

A study on the accuracy of colonoscopy in detecting colorectal cancer

Estudo sobre a acurácia da colonoscopia na detecção do câncer colorretal

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ABSTRACT

Justification and objective: colorectal cancer (CRC) is the third most common malignant neoplasm and the second major cause of cancer-related death. Colonoscopy is the most accurate technique for diagnosing structural lesions in the colon. The aim of this study was to calculate the diagnostic agreement rate (Kappa) of colonoscopy in cases of suspected colorectal cancer and histopathological examination (gold standard) in symptomatic patients examined between 2007-2010. **Patients and methods:** 233 cases were assessed in this observational prospective study. **Results:** changes upon colonoscopy suggestive of colorectal cancer were present in 24 (6.87%) patients submitted to colonoscopy and diagnosis was confirmed by histopathology in 21 cases. Most affected by CRC were the colon (62.5%) and rectum (37.5%), and no lesions were found in the anus or anal canal. The left colon was the most affected (75%), with 58.33% of the lesions in the sigmoid region; and 25% of lesions were found in the right colon. **Conclusion:** The Kappa index of diagnostic agreement for this sample in the detection of colorectal cancer was 0.88 with CI 0.78 and 0.98, considered substantial.

Key words: Colorectal Neoplasms; Colorectal Neoplasms/diagnosis; Colonoscopy; Biopsy.

RESUMO

Justificativa e objetivos: o câncer colorretal (CCR) é a terceira neoplasia maligna mais comum e a segunda maior causa de morte relacionada ao câncer. A colonoscopia é a técnica de mais acuidade para o diagnóstico de lesões estruturais do cólon. O objetivo deste estudo foi calcular o índice de concordância diagnóstica (Kappa) da colonoscopia na suspeição de câncer colorretal comparando com o exame histopatológico (padrão-ouro) em pacientes sintomáticos examinados entre 2007 e 2010. **Pacientes e métodos:** foram estudados 233 casos de forma observacional e prospectiva. **Resultados:** alterações colonoscópicas suspeitas de câncer colorretal estavam presentes em 24 (6,87%) dos pacientes submetidos à colonoscopia e o diagnóstico foi confirmado pela histopatologia em 21 casos. Os locais mais acometidos pelo CCR foram o cólon (62,5%) e o reto (37,5%), não sendo encontradas lesões em ânus e canal anal. O cólon esquerdo foi o mais acometido (75%), com 58,33% das lesões em região sigmoide; e no cólon direito foram encontrados 25% das lesões. **Conclusão:** o índice Kappa de concordância diagnóstica nesta amostra na detecção do câncer colorretal foi de 0,88 com IC 0,78 e 0,98, considerado substancial.

Palavras-chave: Neoplasias Colorretais; Neoplasias Colorretais/diagnóstico; Colonoscopia; Biópsia.

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INTRODUCTION

Colorectal cancer (CRC) is a major cause of morbidity and mortality in western populations. In the United States, it is the second largest cause of death by cancer. In Brazil it is the fifth most frequent malignant tumor among men and the fourth among women, with 11,300 and 13,970 new cases per year, respectively. It is the third cause of death by cancer in the South and Southeast regions. Its development occurs out of pre-neoplastic conditions resulting from the transformation of normal colon epithelium into adenomatous polyp and cancer.¹⁻⁴

Among colorectal tumors, 95% are adenocarcinomas; squamous cell carcinomas, lymphomas, carcinoids, liposarcomas, and leiomyosarcomas are rarely found.²

CRC is the third most common cancer in the world, the second most common type in western countries, and is surpassed only by lung cancer and breast cancer.

The progression of adenocarcinoma is slow, possibly spanning several years, and goes through a considerable number of genetic alterations. Adenomatous polyps are benign glandular neoplasms with potentially malignant epithelial changes. Their development is associated with an accumulation of genetic alterations that lead to imbalance between proliferation of epithelial cells and apoptosis. The probability of an adenoma progressing into an invasive lesion depends on two critical factors: the size of the polyp and the degree of dysplasia.⁵ Predisposition may be linked to everyday habits such as fat-rich diets and low intake of vegetable fibers. Inflammatory bowel diseases, in particular ulcerative rectocolitis, are also related to the appearance of CRC in direct proportion of evolution time and the extent to which the colon has been jeopardized.²

CRC is more frequent among the elderly and predominates at the average age of 60. Although it affects people below 50 in less than 10% of cases, it can affect all ages, including the young, among whom it is more aggressive and often related to hereditary transmission.^{6,7}

The incidence of CRC in men and women, as well as its location, can vary and has been changing. Its distribution is 52.2% in men and 47.8% in women. Its preferred locations are the colon (53.1 %), rectum (41.2 %), and anus and anal canal (5.7%). The sigmoid and the rectosigmoid junction are the most common locations for CRC incidence.⁷

Patients are generally asymptomatic. The most common signs and symptoms are: changes in bow-

el habits, abdominal pain, fecal occult blood, and changes in fecal matter; and less commonly: mucus in stool, lower abdominal pain, anemia, worsening health status, palpable abdominal mass, acute intestinal obstruction, colonic fistulas, and fecal peritonitis caused by bowel perforation.⁸

The first successful total colonoscopy performed using fiber optics was reported in 1966 by Overholt and Pollard.⁹ From then on, improvements in the method and technical developments have made it the primary means of colon evaluation. It is more sensitive than radiological examination and constitutes a therapeutic option.⁴

Endoscopic methods allow diagnosis and resection of polyps while still benign, thus interrupting the adenoma-cancer sequence. Hossne et al.⁴ reported that 54% of polyps found are adenomatous. As a result, there was a decrease in the incidence of CRC.

