their Management

LAZAR J. GREENFIELD, M.D.

Stuart McGuire Professor and Chairman, Department of Surgery, Virginia Commonwealth University, Medical College of Virginia, School of Medicine. Chief of Surgery, Medical College of Virginia Hospitals; Consultant, McGuire Veterans Administration Hospital, and Richmond Metropolitan Hospital, Richmond, Virginia.

Shock

JAMES D. HARDY, M.D.

Professor and Chairman, Department of Surgery, University of Mississippi School of Medicine. Surgeon-in-Chief, University Hospital, Jackson, Mississippi.

Complications of Thyroid and Parathyroid Surgery; Complications of Gastric Surgery

viii CONTRIBUTORS

STEPHEN E. HEDBERG, M.D.

Clinical Assistant Professor of Surgery, Harvard Medical School. Associate Visiting Surgeon and Senior Endoscopist in Gastrointestinal Surgery, Massachusetts General Hospital, Boston, Massachusetts.

Complications in Surgery of the Colon and Rectum

THOMAS K. HUNT, M.D.

Professor of Surgery, University of California, San Francisco, School of Medicine. Attending Physician, University of California Hospital, San Francisco, California.

Wound Complications

OLGA JONASSON, M.D.

Professor of Surgery, University of Illinois College of Medicine. Chief of Surgery, Cook County Hospital; Attending Surgeon, University of Illinois Hospital, Chicago, Illinois.

Acute Renal Insufficiency Complicating Surgery and Trauma

GEORGE L. JORDAN, JR., M.D.

Distinguished Service Professor of Surgery, Baylor College of Medicine. Chief of Medical Staff, Harris County Hospital District; Attending Surgeon, The Methodist Hospital; Consultant in Surgery, Veterans Administration Hospital; Associate Attending Surgeon, St. Luke's Episcopal Hospital, Houston, Texas.

Complications of Pancreatic and Splenic Surgery

JAMES R. JUDE, M.D.

Clinical Professor of Surgery, University of Miami School of Medicine. Attending Surgeon, Jackson Memorial Hospital, Mercy Hospital, Northridge General Hospital, and Baptist Hospital, Miami, Florida.

Cardiac Arrest and Resuscitation

JOHN P. KAPP, M.D., Ph.D.

Associate Professor of Neurosurgery, University of Mississippi School of Medicine. Attending Physician, University of Mississippi Medical Center, and Veterans Administration Hospital, Jackson, Mississippi.

Complications Involving the Nervous System

JOHN S. KUKORA, M.D.

Assistant Professor of Surgery, University of Mississippi School of Medicine. Attending Surgeon, University of Mississippi Medical Center, and Veterans Administration Hospital, Jackson, Mississippi.

Complications of Thyroid and Parathyroid Surgery

GORDON R. LANG, M.D.

Associate Professor of Clinical Medicine, University of Illinois College of Medicine. Director, Dialysis Unit, and Associate Director, Section of Nephrology, St. Joseph Hospital; Attending Physician, Roosevelt Memorial Hospital; Assistant Attending Physician, University of Illinois Hospital, Chicago, Illinois.

Acute Renal Insufficiency Complicating Surgery and Trauma

HOWARD K. LEONARDI, M.D.

Staff Member, Overholt Thoracic Clinic; Staff Surgeon, New England Deaconess Hospital, Boston, Massachusetts.

Complications of Esophageal and Diaphragmatic Surgery

DERWARD LEPLEY, JR., M.D.

Professor and Chairman, Department of Thoracic and Cardiovascular Surgery, The Medical College of Wisconsin, Milwaukee, Wisconsin.

Complications of Surgery of the Heart and Adjacent Great Vessels

JOHN R. LURAIN, M.D.

Assistant Professor of Obstetrics and Gynecology, Northwestern University Medical School. Assistant Director, Division of Gynecologic Oncology, Prentice Women's Hospital and Maternity Center, Northwestern Memorial Hospital, Chicago, Illinois.

Complications of Gynecologic Surgery

ROBERT M. MILES, M.D.

Professor of Surgery, University of Tennessee College of Medicine. Chief, Surgical Service, Baptist Memorial Hospital; Consultant in Surgery, Veterans Administration Hospital, Memphis, Tennessee.

