

# Colorectal Surgery Consultation

Tips and Tricks for the  
Management of Operative  
Challenges

Sang W. Lee  
Scott R. Steele  
Daniel L. Feingold  
Howard M. Ross  
David E. Rivadeneira  
*Editors*

 Springer

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*Editors*

Sang W. Lee  
Keck School of Medicine  
of University of Southern California  
Los Angeles, CA  
USA

Scott R. Steele  
Cleveland Clinic  
Cleveland, OH  
USA

Daniel L. Feingold  
Columbia University  
New York, NY  
USA

Howard M. Ross  
Lewis Katz School of Medicine  
Temple University  
Philadelphia, PA  
USA

David E. Rivadeneira  
Hofstra-Northwell School of Medicine  
Woodbury, NY  
USA

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## Preface

The art of surgery takes a lifetime to master and develops only through repetition and deliberate practice. Despite long years of surgical training, it is challenging for surgeons to individually acquire operative experiences and pattern recognition that results from years of high-volume clinical practice. Expectedly, significant operative learning and judgment occurs during our first several years of practice. Some of us may be fortunate enough to start our careers in a group practice with senior partners that can impart their knowledge and experience when we encounter difficult operative situations. Many of us may not be so fortunate and find ourselves in a situation in which we rely only on our training and limited experience. With this book, we wanted to gather together operative tips and techniques that are not commonly addressed during our training. We wanted to create a compilation of techniques and tips that might be useful in dealing with unusual, difficult, or unexpected operative situations that may arise during our practice.

At times, we are called by our colleagues to help with unexpected intraoperative problems. These situations have specific challenges as we lack significant knowledge of the patient's history or even what occurred before we walked into the operating room. The need to make expeditious assessment of the patient and act is complicated by the technical complexities and medico-legal ramifications.

This book brings together operative tips and tricks we have learned from our many years of practices in high-volume, specialized, academic centers over the years. For this reason, all the chapters were either personally guided and reviewed or written by one of the editors. It is not surprising that in the process of working on this book, we the editors have learned a lot from each other's experiences. Although the book is by no means all encompassing, we tried to cover a wide variety of situations encountered during endoscopy, anorectal surgery, and open and laparoscopic abdominal surgeries. We also do not pretend that the techniques described are the only way to approach a similar situation, or conversely, that the described approach guarantees success. Yet we hope to provide a few ideas, tip, and tricks to approach these challenging and, at times, demanding circumstances. We designed the text to be simple and succinct and provide salient key points and practical techniques that may make the difference in patient outcomes. We tried to provide as many illustrations and photos as possible to accompany the text and guide operations. We are truly grateful for everyone involved for their time and

contributions. We hope our textbook will stimulate further discussions and lead to better patient outcomes.

Los Angeles, CA, USA

Sang W. Lee, MD, FACS, FASCRS

Cleveland, OH, USA

Scott R. Steele, MD, MBA, FACS, FASCRS

New York, NY, USA

Daniel L. Feingold, MD, FACS, FASCRS

Philadelphia, PA, USA

Howard M. Ross, MD, FACS, FASCRS

Woodbury, NY, USA

David E. Rivadeneira, MD, MBA, FACS, FASCRS

---

## Acknowledgments

Thank you to my fellow editors and Marianna, Michele, Piper, and Flynn.

Scott R. Steele, MD

*Success is not final, failure is not fatal: it is the courage to continue that counts.*

–Winston Churchill

My gratitude to my fellow editors Howard, Danny, and Scott for all of their guidance and hard work and in addition Sang for the leadership and vision for this project. Forever grateful to my family Anabela, Sophia, and Gabriella for their love and support.

David E. Rivadeneira, MD, MBA, FACS, FASCRS

One of the greatest joys of my career has been the friendships I have made with other surgeons. The relationships forged in training and on efforts such as this textbook have enriched my life. The editors and authors of this book have supported me while tackling difficult clinical challenges and caused me to belly laugh too many times to count. I encourage all trainees to take extra effort to get to know your peers (and to read this excellent textbook). Thank you to my family who continue to make every day special.

To Stacy, Fin, Leo, and Emily...all my love.

Howard M. Ross, MD, FACS, FASCRS

To my fellow editors, it has been a joy and an honor collaborating with you over the years. To my wife, Tonja, and Judah, Ethan, Noa, and Lily, for your unwavering understanding, love, and support. And to my parents who supported and inspired me from the very beginning.

Daniel L. Feingold, MD, FACS, FASCRS

I would like to acknowledge and thank my colleagues and friends for volunteering their time and expertise. I extend special thanks to Yuko Tonohira for providing beautiful illustrations. To my editors, David, Howard, Scott, and Danny, thank you for your hard work, dedication, and friendship. Finally to my family, Crystal, Eric, and Ryan, thank you for the unwavering support and love and for making everything worthwhile.

Sang W. Lee, MD, FACS, FASCRS

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# Contents

## Part I Introduction

- 1 How to Avoid Getting into Difficult Operative Situations . . . . . 3**  
Sang W. Lee
- 2 Principles in Approaching Difficult Operative Situations. . . . . 7**  
Deborah S. Keller and Scott R. Steele

## Part II How to Deal with Commonly Encountered Intra-operative Findings/Complications

- 3 Extensive Intra-abdominal Adhesions . . . . . 15**  
Jason Lei and David E. Rivadeneira
- 4 Intraoperative Injury to Small or Large Bowel . . . . . 19**  
Laura Greco and Howard M. Ross
- 5 Injury to the Rectum During Pelvic Surgery . . . . . 23**  
Daniel L. Feingold and Mehraneh D. Jafari
- 6 Appendectomy Pathology Report Returns Adenocarcinoma,  
Carcinoid, or Appendiceal Mucinous Neoplasm . . . . . 27**  
Daniel L. Feingold and Steven A. Lee-Kong
- 7 Unexpected Findings: Normal Appendix During  
Appendectomy. . . . . 29**  
Daniel L. Feingold and Steven A. Lee-Kong
- 8 During Sigmoid Resection for Diverticulitis, the Patient  
Is Found to Have Diffuse Diverticulosis . . . . . 31**  
Daniel L. Feingold and Steven A. Lee-Kong
- 9 Intraoperatively the Patient Is Found Incidentally  
to Have Colon or Small Bowel Inflammation. . . . . 33**  
Daniel L. Feingold and Steven A. Lee-Kong
- 10 Unexpected Findings: Intraoperatively Suspected Colon  
Cancer Turns Out to Be Rectal Cancer . . . . . 35**  
Daniel L. Feingold and Steven A. Lee-Kong



