

# Colonoscopy: basic principles and novel techniques

Yark Hazewinkel and Evelien Dekker

**Abstract** | Colonoscopy is considered the ‘gold standard’ for detection and removal of premalignant lesions in the colon. However, studies suggest that colonoscopy is less protective for right-sided than for left-sided colorectal cancer. Optimizing the effectiveness of colonoscopy is a continuous process, and during the past decade several important quality indicators have been defined that can be used to measure the performance of colonoscopy and to identify areas for quality improvement. The quality of bowel preparation can be enhanced by split-dose regimens, which are superior to single-dose regimens. Cecal intubation rates should approximate 95% and can be optimized by good technique. In selected patients, specific devices can be used to facilitate cecal intubation. Adenoma detection rates should be monitored and exceed a minimum of 25% in men and 15% in women. To this aim, optimal withdrawal technique and adequate time for inspection are of utmost importance. Of all advanced imaging techniques, chromoendoscopy is the only technique with proven benefit for adenoma detection. Finally, the technique of polypectomy affects the number of complications as well as the success of completely removing a lesion. In this Review, we provide an overview of both standard and novel colonoscopy techniques and their impact on quality indicators.

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## Introduction

Colonoscopy is an endoscopic procedure pioneered in Japan in the late 1950s that allows visualization of the entire mucosa of the large intestine and distal terminal ileum. Furthermore, it enables tissue sampling for histopathology as well as an opportunity for therapeutic procedures such as polypectomy or dilatation of a stenosis. Among other indications, colonoscopy is considered as the ‘gold standard’ for early detection and removal of colorectal cancer (CRC) and its precursors. However, colonoscopy is not perfect. Accumulating evidence suggests that colonoscopy is not fully protective for right-sided colon cancer. To enhance the diagnostic and therapeutic yield of colonoscopy, definition and measurement of quality parameters are essential to identify areas for improvement. In this Review, we discuss the basic principles and new techniques of colonoscopy and its relation to various important quality parameters.

## General aspects

### Informed consent

Colonoscopy is an invasive procedure with a potential risk of complications, such as perforation or bleeding (Box 1).<sup>1–7</sup> Every patient should receive verbal and written information about the procedure, the risk of complications and possible alternatives. That the patient understands the

importance of a successful bowel preparation is essential. Patient understanding enhances compliance and improves the quality of bowel preparation, as highlighted by a 2011 study that demonstrated that provision of a simple educational booklet aimed at addressing patients’ knowledge of, attitude and belief barriers to bowel preparation markedly improved the quality of the preparation.<sup>8</sup>

### Bowel preparation

Inspection of the colon requires a clean colon without any residual stool or liquid that could mask a suspicious area. Inadequate bowel preparation is associated with reduced adenoma detection rates, incomplete colonoscopy and increased costs.<sup>9–11</sup> The quality of preparation should be assessed during endoscopy and documented in the procedure report. The UK National Health Service (NHS) Bowel Cancer Screening Program (BCSP) Endoscopy Quality Assurance group recommends using the descriptors ‘excellent’ (no or minimal solid stool and only clear fluid requiring suction), ‘adequate’ (collections of semi-solid debris that are cleared with washing or suction) and ‘inadequate’ (solid or semi-solid debris that cannot be cleared effectively) to pragmatically report bowel preparation quality (Table 1).<sup>12</sup> In daily practice, however, these descriptors are also frequently used without standardized definitions. To assess the preparation quality in a validated and standardized format, several bowel preparation scales (such as the Ottawa, Boston and Aronchick scales) are available.<sup>13–15</sup> Although these scales have been shown to be a reliable tool for assessing the

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### Competing interests

E. Dekker declares an association with the following companies: Olympus, Pentan. See the article online for full details of the relationships. Y. Hazewinkel declares no competing interests.

# Colonoscopy Principles And Techniques

**Jamie S. Barkin, Cesar A. O'Phelan**



## **Colonoscopy Principles And Techniques:**

**Colonoscopy** Jeffrey B. Raskin, H. Juergen Nord, 1995      Advanced Colonoscopy Toyooki Sonoda, 2014-09-20 This book provides surgeons and gastroenterologists with state of the art techniques in terms of advanced colonoscopy Chapters introduce methods of removing polyps that were not previously amenable to colonoscopic snare polypectomy Advanced techniques such as closure of perforations and intestinal stenting are extensively covered The text maintains a strong emphasis on surgical endoscopic technique Extensive discussion on equipment and skill acquisition is also covered As many readers will never have seen these complex procedures before extensive photographs and video clips are provided The authors provide tips tricks and pitfalls that will help the reader incorporate these new techniques into their practice Advanced Colonoscopy Polypectomy and Beyond will be of great value to any surgeon or gastroenterologist currently performing colonoscopy and interested in advanced techniques      Colonoscopy Jerome D. Wayne, Douglas K. Rex, Christopher B. Williams, 2011-09-23 First Edition Winner of 2004 BMA Medical Book Competition in Gastroenterology The second edition of this prize winning book is written by some of the world's foremost experts in the field of colonoscopy and colonic imaging Every chapter has been updated and 5 new chapters have been added to include the latest information and advances in the field of colonoscopy Capsule Colonoscopy Narrow Band Imaging Confocal Endomicroscopy Endoscopic Submucosal Dissection in the Colon New Colonoscopes and Assist Devices Drawing on the vast experience of the authors it covers every area of medicine that impacts on colonoscopy including virtual colonography pathology techniques for pediatric and adult procedures and legal aspects concerning colonoscopy The book is focused on patient care and provides explanations on how to perform the procedure effectively and make the best outcome for your patients It serves as a detailed manual of procedures extensively illustrated with diagrams and photographs The book includes a companion website with supplementary material a lecture on the history of colonoscopy interviews with famous gastroenterologists demonstrations of techniques and typical and unusual cases This is an invaluable compendium on all aspects of colonoscopy suitable for use by every grade of practitioner world wide and an essential reference book for all establishments with an endoscopy facility Please note This product no longer comes with a DVD The DVD content is now available online at [wiley.mpstechnologies.com](http://wiley.mpstechnologies.com)      Pfenninger and Fowler's Procedures for Primary Care E-Book Grant C. Fowler, 2019-03-24 Selected for Doody's Core Titles 2024 with Essential Purchase designation in Family Medicine Primary care clinicians are performing more varied procedures than ever before and physicians residents and students need a comprehensive authoritative resource that provides trusted information in an easy to follow format Through three outstanding editions Pfenninger and Fowler's Procedures for Primary Care has been the go to reference for step by step strategies for nearly every medical procedure that can be performed in an office hospital or emergency care facility by primary care providers This 4th Edition continues that tradition with new section editors updated illustrations new chapters