Complications of Surgery That Involve the Venous System

RICHARD C. MILLER, M.D.

Professor of Surgery and Chief of Pediatric Surgery, University of Mississippi Medical Center. Associate Dean for Clinical Affairs, School of Medicine and Medical Director, University Hospital, Jackson, Mississippi.

Complications of Gastrointestinal Surgery in Infancy

FRANCIS S. MORRISON, M.D.

Professor of Internal Medicine, University of Mississippi School of Medicine. Attending Physician, University Hospital; Consultant, Teaching Staff, Veterans Administration Hospital and Methodist Rehabilitation Center, Jackson, Mississippi.

Hemorrhagic Complications in Surgery

PETER V. MOULDER, M.D.

Professor of Surgery, Tulane University School of Medicine. Attending Physician, Tulane Medical Center and Charity Hospital of New Orleans, New Orleans, Louisiana; Consulting Physician, Veterans Administration Hospital, Alexandria, Louisiana.

Postoperative Pulmonary Complications

DONALD C. MULLEN, M.D.

Associate Clinical Professor of Surgery, The Medical College of Wisconsin, Milwaukee, Wisconsin,

Complications of Surgery of the Heart and Adjacent Great Vessels

MICHAEL NEWTON, M.D., M.B.B.Ch.

Professor of Obstetrics and Gynecology, and Head, Section of Graduate Education, Department of Obstetrics and Gynecology, Northwestern University Medical School. Director, Division of Gynecologic Oncology, Prentice Women's Hospital and Maternity Center, Northwestern Memorial Hospital, Chicago, Illinois.

Complications of Gynecologic Surgery

LLOYD M. NYHUS, M.D.

Professor and Head, Department of Surgery, University of Illinois College of Medicine. Surgeon-in-Chief, University of Illinois Hospital, Chicago, Illinois.

Complications of Hernial Repair

W. SPENCER PAYNE, M.D.

Professor of Surgery, Mayo Medical School. Consultant, Section of Thoracic, Cardiovascular and General Surgery, Mayo Clinic, Rochester, Minnesota.

Complications of Esophageal and Diaphragmatic Surgery

HIRAM C. POLK, JR., M.D.

Professor and Chairman, Department of Surgery, University of Louisville School of Medicine. Attending Physician, University Hospital, Veterans Administration Hospital, Norton-Children's Hospitals, Jewish Hospital, and St. Anthony Hospital, Louisville, Kentucky.

Infection and Fever in the Surgical Patient

CHARLES W. PUTNAM, M.D.

Associate Professor of Surgery, University of Arizona College of Medicine. Chief, Surgical Service, Veterans Administration Medical Center; Attending Surgeon, University of Arizona Health Services Center, Tucson, Arizona.

Complications of Transplantation

JOHN H. C. RANSON, M.A., B.M., B.Ch.

Professor of Surgery, New York University School of Medicine. Attending Surgeon, New York University Hospital, Bellevue Hospital, and Manhattan Veterans Administration Hospital, New York, New York.

Complications of Small Intestine Surgery

NORMAN M. RICH, M.D.

Professor and Chairman, Department of Surgery, Uniformed Services University of the Health Sciences. Senior Vascular Surgeon, Walter Reed Army Medical Center, Bethesda, Maryland.

Complications of Surgery of the Abdominal Aorta and of Aortic Branches

GUY F. ROBBINS, M.D.

Clinical Associate Professor of Surgery, Cornell University Medical College. Senior Attending Surgeon, Breast Service, Department of Surgery, Sloan-Kettering Institute for Cancer Research, New York, New York.

Complications Following the Surgical Treatment of Women with Potentially Curable Carcinoma of the Breast

WILLIAM SCHUMER, M.D.

Professor and Chairman, Department of Surgery, and Professor, Department of Biochemistry, University of Health Sciences/The Chicago Medical School. Chief, General Surgery Section, Veterans Administration Medical Center; Chief, University Service, Department of Surgery, Saint Mary of Nazareth Hospital Center, Chicago, Illinois.

Complications of Parenteral Fluid Therapy and Other States of Postoperative Fluid Disequilibrium

HARRY M. SHIZGAL, M.D.