- 11 Unexpected Findings: Can't Find the Colon Lesion** ..... 37  
Daniel L. Feingold and Steven A. Lee-Kong
- 12 Unexpected Findings: The "Malignant Polyp"** ..... 39  
Daniel L. Feingold and Steven A. Lee-Kong
- 13 Unexpected Findings: Positive Air Leak** ..... 41  
Daniel L. Feingold and Steven A. Lee-Kong
- 14 Unexpected Findings: Anastomotic "Donut" Problems – Incomplete or Missing Donuts with a Negative Leak Test** ..... 45  
Daniel L. Feingold and Steven A. Lee-Kong
- 15 Unexpected Findings: Locally Advanced Colon Cancer** ..... 47  
Daniel L. Feingold and Steven A. Lee-Kong

### Part III Technical Tips and Tricks for Difficult Abdominal Cases

- 16 Difficult to Close Abdomen** ..... 53  
Daniel L. Feingold and David A. Kleiman
- 17 The Difficult Splenic Flexure** ..... 57  
Alison Althans, Deborah S. Keller, and Scott R. Steele
- 18 Hartmann Takedown: Managing the Hard to Reach or Devascularized Left Colon** ..... 63  
Christine Hsieh and Sang W. Lee
- 19 Cannot Find the Rectal Stump During Hartmann Reversal** .... 69  
David E. Rivadeneira
- 20 Rectal Stump Perforation Stump While Passing an End-to-End Anastomotic Stapler** ..... 75  
Sang W. Lee
- 21 Inability to Pass End-to-End Anastomotic Stapler** ..... 81  
Howard M. Ross
- 22 The J Pouch Does Not Reach** ..... 85  
Deborah S. Keller, Richard Cohen, and Scott R. Steele
- 23 Intraoperative Management of Bleeding at Stapled Side-to-Side Anastomosis** ..... 91  
Nivedh V. Paluvoi and Sang W. Lee
- 24 Postoperative End-to-End Anastomotic Bleeding** ..... 95  
Christine Hsieh and Sang W. Lee
- 25 Postoperative Anastomotic Leak After Low Anterior Resection** ..... 101  
Matthew M. Philp and Howard M. Ross
- 26 Colon Does Not Reach for a Coloanal Anastomosis** ..... 107  
Shirley Shih and David E. Rivadeneira

- 27 Cannot Find Internal Opening of Fistula-in-Ano . . . . . 111**  
Daniel L. Feingold and J. Mark Kiely
- 28 How to Deal with Crohn’s Friable and Fragile Mesentery . . . . . 115**  
Anuradha R. Bhama and Scott R. Steele
- 29 Ulcerative Colitis with Severe Inflammation  
and Friable Tissues: How to Avoid Intraoperative  
Perforation and Manage the Colorectal Stump . . . . . 121**  
Sang W. Lee
- 30 Patient Develops Anastomotic Stricture After Low  
Anastomosis with Diverting Ileostomy . . . . . 125**  
Nivedh V. Paluvoi and Sang W. Lee
- 31 Presacral Bleeding. . . . . 129**  
Sarah Koller and Howard M. Ross
- 32 Cannot Extract the Circular Stapler. . . . . 133**  
Daniel L. Feingold and Ravi P. Kiran

#### **Part IV Technical Tips and Tricks for Difficult Laparoscopic Cases**

- 33 General Technical Recommendations for Difficult  
Laparoscopic Cases. . . . . 137**  
Andrew Godwin and David E. Rivadeneira
- 34 Dislodged Laparoscopic Cannulas . . . . . 141**  
Emily Steinhagen and Scott R. Steele
- 35 How to Keep the Small Bowel from Getting in the  
Way of a Laparoscopic Operation. . . . . 145**  
Nivedh V. Paluvoi and Sang W. Lee
- 36 Laparoscopic Suturing . . . . . 149**  
Daniel Fish and Scott R. Steele
- 37 Re-look After Laparoscopic Resection . . . . . 157**  
Howard M. Ross
- 38 Retraction of a “Floppy Uterus” Encountered During  
Minimally Invasive Rectal Resection . . . . . 161**  
Howard M. Ross and Meredith Gunder
- 39 Bleeding During Colectomy . . . . . 163**  
Shirley Shih and David E. Rivadeneira
- 40 Cannot Find the Ureter . . . . . 169**  
Scott R. Steele and Andrew T. Schlusel
- 41 Ileum Becomes Ischemic Due to Torsion During J-Pouch  
Creation . . . . . 175**  
Sang W. Lee