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care physicians to more effectively treat their patients

*Practical Colonoscopy* Jerome D. Wayne, James Aisenberg, Peter H. Rubin, 2013-04-02 Practical Colonoscopy Jerome D Wayne MD Director of Endoscopic Education Clinical Professor of Medicine Mount Sinai Medical Center New York NY USA James Aisenberg MD Clinical Professor of Medicine Mount Sinai Medical Center New York NY USA Peter H Rubin MD Associate Clinical Professor of Medicine Mount Sinai Medical Center New York NY USA Are you looking for a rapid reference step by step guide to teach you all that you need to know in order to perform high quality colonoscopy Then Practical Colonoscopy is the perfect resource for you Drawing upon their collective century of experience performing and teaching colonoscopy Drs Wayne Aisenberg and Rubin share the pearls and principles that they find most useful in every day practice The team is led by Dr Jerry Wayne one of the world s leading practitioners and teachers of endoscopy Up to date practical clinically focused succinct and packed full of outstanding illustrations and videos this multi media tool guides you through the core aspects of best colonoscopy practice Key features include Lucid step by step explanations of the techniques and principles that will help you to achieve outstanding results A companion website that contains 39 videos illustrating important techniques findings and problems Text boxes that highlight and organize the pearls and pitfalls of colonoscopy practice Line diagrams that illustrate important strategies and maneuvers High resolution still photographs that depict important findings and techniques GI trainees will find this the perfect introductory guide to colonoscopy and more experienced specialists will value it as a refresher tool that is replete with hundreds of new pearls provided by world experts Practical Colonoscopy is a must have tool for today s colonoscopist

**Early Diagnosis and Treatment of Cancer Series: Colorectal Cancer E-Book** Susan Gearhart, Nita Ahuja, 2010-07-15 Each volume in the Early Detection and Treatment of Cancer Series is packed with practical authoritative information designed to cover the full range of diagnostic procedures including pathologic radiologic bronchoscopic and surgical aspects You ll be able to determine the safest shortest least invasive way to reach an accurate diagnosis stage the disease and choose the best initial treatment for early stages Based on current evidence in the literature authors provide clinical hands on tools to help you make informed decisions on precisely what tests and imaging studies are needed to diagnose and stage each type of cancer Practical authoritative and highly illustrated this volume in the brand new Early Detection and Treatment of Cancer series covers current protocols and the latest advances in diagnostic imaging and molecular and serologic markers for colon cancer Apply expert advice on the best next step plan for different presentations and tips for less invasive protocols Get clinical hands on tools to help you make informed decisions on precisely what tests and imaging studies are needed for accurate diagnosis and staging Clear figures tables and boxes illustrate step by step care of the full range of problems encountered The small size and convenient format make this an ideal purchase for diagnostic reference Outlines the steps after diagnosis to guide you through formulating a treatment or patient care plan Emphasizes important points such as risk adjusted screening for staging and the use of promising new gene therapies with key points boxes at the beginning of each chapter and pedagogic

features throughout Summarizes the process of accurately diagnosing and staging cancer in a logical almost algorithmic approach for easy reference Complements the procedures outlined in the text with full color photographs and line drawings to reinforce your understanding of the material

**Grainger & Allison's Diagnostic Radiology** Ronald G. Grainger, David J. Allison, 1997

**Gordon and Nivatvongs' Principles and Practice of Surgery for the Colon, Rectum, and Anus** David E. Beck, Steven D. Wexner, Janice F. Rafferty, 2018-12-12

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**CPT/HCPCS Coding and Reimbursement for Physician Services, 2007 Edition** Lynn Kuehn, 2006-12 Catalogue of Films and Videos in the British Medical Association Library British Medical Association. Library, 1993 Principles of Surgery Seymour I. Schwartz, 1999 This is a revised and updated guide to the principles of surgery highlighting advances and techniques in transplantation surgical oncology and trauma It also examines minimally invasive techniques and the principles underlying pathophysiology and surgical intervention **III Congreso Internacional de Endoscopia Gastrointestinal**, 1974 *Advanced Therapeutic Endoscopy* Jamie S. Barkin, Cesar A. O'Phelan, 1990 Doody's Rating Service Daniel J. Doody, 1996

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web apr 14 2014 1140 unit 6 modern and contemporary literature duchess jeweller oliver bacon lived at the top of a house overlooking the green park 1 he had a flat 2 chairs jutted out at the right angles chairs covered in hide sofas filled the bays3 of the windows sofas covered in tapestry the windows the three long windows had the proper allowance of

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web the story the duchess and the jeweler reflects the english society of writer s time it was an age of change the high ups were coming down because of their moral decadence and the commoners were coming up once oliver bacon was very poor and lived in a filthy little alley he worked very hard and used

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