

**REOPERATIVE
GASTROINTESTINAL
SURGERY**

**Thomas Taylor White, M.D.
R. Cameron Harrison, M.D.**

Second Edition

Reoperative Gastrointestinal Surgery

Second Edition

Thomas Taylor White, M.D., F.A.C.S.

Clinical Professor, University of Washington School
of Medicine; Surgeon, Swedish and University
of Washington Hospitals, Seattle

R. Cameron Harrison, M.D., F.A.C.S., F.R.C.S. (C.)

Professor of Surgery, The University of British
Columbia Faculty of Medicine, Vancouver, Canada

Foreword by **J. Englebert Dunphy, M.D., F.A.C.S.**

Professor Emeritus of Surgery, University of California,
San Francisco, School of Medicine

Illustrations by **Phyllis Wood**

Little, Brown and Company

Boston

Published in December 1979

Copyright © 1979 by Little, Brown and Company (Inc.)

Second Edition

Previous edition copyright © 1973 by Little, Brown and Company (Inc.)

All rights reserved. No part of this book may be reproduced in any form or by any electronic or mechanical means, including information storage and retrieval systems, without permission in writing from the publisher, except by a reviewer who may quote brief passages in a review.

Library of Congress Catalog Card No. 79-65316

ISBN 0-316-93604-9

Printed in the United States of America

HAL

Contributing Authors

C. James Carrico, M.D.

Professor of Surgery, University of Washington School of Medicine; Surgeon-in-Chief, Harborview Medical Center, Seattle

Chapter 3

R. Cameron Harrison, M.D., F.A.C.S.,
F.R.C.S. (C.)

Professor of Surgery, The University of British Columbia Faculty of Medicine, Vancouver

Chapters 1, 5, 6, 7, 8, and 11

Michael J. Hart, M.D.

Instructor of Surgery, University of Washington School of Medicine; Attending Surgeon, Swedish Hospital, Seattle

Chapters 7 and 8

David M. Heimbach, M.D.

Associate Professor of Surgery, University of Washington School of Medicine; Director, Burn Unit, Harborview Medical Center, Seattle

Chapters 5, 6, and 11

Tom D. Ivey, M.D.

Assistant Professor of Surgery, University of Washington School of Medicine; Attending Surgeon, University Hospital, Seattle

Chapter 4

Michael Oreskovich, M.D.

Assistant Professor of Surgery, University of Washington School of Medicine; Attending Surgeon, Harborview Medical Center, Seattle

Chapter 3

John A. Schilling, M.D.

Professor and Chairman, Department of Surgery, University of Washington School of Medicine, Seattle

Chapter 2

David A. Simonowitz, M.D.

Assistant Professor of Surgery, University of Washington School of Medicine; Attending Surgeon, Harborview Medical Center, Seattle

Chapters 9 and 10

Thomas Taylor White, M.D., F.A.C.S.

Clinical Professor, University of Washington School of Medicine; Attending Surgeon, Swedish and University of Washington Hospitals, Seattle

Chapters 1, 3, 4, 5, 6, 7, 8, 9, 10, and 11

Foreword

Whenever complications occur following abdominal and gastrointestinal surgery the surgeon confronts one of the most difficult decisions in medicine—whether or not to attempt reoperation. In the inherently complicated case a judgment must be made weighing the risk of reoperation against the potential advantages to be gained. Indeed, if the initial operation presented extreme technical challenges or the patient was in poor condition at the outset, the surgeon may question whether a second look will serve to improve the situation. Occasionally something goes wrong for no clearly identifiable reason after an uncomplicated and apparently well-performed operation—for example, when there is bleeding from the bed of a gallbladder that was clean and dry at the time of closure, or when there is small bowel obstruction after an appendectomy for early appendicitis. Finally, and perhaps too often, the surgeon's initial judgment or technical performance is at fault.

In every circumstance, the guiding principle of the surgeon's life remains responsibility. Although taxed to the utmost in making the decision in favor of reoperating, an experienced surgeon is frequently able to bail the patient out of a situation that would cause a novice operator to founder. When the well-done procedure has gone awry, a second look is necessary; and for the less seasoned surgeon who found an excessive challenge in the initial procedure, there is no substitute for consultation from surgeons

who have complementary experience in solving the immediate problem that requires action.

