ORIGINAL PAPER

THE PROPHYLAXIS OF COLORECTAL CANCER THROUGH ENDOSCOPIC POLYPECTOMY

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Abstract

The evolution of the colorectal cancer (CRC) from a precursor lesion, the adenoma, was reported for the first time decades ago. Today the relationship between a polyp and CRC is widely known, the adenomatous polyp being considered a sequence in the development of this type of malignancy. Early diagnosis, monitoring and, above all, polyp resection represents one of the most efficacious methods in the CRC prophylaxis. The authors made a 4-year analysis (January 2009 - December 2012) of all the patients for whom colonoscopy was performed in the Surgery Clinic 1 of the Bucharest Oncology Institute. Out of all the 1368 colonoscopies, 222 patients had colorectal polyps and for 88.7% of them endoscopic polypectomy was possible. The election of the treatment method in patients with rectocolic polyps has to take into consideration several factors: the macroscopic type (pedunculated or sessile), the number and dimension of the polyp, the histology type and the grade of malignancy. Endoscopic polypectomy is indicated both in the non-malignant polyps and in the "in situ" cancers (with low risk of lymphatic invasion). In all the other cases that could not be removed because of technical or safety limits, the main surgical indication is classic polypectomy. The protocol for further endoscopic follow-up and the main treatment strategy chosen are both done according to the result of the histopathology examination from the resected polyp. The increased frequency and mortality of the colorectal cancer makes this pathology a public health problem. The possibility of prevention offered by an early diagnosis justifies the development of a screening programme for CRC. Colonoscopy plays an important role in controlling this pathology, representing a good method of screening, early diagnosis, treatment and monitoring. The purpose of the study is to emphasize the importance of colonoscopic polypectomy in the prophylaxis of CRC; to determine the incidence of the colorectal polyps and their malignancy rate; to determine the optimal method of treatment and to establish the optimal monitoring protocol in order to identify the postoperative recurrence of polyps.

Keywords*: colorectal cancer, the adenoma, adenomatous polyp*

Introduction

Colorectal cancer (CRC) is considered the most commonly cancer of the digestive tract, with a high mortality rate (being the second leading cause of cancer death in U.S. and the third in Japan) [1;2]. Morson was the first to report in studies the evolution of CRC from a precursor lesion, the adenoma, as the adenoma-carcinoma sequence. It was initially supported

by clinical arguments and today the theory is supported by genetic arguments too, so it is considered essential in the genesis of colorectal cancer [3]. Approximately 20-25% of patients older than 60 have at least one colorectal adenomatous polyp [4]. Although the CRC has a high frequency, it is much rarer than polyps. Only a minority of such lesions become cancer. It is estimated that <1% of polyps ever become malignant [2]. The category of high risk polyps include: any adenoma with severe dysplasia, adenoma >1 cm diameter, adenoma containing >25% villous component (villous adenoma become malignant more than 3 times as often as tubular adenomas and the villous component is considered a predictor of metachronous colorectal adenomas too), more than 3 synchronous adenomatous polyps of any type or size [4]. CRC is developing severe complications that will affect the productive integration of the patient into society and will increase the costs of hospitalization and treatment. The prognosis is directly influenced by the precocity of diagnosis, screening fulfilling a central role in controlling this pathology [5]. The high costs of treatment along with the severity of this pathology and the high mortality rate are supporting the development of a screening programme, more justified by the high frequency of CRC (a public health problem). Early diagnosis is the only way that allows an effective treatment with a good long term survival. In addition, the methods that allow early diagnosis already exist and they are widely used in our medical system, but unfortunately not for the purpose of screening. CRC fully meets the criteria that would justify the development of a national screening programme [3]. Colonoscopy is one of the most relevant methods. Its importance is increased by the fact that it is not only a diagnosis act, but also a therapeutic act, allowing the resection of polyps. Due to the substantial progress made in the colonoscopic polypectomy technique, since its introduction 20 years ago, the method is considered the first option in the treatment of colorectal polyps. The widely known relationship between the adenomatous polyps and cancer supports the importance of treating polyps and polyposis as a way to prevent CRC. Choosing between endoscopic therapy or surgical resection of colorectal polyps should be made considering the size, number, sessile or pedunculated appearance, histology and extent of their malignant degeneration.

