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Pathological evaluation in colorectal polyps endoscopic treatment

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SUMMARY: **Pathological evaluation in colorectal polyps endoscopic treatment.**

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This retrospective study shows that endoscopic polypectomy is the technique of choice to remove the majority of polyps; follow-up and pathologic examinations shed light on the carcinogenesis of colorectal lesions.

From January 1990 to December 2001, 1302 adenomatous polyps were removed, 1175 endoscopically, 127 with surgical procedures. The anatomical and morphologic conditions of the colon and some characteristics of the polyps represent limits to the feasibility and to the efficacy of polypectomy, and the most important variables for the correct management of the patients affected by colorectal adenomatous polyps.

RIASSUNTO: **Valutazione patologica nel trattamento endoscopico dei polipi colorettali.**

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Questo studio retrospettivo mostra che la polipectomia endoscopica rappresenta la tecnica da preferire per rimuovere la maggior parte dei polipi ed il follow-up con esami istologici ripetuti può chiarire la carcinogenesi delle lesioni colorettali.

Dal gennaio 1990 al dicembre 2001 sono state eseguite 1302 polipectomie, 1175 endoscopiche e 127 chirurgiche. Le condizioni anatomiche del colon e le caratteristiche macro- e microscopiche dei polipi possono rappresentare un limite alla realizzazione ed all'efficacia di questo tipo di trattamento e rappresentano le più importanti variabili per un corretto trattamento terapeutico.

KEY WORDS: Colorectal adenomatous polyps - Endoscopic polypectomy - Dysplasia.
Polipi adenomatosi del colon-retto - Polipectomia endoscopica - Displasia.

Introduction

Colorectal adenomas represent an anatomical and clinic entity rarely present before the age of 40, in absence of familiar polyposis. The incidence's peak is between 60 and 70 years of age; the distribution of the large intestine polyps is similar to that of the colorectal cancer.

The incidence of adenoma is much higher than that of cancer; however only few adenomas show malignant potential and develop into cancer (1, 2). The identification and the removal of the colorectal polyps should reduce the incidence of cancer.

Out patient colonoscopy with endoscopic polypectomy is the technique of choice to remove the majority of polyps and their pathologic examinations shed light on the carcinogenesis of colorectal lesions (3-6).

We evaluate feasibility, safety, and effectiveness of endoscopic treatment of colorectal adenomas *vs.* surgical treatment through the analysis of 1302 polypectomies in a period of 12 years long. The data considered by this study are: age, size of the lesion, location, histological features.

Patients and methods

From January 1990 to December 2001, 1302 adenomatous polyps were removed, 1175 endoscopically, 127 surgically. The patients, formerly surgically treated for colorectal carcinoma, those affected by any chronic bowel disease (Crohn's disease, inflammatory bowel diseases), and those with familiar polyposis or with non adenomatous polyps weren't included in this study.

All the endoscopic procedures were performed on unseated patients at the Endoscopic Unit of our Department of Surgery, using Videocolon Pentax EC-3840 or a colonoscope Olympus CF-30 I.

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The patients submitted to a complete endoscopic polypectomy were 1021 (96 of them had 2 or more polyps). These patients, 726 men and 295 women, ranged in age from 23 to 92 years (mean 64,2 years, 467 over sixty). The patients underwent surgical procedures were 127. These patients, 86 men and 41 women, ranged in age from 49 to 86 years (mean 67,4; 73 over sixty).

In all patients pancolonoscopy has been performed. Bowel preparation before colonoscopy was achieved using 4000 ml of a polyethilen glycol electrolytic lavage solution. In 127 patients it hasn't been possible to perform an endoscopical polypectomy, in 66 cases because of the size of the polyps, in 42 cases because of the location, in 19 cases because of the risk of perforation related to the anatomical and morphological conditions of the intestine (diverticulitis, adhesions). All tissues were fixed in 10% formalin and stained with hematoxylin and eosin for the pathologic examination.

The location, the size and the histologic features are the data that we have evaluated also on the report of a recent study of Ikeda et al. (7). We also have considered as an important variant the age, in order to distribute the patients in two groups: under sixty (554) and over sixty (467).

On the basis of the anatomical distribution of colorectal polyps we classified right sided polyps (RSP), left sided polyps (LSP), rectum polyps (RP). Regarding to the size, a very small adenoma (VSA) was defined as lesser than 5 mm in diameter, a small adenoma (SA) as larger than 5 mm but lesser than 10 mm in diameter, a large adenoma (LA) was as larger than 10 mm in diameter.