Drs. White and Harrison offer guidance on reoperations culled from analysis of case after case in all the categories of postoperative complications. Like the First Edition of *Reoperative Gastrointestinal Surgery*, the Second Edition outlines indications and techniques for reoperations subsequent to gastrointestinal surgery, here updated with valuable additions, such as the completely new chapters on wound healing and on the alimentation of patients who are undergoing reoperation. This useful book, which sets forth clear discussions of the chances for success with reoperations and of the timing and extent of secondary procedures to accommodate individual cases, contains a wealth of information for both beginners and practitioners experienced in the art of surgery.

J. Englebert Dunphy

Preface

The nearly seven years since the First Edition of this book appeared have reinforced our opinion that there was a gap in the surgical literature, not only in English but also in other languages, in books regarding the management of complications following gastrointestinal surgery. In the Second Edition we have endeavored to provide a book that can be read at leisure for pleasure and profit, and one that will be effective in helping the surgeon in an emergency situation. To the latter end, we have reorganized the large chapters on the biliary tract, pancreas, and stomach into two chapters each—one for the acute situations and one for the chronic, and we have extended the table of contents at the front of the book to make it easier for the reader to follow.

For the Second Edition we have enlisted the help of seven colleagues from the University of Washington. Dr. John A. Schilling has written a new chapter on wound healing. Another new chapter, on the alimentation of patients undergoing reoperation, focuses the surgeon's attention on what the patient can eat and what the patient should eat in connection with such procedures. More emphasis has been placed on surgical treatment in the remaining chapters, and less on prevention, because the latter is discussed in greater detail in other texts. The result is that the Second Edition contains a how-to-do-it section for almost every situation.

The main new points in the stomach chapters relate to more extensive use of

fiberoptic endoscopy and of cimetidine. There is less discussion of nutritional morbidity. The new chapters on the biliary tract take into greater account basket removal of stones and the use of ultrasound, CAT scans, octanoic acid, choledochoscopy, manometry, endoscopic cannulation of the papilla of Vater, and sphincterotomy; as well as percutaneous cholangiograms.

The chapters on the pancreas have been rewritten to reemphasize the fact that most acute pancreatitis relates to gallstones. In the chapter on pancreatitis we have placed greater emphasis on anatomy and have given more data on the operations for acute and chronic pancreatitis. In the chapter on the small and large bowel we have included new data on bleeding from angiomas of the colon, reorganized the sections on peritonitis and small and large intestinal obstruction, and discussed for the first time the surgical correction of complications of bypass operations. The sections on complications of colostomy and ileostomy have been left essentially unchanged.

We have provided a great deal of new statistical data on reoperations from Vancouver General Hospital in British Columbia and Swedish and University Hospitals in Seattle. Thus the book reflects the extensive experience of both hospital groups.

These features make this book unique and personal. To avoid duplication as much as possible, we have done all the editing ourselves, so that the book reads more as a dual-author work than as a multiple-author work. We eliminated about 75 pages from the original text and replaced them with new material, so the Second Edition is about the same length. All the illustrations have been updated or corrected as needed.

We express our appreciation to Mrs. Lin Richter and Mrs. Katharine Tsioulcas of the staff of Little, Brown and Company. We again thank Mrs. Phyllis Wood of the Department of Medical Illustration at the Uni-

versity of Washington for her new and revised illustrations. We also thank Mrs. Jean McClellan, Ms. Jessica Amanda Salmonson, and Mrs. Gladys Bealing, our secretaries, for their help. We particularly appreciate the Foreword provided us by Dr. J. Englebert Dunphy for this Second Edition.

