ORIGINAL ARTICLE

# Colorectal Cancer Screening in Patients with a Positive Fecal Occult Blood Test: Colonoscopy Results

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**ABSTRACT**

**Introduction:** Colorectal cancer (CRC) screening by fecal occult blood test (FOBT) followed by colonoscopy has been shown to be a cost-effective strategy to reduce both mortality and long-term incidence of this type of tumor. Our goals have been to determine the effectiveness of colonoscopy as a method of screening for CRC in patients with a positive FOBT in terms of adenoma detection rate (ADR) in our health area as well as to evaluate the safety of colonoscopies, based on the observed complications derived from the endoscopic procedure itself or from the sedation used. **Materials and Methods:** This was a observational, retrospective, and descriptive study of the colonoscopy findings in patients who have positive FOBT for CRC screening. **Results:** A total of 281 patients were collected, of whom 150 were men. The data corresponding to the clinical, endoscopic, and histological variables are exposed. Regarding the endoscopic findings, 7 (2.5%) of the examinations were normal; in 203 (35.4%), polyps were observed; in 3 (1.1%), neoformations were found; and in the remaining 68 (24.4%), there were other non-neoplastic findings (angiodysplasias, diverticula, and hemorrhoids). **Conclusions:** Colonoscopy screening for CRC is an effective technique in terms of detecting early stage adenomas and carcinomas, with an ADR higher than the 40% required. In addition, it is a safe procedure, in terms of complications arising from the test and endoscopic sedation.

**Key words:** Adenoma detection rate, colonoscopy, fecal occult blood test

## INTRODUCTION

Colorectal cancer (CRC) screening by fecal occult blood test (FOBT) followed by colonoscopy has been shown to be a cost-effective strategy to reduce both mortality and long-term incidence of this type of tumor.[1,2] The adenoma detection rate (ADR), defined as the proportion of colonoscopies in patients over 50 years in whom at least one adenoma is found, is currently the main quality measure for colonoscopy performance[3] and it is also inversely related to CRC post-colonoscopy risk.[4,5] For screening colonoscopies to be considered good quality, ADR must be >20%, if colonoscopy is the primary screening strategy; or higher than 40%, if it is performed after a positive result of the FOBT.[6]

### Objectives

The objectives of this study were as follows:

- To determine the effectiveness of colonoscopy as a method of screening for CRC in patients with a positive FOBT in terms of ADR in our health area.
- To evaluate the safety of colonoscopies, based on the observed complications derived from the endoscopic procedure itself or from the sedation used.

## MATERIALS AND METHODS

### Study design

This was a observational, retrospective study of the population of patients with a positive result for the FOBT within the CCR screening program, who undergo subsequent colonoscopy, during the first 6 months at the start of this program in the

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**Table 1:** Demographic and clinical variables

| Variable | Result |
|---|---|
| Number of patients (*n*) | 281 |
| Age (years) | 66.52±1.8 |
| Sex | |
| Men | 150 (53.4) |
| Women | 131 (46.6) |
| Family history of CRC | |
| No history | 234 (83.3) |
| Family history of CRC | 47 (16.7) |
| Antiplatelet | |
| Before | |
| None | 218 (77.6) |
| Antiplatelet | 62 (22.1) |
| Antiplatelet | 1 (0.4) |
| During | |
| None | 239 (85.1) |
| Same antiplatelet | 39 (13.9) |
| Change to AAS | 3 (1.1) |
| Anticoagulants | |
| Before | |
| No | 263 (93.6) |
| Yes | 18 (6.4) |
| During | |
| No | 281 (100) |
| Yes | 0 (0) |
| Anesthetic risk | |
| ASA I | 37 (13.2) |
| ASA II | 210 (74.7) |
| ASA III | 32 (11.4) |
| Not specified | 2 (0.7) |
| Weight (kg) | 78.1±13.7 |

VII health area of the Region of Murcia (Southeastern Spain) at the Reina Sofia General University Hospital (RSGUH).

First, we describe the endoscopic findings and other variables related to the quality and safety of the procedures. Second, we assess the possible relation of certain variables with the detection of endoscopic lesions and also the appearance of complications derived from the endoscopic procedure or the sedation.

### Inclusion criteria

The following criteria were included in the study:

- Patients who belong to VII health area of the Region of Murcia.
- Patients who aged between of 63 and 69 years old.