Professor of Surgery, McGill University Faculty of Medicine. Associate Surgeon, Royal Victoria Hospital, Montreal, Quebec, Canada.

Nutritional Complications in the Surgical Patient

ROBERT B. SMITH, III, M.D.

Professor of Surgery, Emory University School of Medicine. Chief of Surgical Service, Veterans Administration Medical Center; Staff Surgeon, Emory University Hospital, Henrietta Egleston Hospital for Children, and Grady Memorial Hospital, Atlanta, Georgia.

Complications of Portal-Systemic Shunt Surgery

ROBERT R. SMITH, M.D.

Professor and Chairman, Department of Neurosurgery, University of Mississippi School of Medicine. Attending Physician, University of Mississippi Medical Center, and Mississippi Methodist Hospital and Rehabilitation Center, Jackson, Mississippi, and Mercy Regional Medical Center, Vicksburg, Mississippi; Consultant, Veterans Administration Hospital, Jackson, Mississippi.

Complications Involving the Nervous System

THOMAS E. STARZL, M.D., Ph.D.

Professor of Surgery, University of Pittsburgh School of Medicine, and Presbyterian University Hospital. Attending Physician, Veterans Administration Medical Center, Pittsburgh, Pennsylvania.

Complications of Transplantation

WATTS R. WEBB, M.D.

Professor and Chairman, Department of Surgery, Tulane University School of Medicine. Chief of Surgery, Tulane Medical Center. Consulting Physician, Touro Infirmary and Baptist Hospital, New Orleans, Louisiana; Lallie Kemp Charity Hospital, Independence, Louisiana; and Huey P. Long Memorial Hospital and Veterans Administration Hospital, Alexandria, Louisiana.

Postoperative Pulmonary Complications

CLAUDE E. WELCH, M.D.

Clinical Professor of Surgery, Harvard Medical School. Visiting Surgeon, Massachusetts General Hospital, Boston, Massachusetts.

Complications in Surgery of the Colon and Rectum

JOHN E. WOODS, M.D.

Professor and Head, Section of Plastic Surgery, Mayo Medical School. Consultant, Head and Neck and General Surgery, Department of Surgery, Mayo Clinic, Rochester, Minnesota.

Complications of Surgery for Cancer of the Head and Neck

PUBLISHER'S FOREWORD

James D. Hardy was born in Birmingham, Alabama, and received his undergraduate education at the University of Alabama. He came north in 1938 to medical school and received his medical degree at the University of Pennsylvania in 1942. He served a medical residency at the University of Pennsylvania Hospital from 1943 to 1944, became a resident in general surgery in 1946 after service in the United States Army, and was Chief Resident in General Surgery from 1948 to 1949 under Dr. I. S. Ravdin and a resident in Thoracic Surgery from 1949 to 1951 under Dr. Julian Johnson.

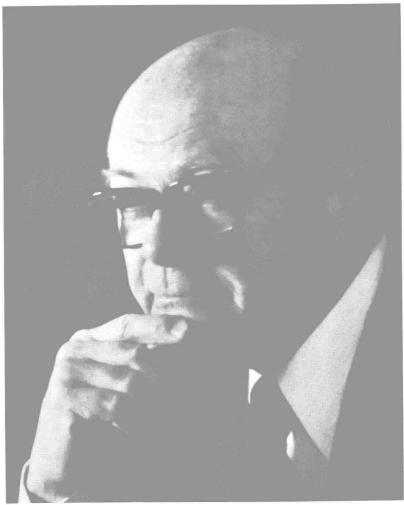
In 1954, after three years as Director of Surgical Research at the University of Tennessee, he accepted his present appointment as Professor and Chairman of the Department of Surgery and Director of Surgical Research at the University of Mississippi Medical Center.

His principal area of investigation has been the pathophysiology of surgical disease, and he has been one of the most significant of modern contributors to the elucidation of surgical physiology. He has also done pioneering work in the field of transplantation of organs and has had extensive experience in vascular surgery. He is a Past President of the American Surgical Association, the Society for Surgery of the Alimentary Tract, the Southern Surgical Association, and the Society of University Surgeons. He is currently President of the United States Chapter of the International Society of Surgery and President of the American College of Surgeons.