Material and methods

The study was conducted on a sample of 244 patients diagnosed with colorectal polyps. The patients were selected from a total of 1368 colonoscopies performed between January 2009 and December 2011 in the Surgical Clinic 1 of the "Prof. Dr. Alexandru Trestioreanu" Institute of Oncology, Bucharest. Data were obtained from the records of endoscopic explorations and papers of histopathology. The method used for the diagnosis of the polyps was colonoscopy, and for their treatment we used colonoscopic polypectomy (Figure 1, 2) or classic surgery.

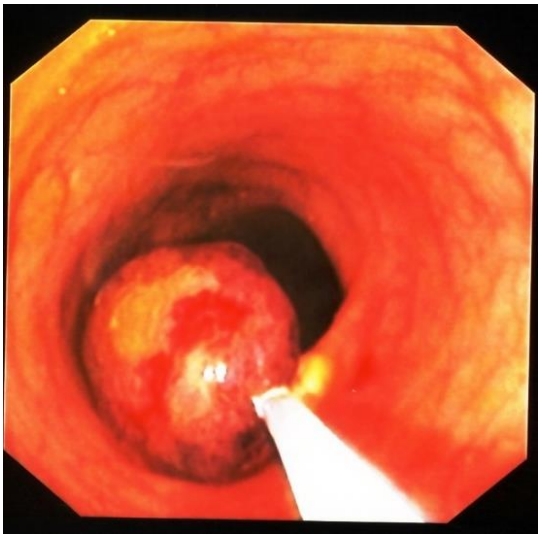

Figure 1- Endoscopic polypectomy

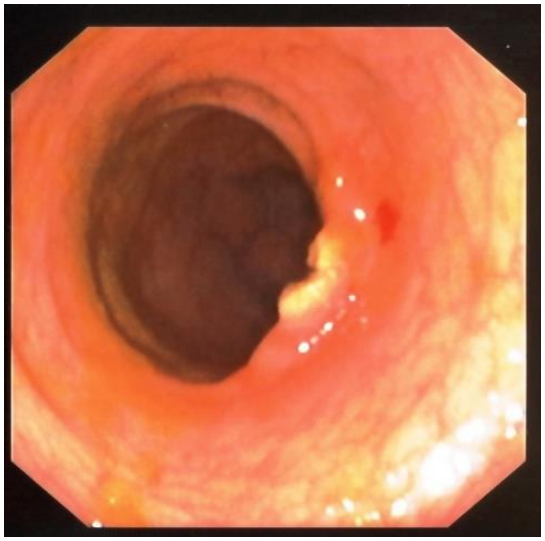

Figure 2 - Appearance of the lesion after endoscopic polypectomy.

The surgical procedures used in the selected cases were: colostomy followed by local excision, left or right hemicolectomy, segmental colectomy and rectosigmoid resection. After data collection, a retrospective study was performed to analyze: the histologic pattern of the resected polyps, polyp distribution by gender, polyps distribution by age, polyps topography, polyps distribution by macroscopic appearance (sessile – Figure 3 or pedunculated – Figure 4), comparison of the sessile and pedunculated polyps depending on location, size and number (Figure 5) of polyps per patient.

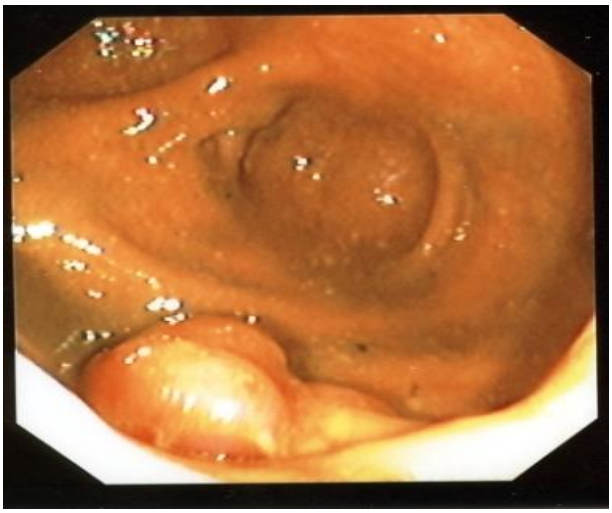

Figure 3 - Sessile polyp.