The pathological features includes: the morphology of the lesion (pedunculated polyp, short stalked polyp, sessile polyp), the glandular architecture (tubular adenoma, villous adenoma, tubulovillous adenoma), and the grade of dysplasia. In according to the criteria of the World Health Organization we recognize two grades of dysplasia: high and low. Adenomas with high grade dysplasia (AHGD) includes the carcinoma in situ. If the histologic examination shows the invasion of the submucosa, we consider the lesion as a real carcinoma of the colon and we always perform a surgical operation even if it has been possible to perform an endoscopic polypectomy.

Results

The distribution of all the polyps was: 321 polyps (24,65%) localized in the right colon, 574 (44,10%) in the left colon and 407 (31,25%) in the rectum. Among 1175 endoscopic polypectomies, 508 were lesions less than 5 mm of diameter, 411 between 5 and 10 mm, and 383 more than 10 mm. The polyps removed by surgery were more than 30 mm (giant polyps).

Macroscopically sessile shapes were prevalent (843/64,75%), the pedunculated ones were 297/22,80%, and the partially pedunculated 162/12,45%). Histology showed 920 tubular adenomas (70,65%), 204 villous adenomas (15,65%), and 178 tubulo-villous adenomas (13,70%). At the histologic examination of the endoscopically removed polyps 956 polyps were adenomas low grade dysplasia (ALGD), 150 adenomas high grade dysplasia (AHGD), 69 malignant (MP); in this cases it is not right to define them as adenomas. The histologic examination of the surgically removed polyps included 41 ALGD, 54 AHGD and 32 MP. The 82% of villous adenomas and the 74% of the tubulo-villous ones showed a high grade of dysplasia or were invasive carcinomas; these histologic architectures have been found in 67% of the cases aged over 60 years. Tables 1-9 show the distribution of the lesions, the size and the grade of dysplasia in the patients over and under 60 years.

The more remarkable data are referred to the grade of dysplasia, that increases in both the groups of age as the size's increasing. In the patients over 60 furthermore the percentage of AHGD is major than the ALGD even if the size of the polyp is similar. In the patients over 60, the percentage of AHGD is major as regards to the patients under 60 for the presence of whatever size of polyp. Moreover, the percentage of malignant polyps, endoscopically removed, was respectively of 53,5% in the patients under 60 and of 56,5% in the patients over 60. In the patients over 60, the presence of AHGD is more increased in the right colon than in the patients under 60. Surgical operation to remove polyp was necessary in 73 patients over 60 and in 63 patients under 60.

All the patients with malignant polyps have been successively subjected to surgical resection. Four of the patients who had been endoscopically polypectomized have been further subjected to surgical operation in urgency because of complications (3 iatrogenic perforations and one massive bleeding not endoscopically treatable).

Because of the size of the lesions and/or of the location, in 97 patients it hasn't been possible to remove the polyp through endoscopy ("problematic polyps"). So, in these patients it has been performed surgery with a different procedure, according to the site and to the information taken from the biopsies.

The practices adopted for the follow-up have been given from the grade of dysplasia of the lesion. The patients with ALGD should undergo colonoscopic surveillance only at two years after complete removing of all polyps found during initial examination; in the patients with a very dangerous grade of malignancy adenomas at six months, one and three years. Finally, the patients with malignant polyps are followed with a more careful and longer not only endoscopic follow-up (tumoral markers, hepatic sonography, CT scan).

Discussion

The term "polyp" generally refers to any protuberant lesion of the intestinal mucosa. Two third of all colonic polyps are adenomas. Age is the most important risk factor for the development of colonic adenomas. Thanks to colonoscopic screening, it is suggested that the incidence of adenomas in asymptomatic pa-

TABLE 1 - DISTRIBUTION OF VERY SMALL SIZE (< 5 mm) COLORECTAL ALGD AND AHGD ENDOSCOPICALLY REMOVED IN PATIENTS UNDER 60 YEARS.

	Right colon	Left colon	Rectum	Total
ALGD (%)	76 (97,45%)	144 (96,65%)	81 (95,3%)	301 (96,5%)
AHGD (%)	2 (2,55%)	5 (3,35%)	4 (4,7%)	11 (3,5%)
Total	78	149	85	312

TABLE 2 - DISTRIBUTION OF VERY SMALL SIZE (< 5 mm) COLORECTAL ALGD AND AHGD ENDOSCOPICALLY REMOVED IN PATIENTS OVER 60 YEARS.

	Right colon	Left colon	Rectum	Total
ALGD (%)	45 (93,75%)	73 (92,4%)	64 (92,75%)	182 (92,85%)
AHGD (%)	3 (6,25%)	6 (7,6%)	5 (7,25%)	14 (7,15%)
Total	48	79	69	196

TABLE 3 - DISTRIBUTION OF SMALL SIZE (5-10 mm) COLORECTAL ALGD AND AHGD ENDOSCOPICALLY REMOVED IN PATIENTS UNDER 60 YEARS.