T. T. W.

R. C. H.

Contents

Contributing Authors	v
Foreword	vii
Preface	ix

1. Indications for and Frequency of Reoperations in Gastrointestinal Surgery	1
Early Reoperations	1
Postoperative Hemorrhage	5
Postoperative Obstruction	6
Late Reoperations	7
2. Wound Healing	9
Preoperative Preparation	10
Systemic	10
Local Preparation of the Patient	12
Selection of a Site for Incision	12
Technical Considerations	12
Wound Complications	14
Wound Dehiscence	15
3. The Alimentation of Patients Undergoing Reoperation on the Gastrointestinal Tract	19
Assessment of Nutritional State	19
Enteral Feeding	19
Nasogastric Feeding	20
Esophagostomy	20
Gastrostomy	20
Jejunostomy	21
Planning Nutritional Support	22
Selection and Composition of Tube Feedings	23
Complications from Enteral Hyperalimentation	24
Parenteral Hyperalimentation	24
Oral Feedings	26

4. Reoperations on the Esophagus	29
Early Complications after Esophagoscopy or Gastroscopy	29
Perforation of the Esophagus	29
Mediastinitis	30
Bleeding	30
Diagnosis of Complications of Esophagoscopy	30
Esophageal Leak	30
Treatment of Bleeding after Esophagoscopy	32
Late Complications after Esophagoscopy, Bougienage, Biopsy, or Other Transesophageal Maneuvers	33
Complications of Operations on the Esophagus Not Involving Resection	33
Heller's Esophagomyotomy	33
Reflux Following Heller Esophagomyotomy	33
Recurrence of Symptoms of Achalasia	34
Stricture	35
Esophageal Transection and Resuture for Bleeding Varices and Thoracotomy for Removal of an Impacted Foreign Body in the Esophagus	36
Complications of Long-Term Palliative Esophageal Intubation for Carcinoma	36
Blocked Celestin Tube	36
Lost Celestin Tube	37
Obstruction	37
Reoperation after Resection of the Esophagogastric Junction with Esophagogastrostomy	37
Replacement of a Segment of Resected Esophagus with Colon, Greater Curvature of the Stomach, or Small Bowel	38
Reoperation after Operation for Reflux Esophagitis	40
Recurrent Symptoms Following Dilatation of Esophageal Stricture	41
Problems Following Various Operations for Hiatal Hernia	42
5. Early Reoperations in Gastroduodenal Surgery	45
Incidence, Cause, and Prevention of Early Postoperative Complications	45
Peritonitis	46
Incidence	46
Cause and Prevention	46
Diagnosis	50
Surgical Judgment Regarding Reoperation for Peritonitis and Fistula	52
Early Complications of Vagotomy	60
Early Postoperative Obstruction	61
Cause and Prevention	61
Diagnosis	65
Nonoperative Management	65
Operative Management	66
Hemorrhage after Elective Gastric Surgery	67
Intraperitoneal Hemorrhage	67
Intraluminal Hemorrhage	68
Diagnosis	68
Management	68

Bleeding after Surgery for Bleeding	70
Cause and Prevention	70
Differential Diagnosis of Gastrointestinal Re-	
bleeding	72
Differential Diagnosis of Gastrointestinal Re-	
bleeding—Site Unknown	72
Nonoperative Management	73
Operative Management	74
Jaundice Following Gastric Operations	77
Prevention	78
Diagnosis	79
Treatment	79
Pancreatitis	79
Acute Early Diarrhea	79
Cause and Prevention	79
Diagnosis	80
Treatment	80
Early Complications after Operations on the Duodenum	80
Lateral Duodenal Fistula	81
Early Complications after Operations for Perforation	83
Incidence, Cause, and Prevention	83
Peritonitis	85
Obstruction	86
Bleeding	86
Malignancy	87

6. Late Complications of Gastric Surgery 91

Stomal Ulcer	91
Incidence	91
Causes and Prevention	91
Diagnosis	93
Treatment of Stomal Ulcer	95
Stomal Ulcer with Complications	103
Zollinger-Ellison Ulcer	104
Gastrojejunocolic Fistula	105
Gastrocolic Fistula	105
Other Late Sequelae Following Gastric Surgery	105
Early Dumping	107
Treatment	108
Surgical Therapy	108
Late Dumping (Postoperative Hypoglycemia)	111
Postvagotomy and Postgastrectomy Diarrhea	112
Incidence	112
Cause and Prevention	112
Treatment	113
Afferent Loop Syndrome	113
Acute Afferent Loop Obstruction	113
Chronic Loop Problems	114
Alkaline Reflux Gastritis	117
Gastric Outlet Obstruction	118
Jejunogastric Intussusception	118
Late Esophageal Complications of Vagotomy	119
Nutritional Morbidity Following Stomach Operations	119