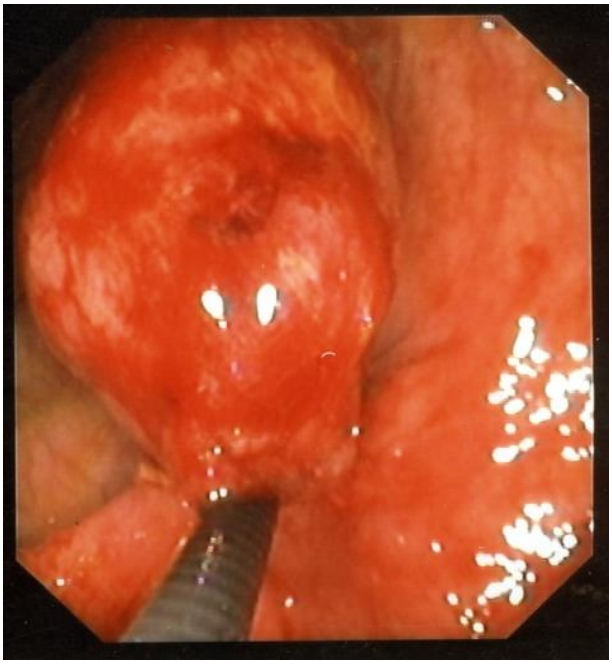

Figure 4 - Pedunculated polyp

The microscopic appearance of adenomatous polyps and their malignancy grading, the type of treatment (endoscopy or classic surgery) and postoperative complications. Correlating the macroscopic appearance with the histologic pattern of the polyps, we established the method of treatment for each patient. The postoperative monitoring of the patients followed the standard protocols.

Figure 5 - Multiple polyps.

The purpose of the study is to emphasize the importance of colonoscopic polypectomy in the prophylaxis of CRC; to determine de incidence of the colorectal polyps and their malignancy rate; to determine the optimal method of treatment and to establish the optimal monitoring protocol in order to identify the postoperative recurrence of polyps.

Results

Out of the 1368 endoscopies performed, 1146 (82%) were made only for diagnosis and 222 (18%) had a therapeutic purpose too. According to the results, men pose a greater risk for developing colorectal polyps compared to women: 152 (62%) patients were men and 92 (38%) women. We also observed a gradual increasing trend of the risk proportional to the age, reaching a peak after 70. Out of the 244 patients who were diagnosed with colorectal polyps, 324 polypoid lesions were found in total. Most of them were adenomas (249) of which 23 were synchronous colorectal adenomas and 36 postpolypectomy metachronous adenomas. From the total number of 222 patients with removed polyps, 156 were located in the descending and sigmoid colon, which is the most common location. Sessile polyps were

found in 70% (172) of cases and pedunculated polyps in 30% (72). The most common sites of polyps, both sessile and pedunculated, were the descending and sigmoid colon (107 of 172 sessile polyps; 49 of 72 pedunculated polyps). From all the polypoid colorectal lesions that were diagnosed, 57% had sizes less than 1 cm, 24.5% between 1-2 cm, 18.5% larger than 2 cm. Of the 244 patients diagnosed with colorectal polyps, 138 were diagnosed with only one polyp, and in the other cases multiple polyps were found: 85 patients had 2 to 5 polyps and 21 patients had more than 5 polyps. Of the 325 polyps that were found in total, the majority (249) were adenomas, these having the highest risk of malignant degeneration. Of the 249 colorectal adenomas, 116 were tubular and tubule-villous, 28 were villous, 57 were low dysplasia and 48 were high dysplasia (Figure 6,7). Of the 48 adenomatous polyps with high grade dysplasia (Early Colorectal Cancer-WHO), 21 were intramucosal colorectal cancers and 27 were intraepithelial colorectal cancer ("in situ"). Most of these dysplastic adenomas were villous (63%) and larger than 2 cm (73%). Regarding the risk of dysplasia in relation with the number of polyps, the conclusion of the study was that 55% of the dysplastic cases were multiple adenomas. It was possible to perform total excision by endoscopic polypectomy to the majority of polyps that were colonoscopically diagnosed. Surgical resection of polyps was practiced only when the endoscopic resection of an advanced adenoma could not be safely performed or when a malignant polyp required surgery, following the principles of the oncological surgery. For the treatment of the colonic adenomatous polyps, endoscopic resection was performed in 197 (88.7%) cases and conventional surgery in 25 (11.26%) cases. The surgical methods performed were: colectomy with classic polypectomy (4 cases), segmental colectomy (10 cases), right hemicolectomy (1 case), left hemicolectomy (4 cases) and rectosigmoidian resection (6 cases). Complications of the established treatments were not major. Small bleedings were recorded in 16 cases of postendoscopic polypectomy, which were solved with conservative treatment.