	Right colon	Left color	Rectum	Total
ALGD (%)	43 (91,5%)	106 (93,8%)	72 (92,3%)	222 (93,25%)
AHGD (%)	4 (8,5%)	7 (6,2%)	6 (7,7%)	16 (6,75%)
Total	47	113	78	238

TABLE 4 - DISTRIBUTION OF SMALL SIZE (5-10 mm) COLORECTAL ALGD AND AHGD ENDOSCOPICALLY REMOVED IN PATIENTS OVER 60 YEARS.

	Right colon	Left colon	Rectum	Total
ALGD (%)	34 (87,15%)	61 (87,15%)	56 (87,5%)	151 (87,3%)
AHGD (%)	5 (12,85%)	9 (12,85%)	8 (12,5%)	22 (12,7%)
Total	39	70	64	173

TABLE 5 - DISTRIBUTION OF LARGER SIZE (> 10 mm) COLORECTAL ALGD AND AHGD ENDOSCOPICALLY REMOVED IN PATIENTS UNDER 60 YEARS.

	Right colon	Left colon	Rectum	Total
ALGD (%)	19 (65,5%)	36 (63,15%)	11 (45,85%)	66 (60%)
AHGD (%)	10 (34,5%)	21 (36,85%)	13 (54,15%)	44 (40%)
Total	29	57	24	110

TABLE 6 - DISTRIBUTION OF LARGER SIZE (> 10 mm) COLORECTAL ALGD AND AHGD ENDOSCOPICALLY REMOVED IN PATIENTS OVER 60 YEARS.

	Right colon	Left colon	Rectum	Total
ALGD (%)	9 (40,9%)	14 (45,15%)	11 (45,85%)	34 (44,15%)
AHGD (%)	13 (59,1%)	17 (54,85%)	13 (54,15%)	43 (55,85%)
Total	22	31	24	77

TABLE 7 - DISTRIBUTION OF COLORECTAL MP ENDOSCOPICALLY REMOVED.

Age	Right colon	Left colon	Rectum	Total
< 60 years (%)	6 (35,3%)	13 (48,15%)	11 (44%)	30 (53,5%)
> 60 years (%)	11 (64,7%)	14 (51,85%)	14 (56%)	39 (56,5%)
Total	17	27	25	69

TABLE 8 - DISTRIBUTION OF COLORECTAL ALGD, AHGD AND MP SURGICALLY REMOVED IN PATIENTS UNDER 60 YEARS.

	Right colon	Left colon	Rectum	Total
ALGD (%)	6 (35,3%)	7 (33,35%)	6 (37,5%)	19 (35,2%)
AHGD (%)	7 (41,2%)	9 (42,85%)	6 (37,5%)	22 (40,75%)
MP	4 (23,5%)	5 (23,8%)	4 (25%)	13 (24,05%)
Total	17	21	16	54

TABLE 9 - DISTRIBUTION OF COLORECTAL ALGD, AHGD AND MP SURGICALLY REMOVED IN PATIENTS OVER 60 YEARS.

	Right	Left	Rectum	Total
ALGD (%)	7 (29,15%)	8 (29,65%)	7 (31,8%)	22 (30,15%)
AHGD (%)	11 (45,85%)	12 (44,45%)	9 (40,9%)	32 (43,85%)
MP	6 (25%)	7 (25,9%)	6 (27,3%)	19 (26%)
Total	24	27	22	73

tients is about 25-30% at age 50, moreover they are more common in men (8-10).

The distribution of adenomatous polyps in the colon has important implications for screening programs. Advancing age is a risk factor for right-sided polyps and cancers (11). This hypothesis is assured from the results of our study where it is demonstrated an increase of the percentage in the subjects over 60 *vs.* those younger, of the adenomas of the right colon, especially of AHGD and MP.

Adenomatous polyps have variable dimensions, from less than 1 mm to over 5 cm of diameter. Small polyps (< 5 mm that we indicated as very very small polyps, also known as "diminutive polyps") are rarely pedunculated. In our casistics we report 843 sessile forms on 1175 polypectomies which includes 508 "diminutive polyps".

The adenomas are classified according to the World Health Organization (12) in tubular adenomas, villous adenomas and tubulo-villous adenomas. To be classified as villous, the adenoma should have a villous component of at least 75%. They account for 5 to 15% of adenomas. Tubulo-villous adenomas, having 26 to 75% villous component, account 5 to 15% of adenomas (13). In the current study, the percentage of tubular adenomas was 70,65%, of villous 15,65%, and of tubulo-villous 13,70%.