<b>42</b>	<b>Difficult Laparoscopic Rectal Dissection</b> . . . . .	179
	Deborah S. Keller, Scott R. Steele, and Daniel P. Geisler	
<b>43</b>	<b>Techniques for Laparoscopic Distal Rectal Stapled Transection</b> . . . . .	185
	Howard M. Ross	
<b>44</b>	<b>How to Avoid “Twisting” an Ileocolic or Ileorectal Anastomosis</b> . . . . .	189
	Scott R. Steele and Andrew T. Schluskel	
<b>45</b>	<b>How to Deal with Splenic Injury During Laparoscopic Flexure Mobilization</b> . . . . .	195
	Daniel L. Feingold and Mehraneh D. Jafari	
<b>46</b>	<b>Entering the Reoperative Hostile Abdomen Laparoscopically</b> . . . . .	199
	Laura Greco and Howard M. Ross	
<b>47</b>	<b>Manage Inferior Epigastric Bleeding</b> . . . . .	203
	Titilayo Adegboyega and David E. Rivadeneira	
 <b>Part V Technical Tips and Tricks for Difficult Colostomy/Ileostomy</b>		
<b>48</b>	<b>Hard to Reach Colostomy/Ileostomy</b> . . . . .	211
	Christine Hsieh and Sang W. Lee	
<b>49</b>	<b>Stoma Prolapse</b> . . . . .	217
	Emily Steinhagen and Scott R. Steele	
<b>50</b>	<b>Ileostomy Retracts Below the Skin</b> . . . . .	223
	Titilayo Adegboyega and David E. Rivadeneira	
 <b>Part VI Technical Tips and Tricks for Difficult Anorectal Cases</b>		
<b>51</b>	<b>Difficulties with the Stapled Hemorrhoidectomy Procedure</b> . . . . .	229
	Sang W. Lee	
<b>52</b>	<b>Symptomatic Long Residual Rectal Cuff Status Post J-Pouch</b> . . . . .	233
	Anuradha R. Bhama and Scott R. Steele	
<b>53</b>	<b>Difficult Anterior Perineal Dissection During Abdominoperineal Resection</b> . . . . .	237
	Sang W. Lee	
<b>54</b>	<b>Anastomotic Sinus After Low Anterior Resection and Diverting Loop Ileostomy</b> . . . . .	241
	Daniel L. Feingold and Garrett Friedman	
 <b>Part VII Tips and Tricks for Difficult Colonoscopic Cases</b>		
<b>55</b>	<b>Cannot Pass the Scope into the Cecum</b> . . . . .	247
	David E. Rivadeneira	

---

<b>56</b>	<b>Difficult to Remove Polyp</b> . . . . .	<b>253</b>
	Daniel L. Feingold and Sang W. Lee	
<b>57</b>	<b>Bleeding After Colonoscopic Polypectomy</b> . . . . .	<b>257</b>
	Howard M. Ross and Laura Greco	
<b>58</b>	<b>The Thin Colon After Endoscopic Mucosal Resection</b> . . . . .	<b>261</b>
	David E. Rivadeneira	
<b>59</b>	<b>Cannot Remove the Snare During Colonoscopy</b> . . . . .	<b>263</b>
	David E. Rivadeneira	
<b>60</b>	<b>How to Address a Polyp Involving the Appendiceal Orifice</b> . . . .	<b>267</b>
	Howard M. Ross and Laura Greco	
 <b>Part VIII Medico-Legal Issues</b>		
<b>61</b>	<b>Medico-Legal Issues in Minimally Invasive Colon and Rectal Surgery: A Primer</b> . . . . .	<b>273</b>
	Daniel L. Feingold and Howard M. Ross	
	<b>Index</b> . . . . .	<b>277</b>

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## Contributors

**Titilayo Adegboyega, MD, MPH** Huntington Hospital-Northwell Health, Department of Colorectal Surgery, Huntington, NY, USA

**Alison Althans, BA** University Hospitals Cleveland Medical Center, Cleveland, OH, USA

**Anuradha R. Bhama, MD** Department of Colorectal Surgery, Cleveland Clinic, Cleveland, OH, USA

**Richard Cohen, MD, FRCS** University College London Hospitals, NHS Foundation Trusts, Department of Surgery and Interventional Sciences, London, UK

**Daniel L. Feingold** Division of Colorectal Surgery, Department of Surgery, Columbia University, New York, NY, USA

**Daniel Fish, MS, MD** Department of Colorectal Surgery, Cleveland Clinic, Cleveland, OH, USA

**Garrett Friedman, MD** Mike O’Callaghan Federal Medical Center, Department of Colon and Rectal Surgery, Las Vegas, NV, USA

**Daniel P. Geisler, MD, FACS, FASCRS** NewYork-Presbyterian/Columbia, Department of Colorectal Surgery, New York, NY, USA

**Andrew Godwin, MD** Northwell Health-Lenox Hill Hospital, New York, NY, USA

**Laura Greco, MD** Department of Surgery, Temple University Hospital, Philadelphia, PA, USA

**Meredith Gunder, MD** Department of Surgery, Temple University Hospital, Lewis Katz School of Medicine at Temple University, Philadelphia, PA, USA

**Christine Hsieh, MD** Keck School of Medicine – University of Southern California, Los Angeles, CA, USA

**Mehraneh D. Jafari, MD** UC Irvine Health, Department of Surgery, Division of Colorectal Surgery, Orange, CA, USA

**Deborah S. Keller, MS, MD** Department of Surgery, New York-Presbyterian, Columbia University Medical Center, New York, NY, USA

**J. Mark Kiely, MD** Division of Colorectal Surgery, Department of Surgery, Columbia University, New York, NY, USA

**Ravi P. Kiran, MS, FACS, FASCRS** Division of Colorectal Surgery, Department of Surgery, Columbia University, New York, NY, USA

**David A. Kleiman, MD** Lahey Hospital and Medical Center, Department of Colon and Rectal Surgery, Burlington, MA, USA

**Sarah Koller, MD** Department of Surgery, Lewis Katz School of Medicine at Temple University and the Temple University Health System, Philadelphia, PA, USA

**Sang W. Lee, MD, FACS, FASCRS** Department of Surgery – Colon and Rectal Surgery, Keck School of Medicine of University of Southern California, Los Angeles, CA, USA

**Steven A. Lee-Kong, MD, FACS, FASCRS** Division of Colorectal Surgery, Department of Surgery, Columbia University, New York, NY, USA

**Jason Lei, MD** Virtua Medical Center, Department of Colon and Rectal Surgery, Voorhees, NJ, USA

**Nivedh V. Paluvoi, MD** University of Miami, Department of Surgery, Division of Colorectal Surgery, Pasadena, CA, USA

**Matthew M. Philp, MD, FACS, FASCRS** Division of Colon and Rectal Surgery, Temple University School of Medicine, Philadelphia, PA, USA