**Table 2:** Endoscopic and histological variables

| Variable | Result (%) |
|---|---|
| Endoscopic findings | |
| Normal | 7 (2.5) |
| Polyps | 203 (72.2) |
| Neoformation | 3 (1.1) |
| Other | 68 (24.2) |
| Number of polyps | |
| Total | 309 |
| Per patient | 3.36±3.3 |
| Number of adenomas | |
| Total | 204 |
| Per patient | 2.14±2.3 |
| Polyp size (cm) | |
| <0.5 | 158 (51.1) |
| 0.5–1 | 76 (24.6) |
| 1–2 | 56 (18.1) |
| >2 | 19 (6.1) |
| Adenoma histology | |
| Low-grade dysplasia | 168 (82.3) |
| High-grade dysplasia/*in situ* carcinoma | 29 (14.2) |
| Infiltrant | 7 (3.4) |
| Type of preparation | |
| MoviPrep® | 125 (48.4) |
| CitraFleet® | 133 (51.6) |
| Quality of preparation (Boston scale) | |
| Boston <6 | 45 (16) |
| Boston ≥6 | 219 (78) |
| Not specified | 17 (6) |
| Complete colonoscopy | |
| Yes | 259 (92.2) |
| No | 5 (1.8) |
| Not specified | 17 (6) |
| Time (min) | |
| Total procedure time | 24±12.3 |
| Withdrawal time | 14.4±9.5 |
| Sedation | |
| Midazolam+fentanyl | 4 (1.4) |
| Propofol | 277 (98.6) |
| Propofol dose (mg) | |
| Total dose | 234.6±106.2 |
| Dose per kg | 3±1.3 |
| Complications of sedation | |
| No complications | 256 (91.1) |

*(Contd...)*

**Table 2:** *(Continued)*

| Variable | Result (%) |
|---|---|
| Desaturation | 4 (1.4) |
| Bradycardia | 3 (1.1) |
| Hypotension | 15 (5.3) |
| Bradycardia+Hypotension | 3 (1.1) |
| Complications of the procedure | |
| No complications | 272 (96.8) |
| Early bleeding | 7 (2.5) |
| Late bleeding | 2 (0.7) |
| Perforation | 0 (0) |

**Table 3:** Withdrawal time - adenomas detected

| Adenomas | Withdrawal time (min) | |
|---|---|---|
| | Median | IQ Range |
| 1 | 10.5 | 7.75–16.5 |
| 2 | 12.5 | 9.00–22.75 |
| 3 | 20.0 | 12.5–20.5 |
| 4 or more | 20.0 | 10–34.0 |

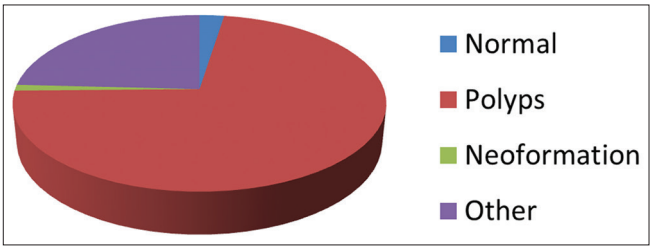



**Figure 1:** Endoscopic findings

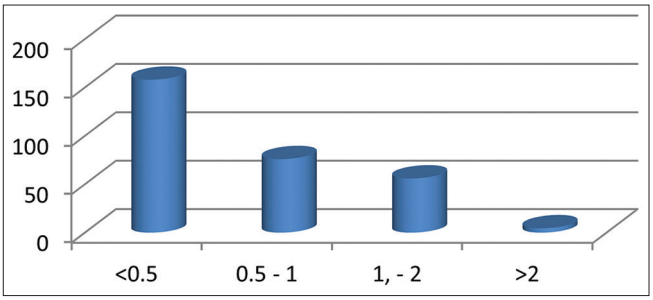



**Figure 2:** Polyp size (cm)

- Patients who accept participation in the CRC screening program.
- Patients who obtain a positive result in the FOBT.

### Exclusion criteria

The following criteria were excluded from the study:

- Positive FOBT requested for a reason other than CRC screening.
- Contraindication to a colonoscopy.
- Colonoscopy performed in a hospital other than RSGUH.
- Patients with personal history of CRC or colonic adenomas.
- Endoscopic follow-up for another colonic pathology diagnosed before the CRC screening program.