7. Early Reoperations on the Biliary Tract	125
Complications Following Cholecystectomy (with or without Common Duct Exploration)	126
Bile Leakage	126
Peritonitis, Abscess, or Both	130
Postoperative Hemorrhage	135
Hemobilia	136
Retained Common Duct Stones after Duct Exploration	137
Incidence	137
Prevention and Diagnosis	137
Treatment	137
Management	139
Jaundice	142
Differential Diagnosis	142
Management	144
Common Duct Injury	147
Prevention	147
Occurrence	148
Diagnosis and Treatment	148
Overlooked Neoplasms and Sclerosing Cholangitis	150
Acute Pancreatitis	153
Early Complications Following Cholecystostomy	155
Early Complications Following Biliointestinal Anastomoses and Sphincteroplasty	155
Duodenal Leaks and Fistulas	155
Prevention	157
Diagnosis and Treatment	157
Leakage Following Choledochojejunostomy	158
Failure to Relieve Jaundice by Biliointestinal Anastomosis	158
Postoperative Cholangitis	160
Hemorrhage Following Biliointestinal Anastomosis, Sphincteroplasty, or Duodenotomy	161
 8. Late Reoperations on the Biliary Tract	 165
Retained or Re-formed Common Duct Stones	165
Diagnosis	166
Technical Approach	167
Residual Gallbladder and Cystic Duct Remnant	177
Diagnosis	178
Surgical Therapy	180
Stenosis of the Ampulla and Distal Bile Duct	180
Anatomy of the Sphincter of Oddi	181
Type of Incision	181
Location of the Duodenal Incision	183
Papillotomy	184
Indications for Sphincteroplasty as Opposed to Choledochoduodenostomy	184
Sphincteroplasty	185
Bile Duct-Intestinal Anastomosis	186
Choledochoduodenostomy	190
Anastomoses between the Upper Biliary Tract and the Jejunum	194
Choledochojejunostomy	195

- Cut or Damaged Duct 196
- Diagnosis 196
- Transhepatic Cholangiograms 196
- Surgical Technique 197
- Hepaticojejunostomy 200

9. Reoperations on the Pancreas for Acute Pancreatitis 203

- Frequency of Secondary Operations of the Pancreas 203

- Surgical Anatomy of the Pancreas 203
 - Operative Approaches to the Pancreas 206
 - Classification of Types of Pancreatitis 207

- Causes of Complications Following Laparotomy Only for Acute Pancreatitis (Patient Gets Better); Management Following the Attack 209

- Alcoholism 210
 - Causes Unrelated to Alcoholism 210

- Methods of Investigating Pancreatic Disease 215

- Radiologic Procedures 215
 - Biochemical Methods 218

- Complications after Laparotomy Only for Acute Pancreatitis (Patient Gets Worse) 220

- Complications Following Drainage of Acute Pancreatic Cysts 221

- Patients with Prior Bile Duct Exploration with or without a Sphincter-Cutting Procedure and with Recurrent Acute Pancreatitis 222

10. Reoperations for Chronic Pancreatitis and Pancreatic Tumors 237

- Recurrent Pain after Splanchnicectomy or Celiac Ganglionectomy 238

- Previous Pancreaticojejunostomy 238

- Surgical Management 238

- Operative Technique 240

- Late Complications 247

- Left-to-Right Resection of the Pancreas 247

- Pancreatic Resection to the Aorta or Portal Vein 247

- Early Complications 249

- Late Complications 250

- Eighty to 95 Percent Pancreatectomy 251

- Pancreaticoduodenectomy 252

- Late Complications after Pancreaticoduodenectomy or Left-to-Right Pancreatic Resection 252

- Cancer of the Pancreas 255

- Complications after Surgery for Carcinoma of the Pancreas 255

- Complications Following Pancreaticoduodenectomy 256

- Reconstruction after Pancreaticoduodenectomy 259

- Total Pancreatectomy 261

- Islet Cell Tumors 261

- WDHA Syndrome 262

Beta Cell Tumors	262
Angiography	262
Exploration for an Islet Cell Tumor	263
Palpable Tumor	263
Nonpalpable Tumors	264