**David E. Rivadeneira, MD, MBA, FACS, FASCRS** Surgical Strategic Initiatives, Northwell Health, New Hyde Park, NY, USA

Surgical Services and Colorectal Surgery, Huntington Hospital, Huntington, NY, USA

Hofstra University-Northwell School of Medicine, Hempstead, NY, USA

**Howard M. Ross, MD, FACS, FASCRS** Division of Colon and Rectal Surgery, Lewis Katz School of Medicine at Temple University and the Temple University Health System, Philadelphia, PA, USA

**Andrew T. Schluskel, DO, FACS** Madigan Army Medical Center, Department of Surgery, Tacoma, WA, USA

**Shirley Shih, MD** Northwell Health, Department of Colorectal Surgery, Woodbury, NY, USA

**Scott R. Steele, MD, FACS, FASCRS** Case Western Reserve University School of Medicine, Cleveland, OH, USA

Department of Colorectal Surgery, Cleveland Clinic, Cleveland, OH, USA

**Emily Steinhagen, MD** University Hospitals Case Medical Center, Department of Surgery, Cleveland, OH, USA

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**Part I**

**Introduction**



# How to Avoid Getting into Difficult Operative Situations

# 1

Sang W. Lee

## Clinical Scenario

A 67-year-old male who underwent sigmoidectomy with high ligation of his inferior mesenteric artery (IMA) for sigmoid cancer presents 3 years later with a second primary colon cancer located in the mid-descending colon.

## Key Points

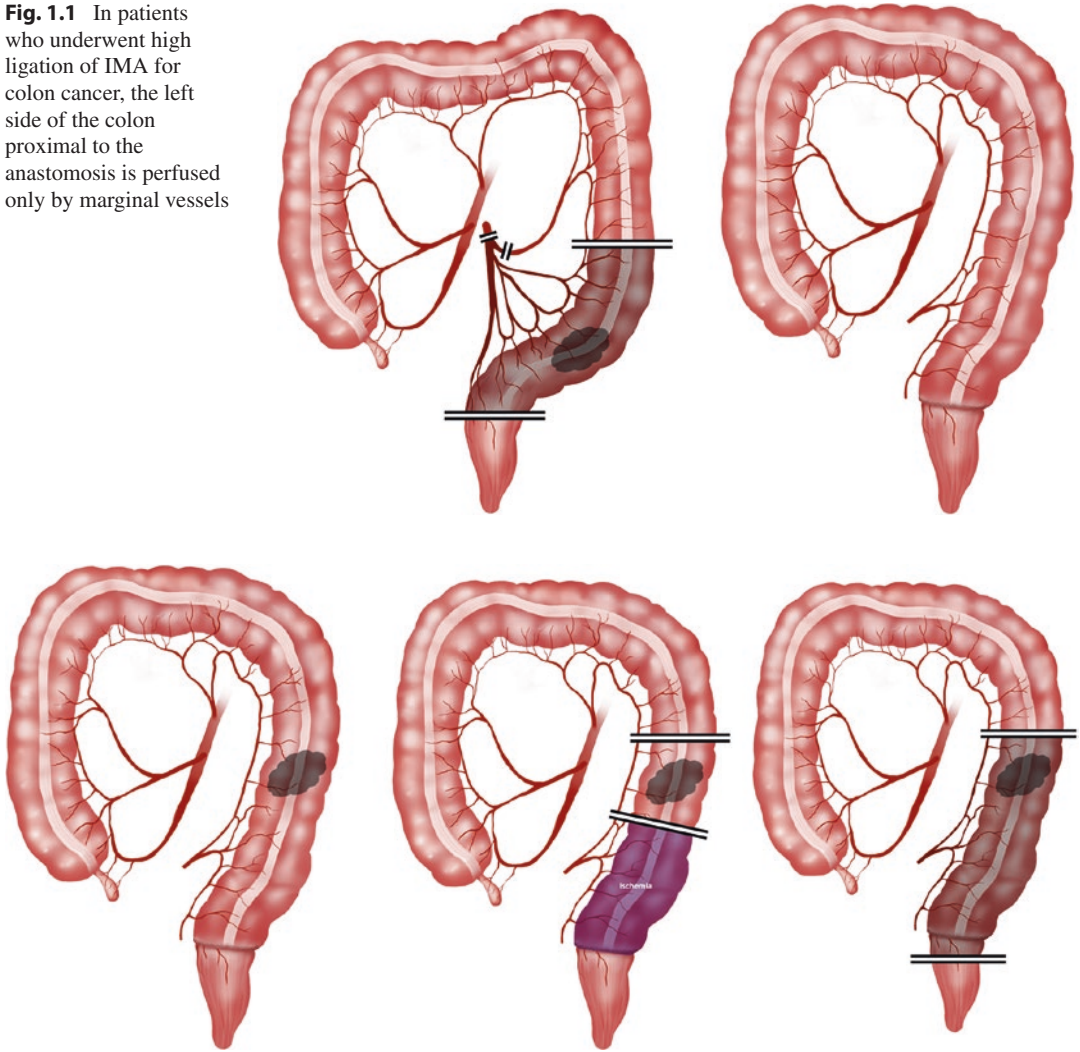
1. As surgeons, we occasionally encounter difficult operative situations.
  - (a) Avoidable situations often result from inadequate preparation. Try to gather as much of the relevant information as possible, and optimize the situation. Anticipate and plan ahead for potential operative difficulties.
  - (b) Unavoidable or unexpected situations can occur despite appropriate preparation. Chapter 2 will review strategies dealing with unanticipated intraoperative difficulties.
2. Review relevant medical records and operative reports. Try to obtain and review as much of the relevant medical and surgical information as possible.
  - (a) Which parts of the colon were resected? What mesenteric vessels were taken previously? In patients who underwent high ligation of the IMA for colon cancer, the left side of the colon proximal to the anastomosis is perfused only by the marginal vessels. In the event of a subsequent tumor in the left side of the colon, the blood flow to the colon requires that the resection includes the previous anastomosis and the margin should be distal to the previous anastomosis (Figs. 1.1 and 1.2).
  - (b) Was the splenic flexure mobilized previously?
  - (c) How much of the small intestine remain?
  - (d) Is the ileocecal valve still present?
  - (e) What was the extent of adhesions during the last surgery? Although a history of multiple previous surgeries is not a contraindication to performing laparoscopy, early proactive conversion should be made in appropriate situations.
  - (f) Review all relevant radiologic reports and images.
  - (g) Review pathology reports. Make note of the length of the specimen and number of lymph nodes retrieved.
3. Consider performing additional preoperative studies.
  - (a) For malignancies, obtain pathologic slides and have them reviewed at your home institution for a second opinion.