### Study variables

- Demographics: Age, sex, weight (kg), and family history of CRC.
- Clinics: Treatment with antiplatelets or anticoagulants and anesthetic risk according to the ASA scale (I to IV).
- Endoscopic: Endoscopic findings, type of preparation, quality of preparation (Boston scale), time of examination, number of complete colonoscopies, Propofol dose (mg) used in sedation, complications of the procedure, and complications of sedation.
- Histological: Number of polyps, number of adenomas, histology of adenomas (degree of dysplasia).

Variables derived from those listed above:

- ADR (number of colonoscopies in which at least one adenoma is detected/total number of colonoscopies carried out)
- Rate of adenomas per polyp (total number of adenomas/total number of polyps)
- Rate of advanced adenomas (total number of adenomas with high-grade dysplasia or carcinoma *in situ*/total number of adenomas).

### Data analysis

The Excel® 2010 program and the SPSS® v22 package were used to manage the data and statistical analysis.

### Study limitations

- In some of the patients, it has not been possible to collect all the variables listed above from the clinical and endoscopic reports.
- The endoscopic procedures and reports have been carried out by different doctors, which add interpersonal variability and subjectivity.
- It is a small study, insufficient to demonstrate statistically significant associations.

## RESULTS

A total of 281 patients were collected, of whom 150 were men. The data corresponding to the clinical, endoscopic, and histological variables are shown in Tables 1 and 2.

Regarding the endoscopic findings, 7 (2.5%) of the examinations were normal; in 203 (35.4%), polyps were observed; in 3 (1.1%), neoformations were found; and in the remaining 68 (24.4%), there were other non-neoplastic

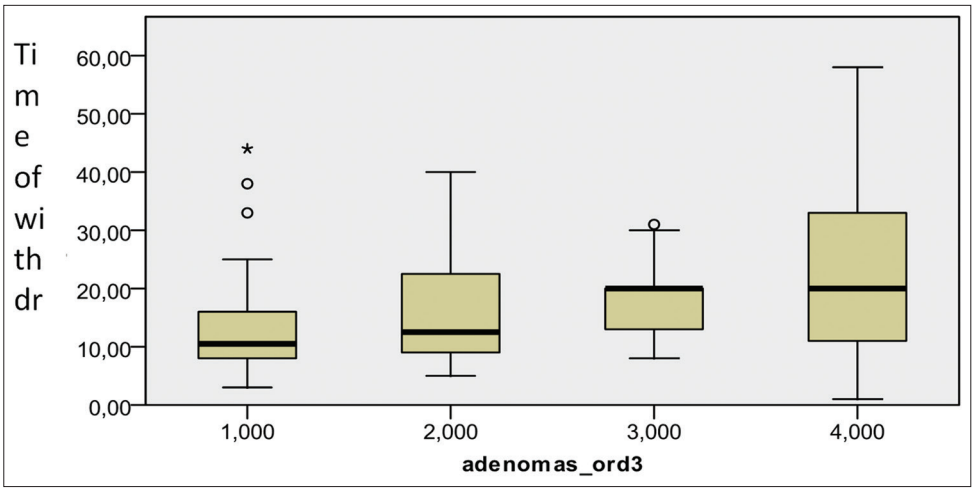
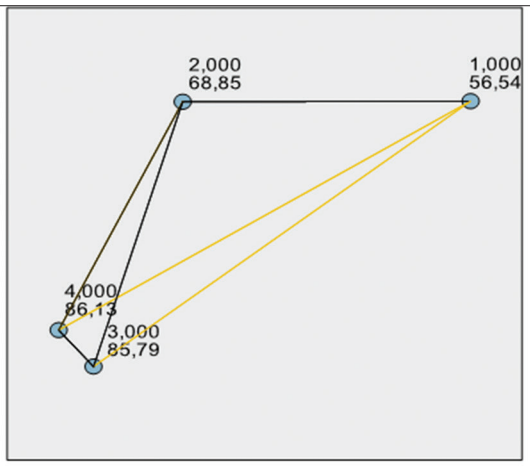



**Figure 3:** Kruskal–Wallis test for independent samples




Cada nodo muestra el rango promedio de muestra de adenomas_ord3.