11. Reoperations on Small and Large Bowel 269

Hemorrhage	269
Hemorrhage into the Abdominal Cavity	269
Bleeding into the Gastrointestinal Tract Immediately Following Surgery	270
Intestinal Bleeding after an Operation for Bleeding	270
Diagnosis	270
Management	274
Early Postoperative Intestinal Obstruction	275
Group I—Paralytic Ileus	275
Group II—Mechanical Obstruction	275
Differentiating Postoperative Paralytic Ileus from a Mechanical Obstruction	276
Late Postoperative Obstruction	276
Diagnosis	278
Obstruction Following Operations for Cancer	278
Nonsurgical Treatment	279
Operative Treatment	279
Recurrent Intestinal Obstruction Secondary to Adhesions	283
Intestinal Fistulas	285
Acute Postoperative Generalized Peritonitis	286
Operative Management	286
Principles of Treatment of Fistulas	287
Short Bowel Syndrome	291
Surgical Correction of Complications of Bypass Operations	293
Short Bowel Secondary to Massive Resection	293
Treatment	294
Ileostomy	295
Stricture	295
Prolapse of the Distal Loop of a Loop Ileostomy	297
Prolapse of an End Ileostomy	298
Sudden Prolapse of an End Ileostomy	299
Transplantation of an Ileostomy	299
Transplantation with a Short Mesentery	299
Too Long an Ileostomy	301
Retraction of a Stoma	301
Closure of the Ileostomy	301
Herniation Adjacent to the Ileostomy beneath the Skin and Fascia and around the Mesentery	301
Colostomy	302
Appropriate End Sigmoid Colostomy or Left Colon Colostomy	303
Stricture	303
Prolapse	303
Hernia	304

Indications for and Frequency of Reoperations in Gastrointestinal Surgery

Thomas Taylor White
and R. Cameron Harrison

Early Reoperations

Reoperations for complications or improper indications occur immediately after about 4 percent of primary gastrointestinal operations. The frequency of secondary, unplanned surgery of this nature is not well documented except in a few centers, and then only partially. Since mortality may be related to the surgical specialty (Table 1-1), it is probable that the complication rate will also be related to the type of surgeon. Still, we have only two groups of studies, those from the French Academy of Surgery and our own, which give the overall picture. In the French figures and ours (Table 1-2) early reoperation was required in 0.9 and 1 percent of appendectomies, 4.2 and 6.5 percent of stomach and duodenal operations, 2.4 and 1.8 percent of biliary tract and pancreas operations, 4.5 and 2 percent of small intestine operations, and 6.4 and 5.3 percent of colon and rectal operations. The rate of early reoperation is surprisingly similar in these disparate series. At the Barnes Hospital in St. Louis the reoperation rate after biliary surgery was 3.8 percent (Table 1-3), and in Ohio it was approximately 4 percent [2a, 7, 9].

A postoperative complication that requires a secondary operation calls for the best a surgeon and team have to offer: wisdom, experience, a good moral sense, and technical ability to handle a difficult situa-

tion. It is a fortunate patient whose surgeon can respond wisely to the simple but dramatic question, "Must we operate?" It is important not to let the hour pass when a reoperation should have been done; on the other hand, it is just as important not to do a reoperation that may end in a fatality. The decision to do an urgent reoperation is a difficult one to make because error may mean disaster.

Surgeons often complain about the physician's delay before he calls for help in intestinal obstruction, peritonitis, or gastrointestinal bleeding. In these instances the surgeon feels that there is a clear reason for operation without going into a great discussion. Paradoxically, the same surgeon is often late in reoperating for peritonitis, intestinal obstruction, or hemorrhage on his own postoperative patients. He should not hesitate to obtain a consultation from a trusted colleague. Every surgeon must also distinguish between the time to reoperate and the time for further nonoperative care.

The average rate for early reoperation after abdominal surgery is 2.5 percent. If one eliminates the simple appendectomies, this rate climbs to approximately 5 percent. Reoperation has, in the past, been accompanied by a high operative mortality (30 percent). The reoperative mortality rates available from various authors vary from 20 to 66 percent in the immediate postoperative period. When there are repeated reoperations,