Histologically, adenomatous polyps are made up of epithelial packed tubules, divided by their own lamina, which tendentially develop and ramify in a horizontal way regarding to the level of the muscularis mucosae (14). Villous polyps are, instead, made up from a central nucleus of connettive tissue from which grow up many villi recovered by epithelium that develop in vertical way regarding to the intestinal lumen. The recovering epithelium presents some characteristics similar in all adenomas, independently from tubular or villous structure. The aspects of dysplasia or atypia are schematically represented from an increase of the mitosis and of the pluristratification of the cells that in the case of adenomatous polyps project in the lumen of the tubules, while the villous polyps invade the connettive nucleus of the polyp. The grade of dysplasia can be low, moderate or high, according to the nuclear alterations

(increased dimensions, pleomorphism, loss of polarity, stratification and increasing of the mitosis) (15, 16).

More recently, this classification scheme has been replaced by a system that recognizes two grades of dysplasia (high and low). The two-grade system is preferable since it is associated with less inter-observer variation. High grade dysplasia should be considered as a carcinoma *in situ* and it is thought to represent an intermediate step in the evolution from adenomatous polyp to cancer, and is a significant risk factor for subsequent colorectal malignancy. Lesions that infiltrated the submucosa were considered to be cancer. The adenomatous polyps are by definition dysplastic, but only a small minority of adenomas progress to cancer. The location of adenoma was found to be similar to that of cancer in the colon-rectum, especially for AHGD (17).

From the Tables of our study it is showed how the size of adenomas and the age of the patients are correlated with a remarkable increase of lesions with high grade of dysplasia. Particularly villous histology and increasing polyp size are independent risk factors for high-grade dysplasia within an adenoma (18). The risk for high-grade dysplasia increases from 1 percent in "diminutive polyps" to 6% in small adenomas and 21% in larger adenomas (18). This study shows an increased incidence of AHGD as the size of lesion increases.

It can be evidenced from the data reported how those percentages are higher in the subjects over 60 years. Therefore, older age is another risk factor for high-grade dysplasia within adenoma, independent of size and histology.

Endoscopic polypectomy/mucosectomy for large colorectal polyps is a difficult method of treatment, although it is safe in experienced hands and prevent from undergoing unnecessary surgery. The potential risk of malignancy and technical difficulty in achieving complete removal of large colorectal polyps represent the most serious problem for the endoscopist. In our study there are included 127 patients in which the endoscopically complete removing of the lesion wasn't done because of the size and/or the sites of polyps, and therefore surgery was necessary. Also a suite of biopsies negative for carcinoma do not exclude the possibility of a cancerized polyp.

Some polyps of increased consistence, with a large implanting base, ulcerated or that cannot be lifted with injections in the submucosa, must be considered potentially malignant. Polyp's site, besides its extension, is another factor to be notable. A polyp placed between nine and twelve o'clock of the field of vision shows a bigger difficulty of treatment regarding to a correspondent position at five o'clock.

The identification of the polyps could be easier moving the abdomen or changing patient's position.

Some polyps that are placed in both sides of a haustral bend (clamshell polyps) can give some problems during the endoscopical removing procedure. Plated "carpet polyps" that develop over 4 cm cannot be endoscopically treated and need surgical procedure. Besides, from the data of the literature, it is clear that the polyps 31 to 40 mm in size have a malignant potential of 40% and in those larger than 40 mm the rate is more than 60%. These data suggest that endoscopic therapy is not oncological adeguate in such cases and that primary surgical therapy should be advocated (19).

Some difficulties can be also found in the endoscopical removing of polyps in patients with diverticulitis, "dolichocolon" or surgical adhesions.

As concerns to the rectal polyps, the so-called "problematic" rectal polyps are represented by those placed near the anus and in the rectal-sigmoid junction or Houston's valves. Among those with a large implanting base (large or giant polyps) are considered problematic those expanding for over 1/3 of the rectal circumference and/or those with an extension into two continuous bends (20). The choice of surgical options in problematic rectal polyps foresees a transanal approach (generally possible till 12-13 cm from the anus) or a transabdominal one (in the higher lesions).

Conclusions

This study, confirming the findings of several other Authors (5, 7, 10, 19), shows that the majority of polyps can be removed through a colonoscope (90,25% in our series). Endoscopic snare polypectomy performed on an outpatient basis by an expert endoscopist is the best procedure in the treatment of the majority of the colorectal adenomas. Surgery must be performed when the histologic examination shows the presence of an invasive carcinoma; it is mandatory in urgency when an endoscopic polypectomy determines a colic perforation or a bleeding otherwise not solvable (0,30% in our casistic). Those "accidents" are more frequent in the elderly because the anatomical and morphological regressive modifications of the colon ("presbyopic-colon") and because of the frequency of diverticular disease.

The location, the size, the grade of dysplasia of the polyps and the anatomical and morphologic conditions of the colon should represent a limit to the feasibility and efficacy of the endoscopic treatment.

Clinical and endoscopical follow-up must be performed in all the patients at different intervals according to the histologic findings and the results of the successive endoscopies.

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