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S. W. Lee (✉)  
Department of Surgery – Colon and Rectal Surgery,  
Keck School of Medicine of University of Southern  
California, Los Angeles, CA, USA



**Fig. 1.1** In patients who underwent high ligation of IMA for colon cancer, the left side of the colon proximal to the anastomosis is perfused only by marginal vessels

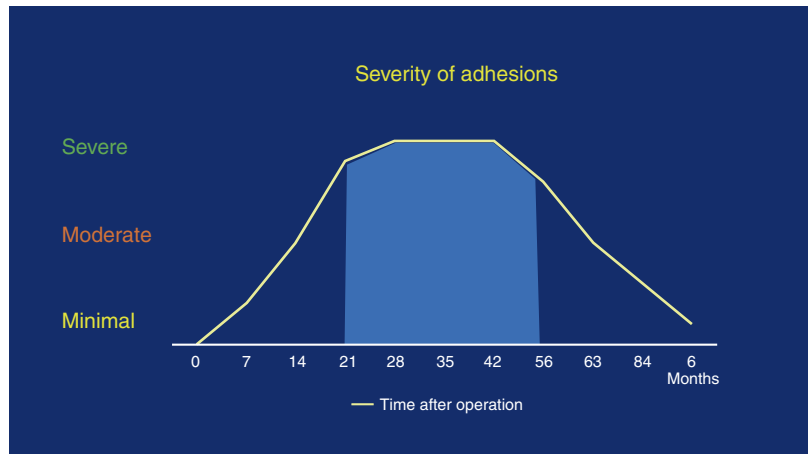


**Fig. 1.2** In case of recurrent tumor in the left side of the colon, the distal resection margin has to include the previous anastomosis and be distal to the previous anastomosis

- (b) Sigmoidoscopy should be performed for all patients who present with a presumed left-sided colonic lesion to rule out actually having rectal cancer. Rectal cancer needs to be properly staged for possible neoadjuvant therapy prior to operation.
- (c) Tattoo should be placed for localizing smaller lesions or pathologies not visible by radiologic studies.
- (d) CT of the abdomen or MR of the pelvis if recent radiologic studies are not available.
- (e) In cases of Hartmann reversal, routinely obtain a Hypaque, Gastrografin, or barium study performed through the rectum and, if needed, via the colostomy. Assessment of the rectal stump length and quality and the colon length proximal to the stoma will allow better planning for the reversal surgery. Flexible sigmoidoscopy can also be helpful in this situation.
- (f) Examination under anesthesia in the OR prior to definitive surgery can often provide additional findings.

4. When in doubt, prep the bowel and mark the patient for a stoma.
    - (a) Routine bowel preparation is somewhat controversial as related to preventing surgical site infections.
    - (b) Prepped bowel allows for intraoperative colonoscopic localization of the tumor and primary repair of the colon in case of injury.
    - (c) In high-risk situations, it is important to anticipate the need for diversion. Alerting the patient of this possibility should be a routine part of the preoperative process.
    - (d) Having the patient marked in multiple sites can be helpful in reoperative surgery.
  5. Anticipate the need for assistance from other specialties.
    - (a) For reoperative pelvic surgeries, placement of stents may be helpful in identifying the ureters.
    - (b) Urology, gynecology, or neurosurgery consultation prior to surgery may be indicated in certain situations.
  6. Optimize patient's condition in elective settings.
    - (a) Medical clearance.
    - (b) Optimization of nutrition.
    - (c) Reversal of anticoagulation, antiplatelet agents.
    - (d) Hold immunosuppressive medications, if possible.
    - (e) Appropriate timing for elective surgery needs to be individualized for patients with history of recent MI or stroke.
  7. Timing of reoperative surgery (Fig. 1.3).
    - (a) During the immediate perioperative period, the decision to reoperate should be made as quickly as possible so that it is done, ideally, within 7–10 days postoperatively.
    - (b) If the 7–10-day reoperative window is missed, it is preferable to defer the reoperation for at least 3–6 months, if possible. If the situation is urgent or emergent, re-exploration needs to be performed without delay.
  8. Consider alternative plans such as medical management and less risky and less extensive surgery, especially in high-risk patients.
- 
- ### Operative Assessment
1. What is the best surgical approach based on previous history?
  2. Can it be done laparoscopically? Although a history of multiple previous surgeries is not a contraindication to performing laparoscopy, early proactive conversion should be made in appropriate situations.
  3. Determine the extent of the pathology and come up with road map.
  4. Do what is best and safe for the patient.
- 
- ### Operative Checklist
1. Have additional equipment available in the operating room.
    - (a) Head lights or lighted pelvic retractors, if available.
    - (b) Flexible sigmoidoscopy can be helpful in localizing the pathology and assessing perfusion to the tissues.
    - (c) Additional imaging such as indocyanine green (ICG) perfusion system may be helpful in assessing tissue perfusion.
  2. Mark for possible stoma site.
  3. Additional specialty consultants available for possible OR help.
    - (a) Urology consult for preoperative ureteral stent placement.
  4. Exposure.
    - (a) Early proactive conversion to hand-assisted or laparotomy.
    - (b) Consider epidural catheter placement for extensive laparotomy cases.
  5. Positioning.
    - (a) Consider placing all difficult cases in lithotomy position or split leg position.
      - (i) Provides exposure to anus, rectum, and pelvis

**Fig. 1.3** If the 7–10-day reoperative window is missed, it is preferable to defer the reoperation for at least 3–6 months, if possible. If the situation is urgent or emergent, re-exploration needs to be performed without delay



- (ii) Allows endoscopic evaluation of the colon and the rectum
  - (iii) Allows transanal stapled anastomosis
  - (iv) Allows placement of ureteral stents
6. Schedule difficult cases early in the day, and limit the number of cases scheduled on the same day.
  7. Prior to committing to the operation, confirm the operative plan.
  8. Have checkpoints throughout the operation, and know when and how to back out safely.

