



Original Article

Not only hysterectomy but also cesarean section can predict incomplete flexible sigmoidoscopy among patients with prior abdominal or pelvic surgery

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Abstract

Background: Flexible sigmoidoscopy (FS) is a safe and effective method for colorectal cancer (CRC) screening. Several studies have demonstrated that individuals who have undergone surgery are at a greater risk of having incomplete FS. This study explored predictors of incomplete FS and reduced polyp detection rates for participants who had undergone abdominal or pelvic surgery.

Methods: From January 2009 to December 2009, individuals participating in health examinations and who had undergone abdominal or pelvic surgery were invited to participate in this investigation. Four experienced gastroenterologists performed examinations using a 60-cm Olympus video sigmoidoscope. Factors associated with incomplete FS insertions and reduced polyp detection rates were analyzed using logistic regression models.

Results: Overall, 106 eligible individuals were analyzed, and 45 (42%) incomplete FS insertions were reviewed. Fifty participants (47%) had undergone pelvic surgery, and the other 56 (53%) had undergone abdominal surgery. Pelvic surgeries were cesarean section (25%) and hysterectomy (15%); appendectomy (36%) was the most common abdominal surgery. The main pathological FS findings were hemorrhoids (54%) and adenomatous polyps (18%). Multivariate analysis indicated that only prior pelvic surgery [odds ratio (OR), 3.54; $p = 0.01$] was an independent risk factor for incomplete FS insertion. Incomplete examinations were inversely related to adenomatous polyp detection rates (OR, 0.23; $p = 0.03$).

Conclusion: Prior pelvic surgery, particularly cesarean section and hysterectomy, is an independent factor for incomplete FS insertion in a selected adult population. In addition, incomplete FS can increase the risk of missing polyps, particularly in individuals who underwent pelvic surgery.

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1. Introduction

Colorectal cancer (CRC) is the second leading malignancy in industrialized countries and causes >500,000 deaths/year worldwide.¹ The fecal occult blood test, flexible sigmoidoscopy (FS), and colonoscopy are recommended options for CRC screening in national guidelines from most Western countries.^{2,3} Additionally, CRC incidence is rapidly increasing

Conflicts of interest: The authors declare that there are no conflicts of interest related to the subject matter or materials discussed in this article.

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in Asia. The Asia Pacific Working Group on Colorectal Cancer recommends performing FS every 5 years as an option for CRC screening.⁴

Screening by FS, a safe and effective method, is associated with a decreased incidence of CRC and mortality-related CRC.^{5–7} In clinical practice, the utility of FS is dependent on adequate visualization of the colorectal mucosa and complete FS insertion such that polyps can be eradicated prior to when they transform into invasive neoplasms. Incomplete insertion, unfortunately, is a major shortcoming associated with FS. A community-based investigation by Olynyk et al⁸ suggested that the normal risk for CRC was 30%, and asymptomatic individuals aged 55–59 years had an insertion depth of <50 cm. Painter et al,⁹ who conducted a case-controlled study, reported that intubation of the descending colon was not achieved in up to 25% of participants with an average risk for CRC. Several predictors for incomplete FS insertion have been developed for select groups. The most well-known populations are currently individuals aged >65 years, females, those with low body mass index (BMI), inadequate bowel preparation, and prior surgery, in particular hysterectomy.^{10–15} Nevertheless, to date, no comparable data exist for completion rates of FS in a cohort between abdominal versus pelvic surgery. Within the health examination setting in a tertiary medical center, investigators conducted an observational trial for CRC screening by FS to identify predictors of incomplete FS insertion among individuals who had previously received surgery. The secondary objective was to determine whether incomplete FS examination resulted in a reduced polyp detection rate.

2. Methods

2.1. Patients

From January 2009 to December 2009, adults who participated in a health examination at Kaohsiung Veterans General Hospital, Kaohsiung, Taiwan, were enrolled after providing full consent. This study also enrolled patients aged 20–80 years who had undergone abdominal (extrapelvic) or pelvic surgery. Exclusion criteria were combined etiology (abdominal plus pelvic surgery), presence of inflammatory bowel disease, and prior colorectal neoplasm or malignant polyp. This study was approved by the Institutional Review Board at Kaohsiung Veterans General Hospital (Number VGHKS99-CT4-06).

2.2. Methods

Participants were prepared and dined lightly for 2 days prior to the sigmoidoscopy, and on the day of the health examination. After lunch, nursing staff performed bowel preparation using a disposable enema irrigator (Laitest 125 mL/bottle, Taiwan Stanch Co., Ltd., Taipei, Taiwan) containing 50% glycerol and 50% distilled water for each participant 60 minutes prior to the procedure.¹⁶ No analgesic or sedative agents were administered other than topical lubricant

containing 2% xylocaine. Digital rectal examinations were conducted prior to sigmoidoscopy. A repeat colon cleansing was performed when a retained stool was identified in the rectum when participants agreed. All scopic procedures were conducted between 2:00 PM and 5:00 PM using standard 60-cm Olympus video sigmoidoscopes (Olympus PCF-240; Olympus Optical Co., Ltd., Tokyo, Japan) by four experienced gastroenterologists, who perform at least 180 sigmoidoscopies annually. At sigmoidoscopy, the examiner recorded the anatomical site of the sigmoidoscope tip as the rectum, sigmoid colon, descending colon, or splenic flexure. Maximum scope insertion depth and pathologies were also recorded. Insertion <60 cm above the anal verge was defined as an incomplete FS insertion. At the same time, reasons for incomplete sigmoidoscopy (e.g., patient intolerance, abdominal bowel angulation, and inadequate colon cleansing) were carefully determined. An adequate colon cleansing was defined as facilitating visualization of 90% of the bowel lumen up to the FS insertion depth.¹² Poor preparation (<90% colon mucosa observed) was categorized as “mild degree” (allowed the scope to pass through) or “severe degree” (forbade the scope to pass through).

2.3. Questionnaires

During the health checkup, a complete patient history was obtained and physical examinations were performed. The BMI, a measurement tool comparing height to weight, indicated whether participants were overweight [BMI (kg/m²) = (weight in kilograms)/(height in meters)].² Smoking was defined as inhalation of smoke from burning tobacco daily. Habitual consumption of alcohol and caffeine were defined as individuals imbibing alcohol or caffeine \geq twice/week in the preceding 6 months. Habitual exercise was defined as participants who, on average, had an exercise routine for \geq 30 minutes per session \geq twice/week for \geq 1 year. Constipation was defined as <three bowel movements/week and hard and dry stools. Diarrhea was defined as having >three bowel movements or passing >200 g of watery stool daily. A vegetarian was defined as an individual who did not eat meat, fish, or seafood; however, in this definition, vegetarians could eat eggs, egg products, milk, and milk products.

2.4. Statistical analysis

Baseline data are expressed as mean \pm standard deviation (SD) or *n* (%). Quantitative variables were compared using the independent *t* test, and qualitative variables were compared using the Chi-square test and Fisher's exact test when appropriate. A logistic regression model was employed to measure predictors for incomplete FS insertion and reduced polyp detection rates (among individuals with at least one polyp) by univariate and/or multivariate analysis. All hypothesis tests were performed against a two-sided alternative where appropriate. A value of *p* < 0.05 was considered statistically significant. Analyses used SPSS version 12.0 for Windows (SPSS, Inc., Chicago, IL, USA).

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