The biopsied polyp should be histologically examined in order to detect whether or not there is a carcinoma, for its histologic grade, vascular and/or lymphatic invasion, and margin of safety. It is important to determine whether polypectomy already constituted the definitive treatment or if a surgical resection of the colon is needed.¹⁰

The screening of patients with low risk of developing CRC involves an annual test for occult fecal blood. From the age 50, flexible sigmoidoscopy every five years or rigid rectosigmoidoscopy every two years are recommended. Patients with high risk of developing colorectal cancer should be screened by colonoscopy from the age of 40.¹⁰

The definitiveness of diagnosis by colonoscopy can vary considerably depending on the place and the medical staff performing it.⁴

The aim of this article is to determine the accuracy of colonoscopy in detecting CRC, to assess its sensitivity and specificity, and the index of diagnostic agreement with histopathological examination. It will moreover assess the distribution of CRC among cases in terms of age, sex, and most affected portion of the lower intestinal tract.

PATIENTS AND METHODS

We studied 233 patients from a symptomatic population; colonoscopies and biopsies of lesions considered suspicious were performed in a tertiary hospital in the Greater Belo Horizonte between January 2007 and

April 2010. The symptoms most commonly related to a colonoscopy referral were: fecal occult blood, bowel cramps, normocytic and normochromic anemia (the latter to be clarified), changes in the colon or rectum on barium enema tests, clinical suspicion of tumor of the large intestine, lower gastrointestinal bleeding, non-polypoid hereditary CRC, changes in intestinal habits, and inflammatory bowel diseases. The biopsies were collected with cold, spiculated-type biopsy forceps, and colonoscopic polypectomy were performed with an oval handle for the anatomopathologic study.

Data were tabulated in BR Office (version 3.2) software and the statistical analyses were performed with aid of the Minitab software (version 14.0). The Kappa index of diagnostic agreement was calculated from endoscopic findings suggestive of malignancy and the histopathologic evaluation of the colon biopsy.

P values lower than 0.05 ($p < 0.05$) were considered statistically significant.

RESULTS

Of the 233 patients who underwent colonoscopy, there was suspicion of colorectal cancer in 24, with histopathologic confirmation in 21.

Of the 209 patients without alterations compatible with CRC, two were diagnosed with CRC through anatomopathologic study.

Among the cases with a confirmed diagnosis of colorectal cancer, 13 were women. The age of patients with CCR ranged from 29 to 81 years, with an average of 56.95 years and standard deviation of 22 years.

The most commonly affected site for CRC cases was the colon (62.5%), followed the rectum (37.5%). No lesions were found in the anus or anal canal. The left colon was the most affected (75%); 58.33% of its lesions were in sigmoid areas, and 25% of lesions were found the in the right colon.

The recorded Kappa index was 0.88 and the confidence interval ranged from 0.78 to 0.98 ($p = 0.001$).

Colonoscopy for detection of CRC showed 91.3% sensitivity, 98.6% specificity, 87.5% positive predictive value and 99.0% negative predictive value.

DISCUSSION

The data found in this study are similar to what has been reported by Sanchez et al.⁷ and Santos et

al.¹⁰ regarding the prevalence of suspected colorectal cancer on colonoscopy and diagnosed by biopsy (Table 1). This observation indicates that endoscopic suspicion constitutes relevant evidence and should be regarded as a reason for histopathologic analysis to be carefully performed for the sake of a discerning pathological judgment.

Table 1 - Comparison of results of this study and the works by Sanchez et al. and dos Santos et al.¹⁰

Colonoscopy	Comparison of results		
	This study	Sanchez et al. (2005)	Santos et al. (2009)
Prevalence of CRC	6.02%	4.76%	6.2%

This study has also revealed similar data to that described by De Melo et al.² on the correlation between patients with normal colonoscopy and colon with preserved histological architecture. Of the 325 colonoscopies reported here and for which CRC was not suspected, CRC-type lesions were found in two cases (Table 2). This shows that the anatomopathological study must be thorough in the search of any abnormality and should be considered even when endoscopy yields normal results.

Table 2 - Comparison of results of this study and the work by Melo et al.²

Prevalence of normal colonoscopies with normal histology	This study	Melo et al. (2009)
Percentage	99.38 %	99.1 %

Cruz et al.⁶ obtained some results that are similar to those in this study, such as: age at diagnosis, location, and gender of patients affected by CRC (Table 3).

Table 3 - Comparison of results of this study and the work by Cruz et al. regarding the characteristics of CRC

Parameters	Cruz et al.(2007)	This study
Average age upon diagnosis	60.6 years	58.2 years
Males	52.2%	47.37%
Females	47.8%	52.63%
Colon compromised	53.1%	60%
Rectum compromised	41.2%	40%
Located on right colon	22.2%	33.3%
Located on left colon	77.8%	66.7%

CONCLUSIONS

There was substantial agreement between the colonoscopic and histopathologic diagnoses in the analysis of colorectal lesions suggesting CRC. It is important to consider that cases of CRC were diagnosed even among those with lesions considered to be benign endoscopically. Clinical suspicion must always be confirmed by histopathologic study, and the diagnosis must never be solely based on endoscopic observation.

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