## Operative Techniques

Intraoperative considerations and strategies will be discussed in Chap. 2.

## Technical Pearls (Tips and Tricks)

1. Anticipate and plan ahead for potential operative difficulties—plan for the unexpected.
2. Anticipate the need for assistance from other specialties.
3. Mark for a stoma.
4. Consider placing ureteral stents in reoperative pelvic surgery.
5. Have experienced help available.

## Special Postoperative Care

1. Possible telemetry and ICU care should be planned.
2. Appropriate postoperative care will be based on the operative findings and procedures performed.

## Suggested Reading

1. Bailey HR, Isaacson TC. The intraoperative consult. In: Steele SR, Maykel JA, Champagne BJ, Orangio GR, editors. Complexities in colorectal surgery. New York: Springer Publ; 2014. p. 463–76.



# Principles in Approaching Difficult Operative Situations

# 2

Deborah S. Keller and Scott R. Steele

## Clinical Scenario

You are called in by the urology team during a robotic prostatectomy for a “small tear” in the anterior rectal wall. On the monitor, you see the pelvis filled with dark venous blood. With suctioning, the rectum appears significantly injured and the bleeding continues. The senior urologist tells you to try to fix it robotically and that “this guy will not accept a bag.”

## Key Points

1. The initial assessment is critical. The surgeon must verify through their own examination what the real purpose of the consultation is and should determine the clinical status of the patient in order to decide on the best next steps in any given situation.
  - (a) Use a controlled, stepwise approach, just like starting with the ABCs in trauma. At the initial assessment, look at the whole

patient: airway, breathing, circulation, disability, and exposure. How is your exposure?

- (b) Take the time to assess the urgency of the situation prior to making your first move.
  - (c) Do not commit to an operation by performing an irreversible maneuver such as ligating a major vessel or performing a bowel resection without first assessing resectability and surveying the abdomen.
2. Ensure you have adequate exposure.
    - (a) In laparoscopic or robotic cases that require better visualization or exposure, take the time to insert additional trocars, as needed, or convert the minimally invasive surgical platform to an open procedure, if needed.
    - (b) In open cases, extend the existing operative incision as needed, insert an abdominal wall retractor, as deemed appropriate, and pack away the small bowel and other structures to obtain the ideal view of the region of interest.
    - (c) Ask for the retractors and equipment that you are comfortable using.
    - (d) Pay attention to positioning, using gravity to have the omentum, bowel, and viscera fall away from your field of intended view.
    - (e) Ensure that you feel comfortable with the exposure. If the requesting surgeon is robotic or laparoscopic and you feel the

D. S. Keller  
Department of Surgery, New York-Presbyterian,  
Columbia University Medical Center,  
New York, NY, USA

S. R. Steele (✉)  
Case Western Reserve University School of  
Medicine, Cleveland, OH, USA

Department of Colorectal Surgery, Cleveland Clinic,  
Cleveland, OH, USA

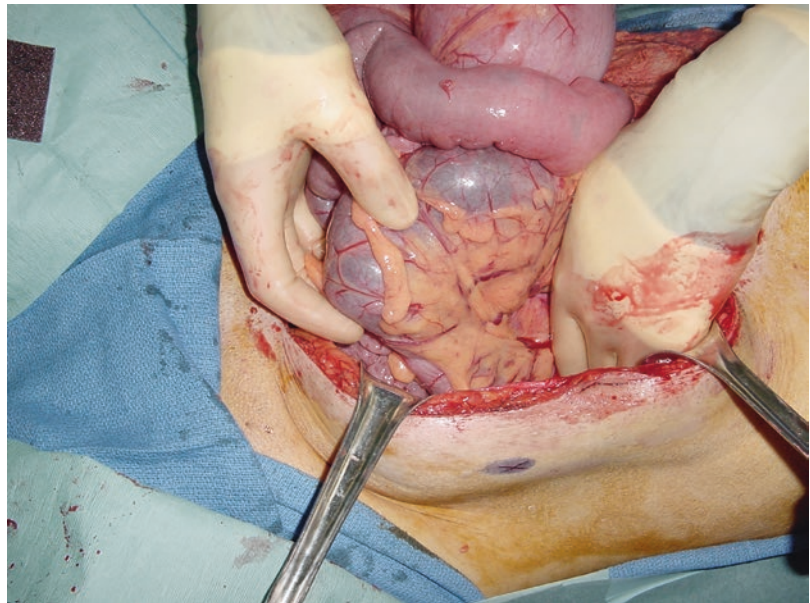
- need to open to do what needs to be done, *do it!*
3. Damage control procedures may be required to temporize the situation.
    - (a) Pack the abdomen to stop bleeding.
    - (b) Oversee enterotomies and staple off unsalvageable portion of the bowel to control feculent spillage and stop ongoing contamination.
    - (c) Decompress fluid-filled, edematous, or obstructed bowel to facilitate dissection via a controlled enterotomy or colotomy in a segment of bowel that will, ideally, be resected (Fig. 2.1).
    - (d) Transfer to the intensive care unit, and resuscitate the patient before definitive surgery is attempted.
    - (e) Communicate with the critical care team the plan to optimize and return to the operating suite for definitive surgery, so all team members are aligned.
  4. Use your experience and sound judgment to do what is best for the patient.
    - (a) Keeping in mind the enemy of good is better, know when to bail out of the elective operation and move the patient to damage control or a resuscitation phase.
    - (b) Ask for additional help, if available, for insight into management and technique. In certain situations even students or trainees can provide invaluable retraction.