| Muestra 1-Muestra 2 | Estadístico de prueba | Estándar Error | Desv. Estadístico de prueba | Sig. | Sig. ajust. |
|---|---|---|---|---|---|
| 1,000-2,000 | -12,313 | 8,314 | -1,481 | ,139 | ,832 |
| 1,000-3,000 | -29,257 | 11,083 | -2,640 | ,008 | ,050 |
| 1,000-4,000 | -29,593 | 9,393 | -3,150 | ,002 | ,010 |
| 2,000-3,000 | -16,944 | 11,538 | -1,469 | ,142 | ,852 |
| 2,000-4,000 | -17,280 | 9,926 | -1,741 | ,082 | ,490 |
| 3,000-4,000 | -,336 | 12,339 | -,027 | ,978 | 1,000 |

Cada fila prueba la hipótesis nula hipótesis nula de que las distribuciones de la muestra 1 y la muestra 2 son iguales.
Se muestran las significaciones asintóticas (pruebas bilaterales). El nivel de significancia es , 05.

**Figure 4:** Comparison of adenomas in pairs

findings (angiodysplasias, diverticula, and hemorrhoids) [Figure 1].

Of the 203 patients who had polyps, 168 had adenomas after the histological study. Thus, we obtain an ADR in our

population of 59.8% (66% in men and 52.7% in women); this difference between the sexes is being statistically significant ($P = 0.023$).

In total, 309 polyps were found, of which 204 (66%) were true adenomas. In the individual analysis, the average of polyps per patient was 3.36 ± 3.3 polyps, of which 2.14 ± 2.3 corresponded to true adenomas after the anatomopathological examination.

Regarding the size of the polyps, 158 (51.1%) were smaller than 0.5 cm, 76 (24.6%) measured between 0.5 and 1 cm, 56 (18.1%) between 1 and 2 cm, and 19 (6.1%) exceeded 2 cm [Figure 2].

Regarding the histology of the true adenomas, 168 (82.4%) constitute low-risk adenomas (low-grade dysplasia) and 36 (17.6%) advanced adenomas (high-grade dysplasia/ carcinoma *in situ*).

We analyzed the variables that could be related to ADR, and found with sex, there was a statistically significant relationship ($P = 0.023$), but this was not the case with age or family history of CRC.

We also studied the possible relationship between the time taken on withdrawal of the colonoscope and the number of adenomas detected [Table 3].

For this analysis, we used the Kruskal–Wallis test for independent samples [Figure 3], finding that the withdrawal time has a statistically significant relationship with the number of adenomas detected, if we compare colonoscopies with a single adenoma to colonoscopies with 3 or more adenomas detected [Figure 4].

We studied the possible association between the quality of the preparation according to the Boston scale, with the type of preparation or with sex of the patient. No statistically significant differences were found. In turn, we analyzed whether this variable (preparation quality) could influence the completion of the colonoscopic procedure, the withdrawal time, or the number of detected polyps. Again, no differences were found.

Complications of the colonoscopies included 9 cases of bleeding (7 early and 2 late bleedings) and no perforations. After analyzing the relationship of the bleeds with the fact that the patient took antiplatelet or anticoagulant drugs before the exploration, we found that taking anticoagulants had a statistically significant relationship with the onset of late bleeding in our study population ($P < 0.0001$). We did not find, however, a relationship with the use of antiplatelets.

There were 25 complications related to sedation (15 hypotension, 3 bradycardia, 3 hypotension + bradycardia, and 4 oxygen desaturations). All these complications were mild, resolved respectively after administration of saline, atropine, positional maneuvers, and/or increased oxygen flow. It was not necessary to use mechanical ventilation or vasoactive drugs, other than atropine, in any patient. No test had to be stopped early due to the complications described.

## CONCLUSIONS

Colonoscopy screening for CRC in our health area is an effective technique in terms of detecting early-stage adenomas and carcinomas, with a ADR higher than the 40% required. In addition, it is a safe procedure, in terms of complications arising from the test and endoscopic sedation.

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**How to cite this article:** Del Val Oliver B, González Valverde FM. Colorectal Cancer Screening in Patients with a Positive Fecal Occult Blood Test: Colonoscopy Results. Clin J Surg 2019;2(1):1-5.