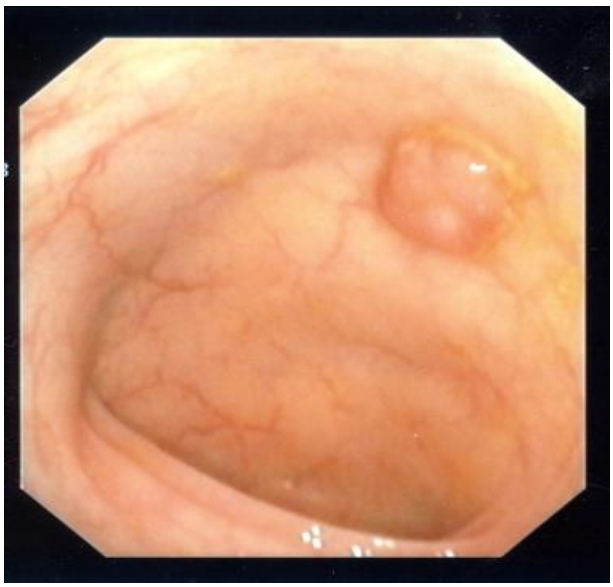

Figure 6- Low dysplasia polyp

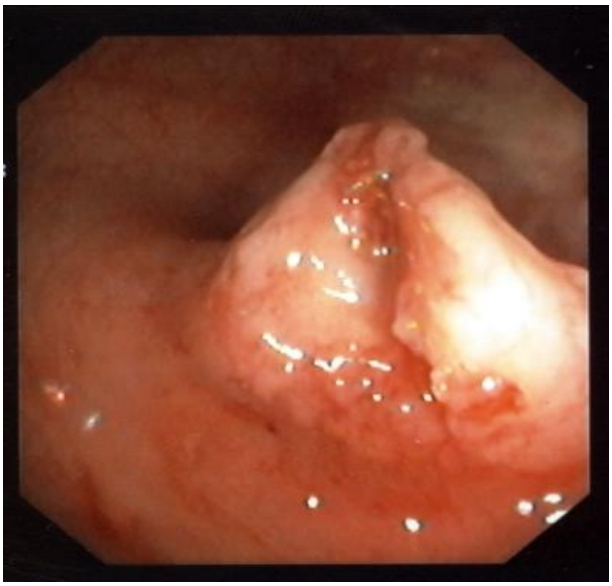

Figure 7- High dysplasia polyp

Discussions

Adenomatous polyp-carcinoma sequence is supported by strong arguments, both clinical and genetic. It was observed that the risk of cancer is higher for patients who develop polyps. The polypectomy is favorably influencing the evolution of these patients and reducing the risk, while unresectable polyps progress to cancer (in familial polyposis almost 100% becomes cancer [2]). The fact that the incidence of polyps is higher in the 5th decade and the incidence of cancer in the 6th decade, suggests a 10-year interval required for the polyp-cancer progression. Another argument is represented by the presence of benign

adenomatous tissue associated in most malignant tumors. This concept is also supported by genetic studies, which were able to discover the mutations involved in each stage of progression from normal epithelium to metastatic carcinoma [3]. The probability of an adenomatous polyp becoming a cancer depends on its macroscopic appearance, its size and its histologic pattern. The biggest risk is for the sessile, larger than 2,5 cm and villous polyps [2].

For the detection of adenomatous polyps the entire colon must be examined considering the high frequency of synchronous lesion. They are noted in literature in about one third of the cases. In our group of 244 patients who developed polypoid lesions, 43% were diagnosed with multiple polyps. Diagnosis of colorectal polyps multiplicity requires a complete examination by colonoscopy and not considering the diagnosis to be complete after highlighting the first polyp. In this context colonoscopy should be repeated periodically, even without a history of cancer, as these patients have a 30-50% probability of developing a new adenoma and a high risk of malignancy. However, an adenomatous polyp becomes clinically significant after an evolution of minimum 5 years. Therefore, the interval between colonoscopies is not needed to be less than 3 years. In patients who cannot accept the colonoscopy, or it is impossible to perform, an alternative method is the association of double contrast barium enema and rectosigmoidoscopy.