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## Operative Assessment

- 1 What is the stability of the patient?
  - (a) In your initial assessment, talk to the consulting surgeon as well as the anesthesiologist about the patient's fitness for exploration and surgical procedures.
  - (b) Take notice of the vital signs and if blood products or vasopressor medications are hanging or were given.
  - (c) Determine if the operating room is still the best place for the patient or if damage control measures should be undertaken and the patient transferred to intensive care for resuscitation, warming, etc.
- 2 Determine the location and extent of the injury.
  - (a) Understanding the mechanism of the injury can help determine if this is a tissue or vascular injury and can guide management.

**Fig. 2.1** Dilated bowel

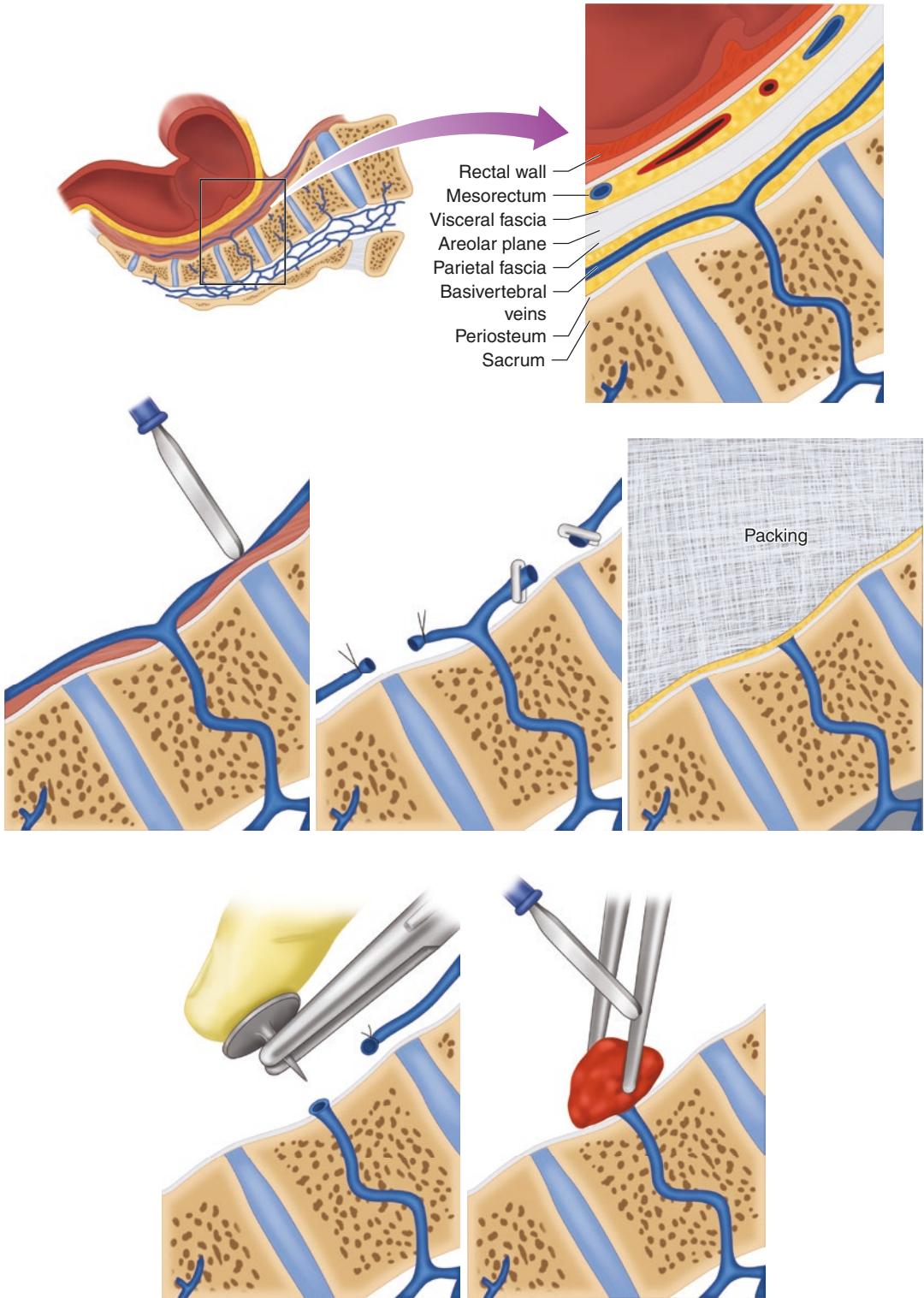


- (b) During a prostatectomy, the rectum is most commonly injured when developing the extraperitoneal plane between the prostate and rectum or when retracting the seminal vesicles anteriorly and incising Denonvilliers fascia to develop the plane between the prostate and the rectum for the anterior dissection.
- 3 Is the robotic approach the best approach?
- (a) Use the approach you are most comfortable with and can work most efficiently regardless of the current robotic setup.
- (b) If there is a need for better visualization, better retraction, direct pressure, or tactile sense, convert from a robotic approach to a laparoscopic, hand-assisted, or open approach, as needed.
- 4 Always do what's best for the patient.
- (a) While it may be reported that the patient does not want an ostomy, use your best surgical judgment, and perform the procedures necessary for the best patient outcome. A stoma can generally be reversed, but major complications may be permanent.
- (b) The risk of needing a diverting stoma may have been covered in the informed consent, but if it was not explicitly listed under the possible procedures, the consent often covers any procedure deemed necessary by the surgical team abating any medicolegal fears of performing a stoma. In this situation, it may be helpful to talk with the waiting family to update them and review your recommendation for fecal diversion at that time.
- (c) Document accordingly. Make sure to make note of who called you into the case, time in and out for your procedure, and discussions had with family members.
- (c) Pelvic retractors, such as a St. Marks or a Sweetheart (lighted retractors, if available), if making a lower midline or Pfannenstiel incision
- (d) Bookwalter retractor if making a midline laparotomy incision
- (e) Rigid proctoscope
- (f) Headlight
2. Exposure.
- (a) Consider making a low midline, full midline, or Pfannenstiel incision, as needed, to assess and manage the complication.
- (b) Put in additional ports, as needed, to help retract omentum, small bowel, or other organs (e.g., large uterus). Simply adding a 5 mm port can help tremendously.
3. Positioning.
- (a) Reverse Trendelenburg allows gravity to help move the small bowel out of the pelvis and can lower the hydrostatic pressure in the presacral veins.