IN MEMORIAM

CURTIS PRICE ARTZ

1915-1977



ELSON-ALEXANDRE

The previous three editions of "Complications" were joint editorial efforts of Dr. Artz and myself. We alternated the major responsibility, but each edition contained much from both of us. The development of this fourth edition has been an especially poignant one. Dr. Artz and I were closely associated from 1956 until his untimely death in 1977, first as colleagues on the faculty of the University of Mississippi Medical Center and later as Co-editors of this book and in many other endeavors.

Dr. Artz was a man of many talents. Known by all his colleagues for his energy and enthusiasm, he was an excellent surgeon with special expertise in burn

management. He was greatly admired as a teacher, a reflection of his mastery of organization and his superbly articulated interest in his subject. He was a part of many enterprises, surgical societies, and other people's lives. He was an outstanding leader and loyal friend. He was Professor and Chairman of the Department of Surgery at the Medical University of South Carolina at the time of his death. It has been a great loss.

JAMES D. HARDY

PREFACE

Much has changed in clinical surgical practice since the third edition of "Complications" was published six years ago. A large number of new operations and procedures have been developed. Many remarkable, and in some cases even stunning, advances in diagnosis and in treatment have occurred. And, yes, new types of complications have accompanied the new investigative and therapeutic modalities. Thus, all of these considerations have rendered a new edition of this reference source imperative.

Accordingly, the entire material presented in the third edition has been searchingly examined, obsolete items deleted, others altered to accord with current knowledge, and new material added in every chapter. Too, a number of new authors have joined the volume, and each has brought on board a new and different insight and experience with respect to each specific complication or problem considered.

We are pleased with this volume. The editor extends his warmest appreciation to the authors for their authoritative contributions, to Mrs. Virginia W. Keith and Mrs. Sandra M. Day for their dedicated editorial assistance, to Mr. Carroll C. Cann, Medical Editor of the W. B. Saunders Company, and to the publishers themselves.

JAMES D. HARDY

CONTENTS

Chapter 1 INFECTION AND FEVER IN THE SURGICAL PATIENT Hiram C. Polk, Jr., and Donald E. Fry	1
Host-Pathogen Relationships Postoperative Fever and Infection Special Problems in Surgical Infection Antimicrobial Chemotherapy Future Prospects in Infection Bibliography	1 3 14 16 17 18
Chapter 2 WOUND COMPLICATIONS Thomas K. Hunt	20
The Basic Nature of Wounds Wound Dehiscence Wound Pain. Serum Collection Hemorrhage Drains. Suture Sinuses. Infection Hypertrophic Scars, Contracted Scars, and Keloids Reoperation Through Existing Wounds Hernia Bibliography	20 24 26 26 26 27 27 29 30 30 31
Chapter 3 SHOCK Lazar J. Greenfield	33
Historical Perspective Diagnosis of Shock Pathophysiology and Compensatory Mechanisms Hypovolemic Shock Cardiogenic Shock Septic Shock Cellular Function in Shock	33 34 34 37 38 41

XX CONTENTS

Approach to the Patient	42
Specific Organ Failure	52
Chapter 4 HEMORRHAGIC COMPLICATIONS IN SURGERY Francis S. Morrison	56
The Hemostatic Mechanism Laboratory Screening for Hemostatic Defects. Disorders of Hemostasis Preexisting Hemostatic Defects Deficiencies of the Intrinsic Clotting System. Deficiencies of the Extrinsic Clotting System Operative and Postoperative Bleeding. Miscellaneous Reports Bibliography	58 60 60 61 63 65
Chapter 5 COMPLICATIONS OF PARENTERAL FLUID THERAPY AND OTHER STATES OF POSTOPERATIVE FLUID DISEQUILIBRIUM	69
Complications of Methods of Administration	78 82
Chapter 6	
ACUTE RENAL INSUFFICIENCY COMPLICATING SURGERY AND TRAUMA	86
Gordon R. Lang and Olga Jonasson	
Prerenal Azotemia	88
Acute Azotemia and Oliguria	91 95 95
Chapter 7 POSTOPERATIVE PULMONARY COMPLICATIONS (Including Complications of Bronchoscopy)	98
Atelectasis and PneumoniaLung Abscess	98 103