The increased frequency and mortality of CRC makes this pathology a public health problem. The evolution of this type of cancer is always severe, causing a drastic decrease in the patient's quality of life. Even treated, the patient will have a difficult reintegration in the productive sector of society. In addition, the costs of treatment, hospitalization and monitoring outweigh the costs of a screening programme that would make possible the prevention of CRC. The utility of a screening program for CRC is that an early diagnosis of superficial lesions in asymptomatic patients would increase the success rate of treatment. A first-line screening method is the hemoccult test. However, even when it is performed technically and optimally, this test is limited. Approximately 50% of CRC had a negative hemoccult test, this fact being caused by the intermittent nature of bleeding within this pathology. Patients with positive tests were subsequently diagnosed with CRC in less than 10% of cases, and with benign polyps in 20-30% of cases. Colonoscopy is more expensive than the hemoccult test but with much higher specificity and sensitivity. While screening decreases the incidence and mortality of CRC, offering the possibility of establishing prophylaxis in asymptomatic patients, the delayed diagnosis in symptomatic patients is crucial. A "false negative" result of a test will delay the diagnosis, worsening the prognosis of the patient. A retrospective study showed the rates of "false negative" results for colonoscopy of 3.5%, CT of 9.4% and double contrast barium enema 26.7% [6]. So colonoscopy proved to be superior to double contrast barium enema. In addition, colonoscopy is the only screening method that can bring biopsy material, either by puncture or resection of the entire piece, by enabling the axis of the polyp for a correct histopathological examination. Microscopic diagnosis of the polyp is important to determine the therapeutic management. So, benign lesions have as indication of first intention the endoscopic polypectomy, and malignant polyps (with base or vascular axis invasion) have surgical indication, respecting the principles of oncology, because they have a high risk of relapse in the remaining tissue of the lesion. Colonoscopy is also a therapeutic act for the colorectal polyps and it is recommended in most cases because it is easily tolerated by patients, it has a low risk of complications, it is a minimally invasive method and the results are comparable to conventional surgery. It was noted even a low rate of recurrence after endoscopic polypectomy of the colorectal polyps [7].

However, there are limitations of colonoscopy, requiring specialized equipment and qualified personnel that are not always available. In addition, endoscopic polypectomy is not always possible to perform, from a technical standpoint (large polyps; their localization in thin wall colon segments –such as right colon – with an increased risk of perforation; inferior rectal polyps do not allow optimal handling of the endoscope). For this cases we recommend the surgical resection of

the polyps. Indications for open surgery are: large sessile polyps (> 2cm) that could not be removed because of a technical or safety limit; multiple polyps in large number and malignant polyps that met at least one of the following criteria: the polyp could not be excised in oncological safety limits, it was a poorly differential carcinoma, the malignant lesion invaded blood or the lymphatic vessels or the excision edges of the polyp were not free.

In our study group there were patients with villous polyps, larger than 2 cm who underwent endoscopic resection. They were monitored by colonoscopy 3-6 months after intervention.

In the cases of malignant polyps who met the criteria for endoscopic treatment, the colonoscopic follow-up was performed at 6 months to 1 year to 3 years after polypectomy, to verify the occurrence of relapse, especially for sessile polyps, which often contain villous tissue with a high malignant potential.

Conclusions

The "adenomatous polyp- CRC" sequence was both, histologically and genetically, proven.

- It is considered necessary a period of approximately 10 years for this progression.
- Although the majority of CRC have adenomatous origin, not all of the adenomatous polyps become cancer. The high risk category include: any adenoma with severe dysplasia, adenoma >1 cm diameter, adenoma containing >25% villous component, more than 3 synchronous adenomatous polyps of any type or size.
- The gold standard in the diagnosis and treatment of colorectal polyps is the endoscopy.
- Early diagnosis may influence the prognosis of CRC, reducing the risk of further complications and the mortality rate.
- The utility of a screening programme for asymptomatic patients that are included in the high risk category is justified, considering the incidence of CRC and the costs involved for patients diagnosed with CRC.
- Colonoscopy is an excellent method of screening, with both valences, diagnosis and treatment, which transforms it in an effective method of prevention of CRC.

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