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## Operative Techniques

1. Control the bleeding.
- Pack the pelvis with laparotomy pads. If needed, maintain the packs to let anesthesia catch up. In an unstable patient, this may be your first and last operative maneuver that day. In a stable patient, cycles of packing combined with irrigation and suctioning the irrigant will help clear the blood and clots from the field, localize the site of the injury, and highlight ongoing bleeding. With these initial maneuvers, you can determine if the bleeding is coming from the rectum itself or torn presacral veins (Fig. 2.2).
2. Assess the damage to the rectum.
- If the area and extent of the rectal injury are not immediately apparent after packing and controlling the bleeding in the pelvis, perform a rigid proctoscopy for an intraluminal view. The insufflation can help delineate the injury.
3. Repair the rectum or divert.
- For injuries to less than 50% of the rectal wall circumference, consider a primary repair.
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- ## Operative Checklist
1. Additional helpful equipment.
- (a) Long pelvic instrument tray
- (b) Long continuous sutures



**Fig. 2.2** Pelvic bleeding

Sharply freshen the edges of the injury, and place sutures in the edges to direct a transverse closure. This can be performed in one or two layers. For more extensive injuries, first determine if the patient's hemodynamic state and degree of bleeding/contamination are conducive to an anastomosis. If so, staple off the proximal and distal ends of the rectum, releasing the attachments up to the splenic flexure as needed for adequate length for a tension free anastomosis. The anastomosis can be fashioned using the anvil in the proximal limb and pairing it to an intraluminal stapler introduced into the rectum, in standard fashion. Consider proximal diversion if creating an anastomosis. If it is not the ideal situation to perform a repair or anastomosis, staple off the rectum distal to the injury, and divert the proximal limb as an end colostomy. Plan to return to the OR and restore continuity under better conditions.

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### Technical Pearls (Tips and Tricks)

1. If the patient is hemodynamically stable and it is appropriate in your surgical judgment to maintain a minimally invasive approach, it may aid your initial assessment—the pneumoperitoneum may help tamponade bleeding, and the camera may afford better visualization than what would be possible through an open approach.
2. In cases where there has been significant bleeding and gross contamination, defer more

complex techniques such as resection and primary anastomosis for a second procedure in a more controlled setting to reduce the risk of further complications.

3. In certain situations, consider performing a repair or anastomosis with a proximal diverting loop ileostomy. This will make the subsequent stoma reversal procedure easier.
4. Don't forget about a scope when needed to air leak test, assess viability of the bowel, or search for other pathology. A colonoscope can provide additional information than just what the initial situation was assumed to be.

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### Special Postoperative Care

1. If there is significant contamination, 24 hours of IV antibiotics should be considered.
2. While it is not our preference to leave drains in the pelvis routinely, if the rectum is repaired below the mid-rectum level or there is any concern for a urinary leak, leave a closed suction drain in the dependent portion behind the rectum.

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### Suggested Reading

1. Bailey HR, Isaacson TC. The intraoperative consult. In: Steele SR, Maykel JA, Champagne BJ, Orangio GR, editors. Complexities in colorectal surgery. New York: Springer Publ; 2014. p. 463–76.



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## Part II

# How to Deal with Commonly Encountered Intra-operative Findings/Complications



# Extensive Intra-abdominal Adhesions

# 3

Jason Lei and David E. Rivadeneira

## Clinical Scenario

A 48-year-old female with a history of ulcerative colitis and several extensive open operations, which include a three-stage restorative proctocolectomy, is scheduled for a hysterectomy for a bleeding myomatous uterus. The gynecologist would like for you to be there because of possible adhesions.

## Key Points

1. The formation of adhesions is multifactorial.
  - (a) The extent and frequency of prior surgical procedures is of paramount importance. Review of previous operative reports is important as they may indicate the level of difficulty you should expect. Mention

of the extent of adhesions and difficulty of the procedure is important.

- (b) Make note of prior resections and anastomoses, prior ostomies, and repair of enterotomies as these may be areas of increased adhesion formation.
  - (c) Prior history of pelvic radiation may indicate significant adhesions of the small bowel in the pelvis, and the option of intestinal bypass may be more prudent than extensive dissection or resection.
  - (d) Patients with keloid scars on the abdomen will often present with significant intra-abdominal adhesions.
2. Careful, cautious, and meticulous dissection.
    - (a) Sharp dissection with either Metzenbaum scissors or scalpel should be the preferred method of adhesiolysis. It is important to avoid the use of energy such as monopolar electrocauterization or ultrasonic or bipolar devices as they can cause thermal injury that may not be immediately apparent but can lead to devastating delayed perforations.
    - (b) When dealing with dense, thick adhesions, it is better to leave a piece of peritoneum, muscle, or fascia on the bowel rather than attempt dissection and risk perforation (Fig. 3.1).
    - (c) Hydrodissection can facilitate the visualization of anatomical planes. The convenient and easy method of infiltrating the

J. Lei  
Virtua Medical Center, Department of Colon and Rectal Surgery, Voorhees, NJ, USA

D. E. Rivadeneira (✉)  
Surgical Strategic Initiatives, Northwell Health, New Hyde Park, NY, USA

Surgical Services and Colorectal Surgery, Huntington Hospital, Huntington, NY, USA

Hofstra University-Northwell School of Medicine, Hempstead, NY, USA  
e-mail: [DRivadeneira@northwell.edu](mailto:DRivadeneira@northwell.edu)