MORPHOLOGICAL STUDY OF THE POLYPOID LESIONS OF THE GASTROINTESTINAL TRACT

Rahat N[1] & Sadiq S[2]

ABSTRACT

Objective: This study was carried out to evaluate the frequency, of polypoid lesions of the gastrointestinal tract and to observe the frequency of dysplastic / malignant change in these polyps.

Design: This was a 13-years retrospective study.

Setting: Department of Pathology, Basic Medical Sciences Institute (BMSI), JPMC Karachi and included all polypoid lesions from the attached hospital, Pakistan Medical Research Council (PMRC) and small numbers from private clinics, from January 1991 to December 2003.

Subjects: This study was based on the review of 152 Polypoid lesions of gastrointestinal tract. The relevant clinical data and parameters like size, number ,presence or absence of stalk, were recorded. The polyps were classified histologically in adenomatous, hamartomatous, inflammatory, neoplastic other than adenomatous and miscellaneous type.

Results: Large intestine was the commonest site where 142 out of 152 polyps were found. Juvenile polyps were the commonest finding. Six polyps were found in the stomach, three in the small intestine,and one was in esophagus.

Conclusion: In comparison with studies from western countries, polypoid lesions especially adenomatous polyps were found less common in the population of Karachi. This study was based on hospital admission and as such do not give any idea of the true incidence of the polyps. There is a need for developing a registry for cases of polyps/polyposis.

KEY WORDS: Polypoid, Juvenile, Adenomatous.

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INTRODUCTION

The word polyp in the gastrointestinal tract is used to describe any circumscribed lesion that projects above the surface of surrounding mucosa and used alone conveys nothing about the nature of such a lesion. It is only by microscopic examination that their true nature is determined. The several histological types of polyps differ in their clinical significance, particularly in their malignant potential. Thus the management of the individual patient with a polyp depends on an accurate histological diagnosis[1-3]. Polyps may be seen any where along the gastrointestinal tract, namely esophagus, stomach, small intestine and large intestine. Polyps are most common in colon. Polyps of gastrointestinal tract are broadly classified as epithelial and non-epithelial. Polypoid lesions of epithelial origin include neoplastic or adenomatous polyps, hamartomatous, hyperplastic and inflammatory polyps. The non-epithelial polyps originates from other layers of gastrointestinal tract like, lymphoid tissue,

1. Dr. Naushaba Rahat
Demonstrator
Department of Pathology,
Peoples Medical College for Girls,
Nawabshah-67450, Pakistan
2. Dr. Saleem Sadiq
Professor
Department of Pathology,
Basic Medical Sciences Institute,
Jinnah Postgraduate Medical Centre,
Karachi-75510, Pakistan

Correspondence

Dr. Saleem Sadiq
E-mail:ss_jpmc-ki@hotmail.com

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smooth muscle, fat and nervous tissue. It is very important to diagnose exact nature that is the specific type, for patient's prognostic point of view.[2,4,5] Polyps are uncommon in esophagus. Most of the inflammatory lesions produce slight mucosal irregularities and erosions. While tumors present at an advanced stage with a morphology ranging from stricture to plaque like masses to fungating ulcers.[6] Polyps in the stomach are not common. Gastric polyps are associated with pernicious anemia and chronic atrophic gastritis. Carcinoma coexists with polyps in the same stomach.[7] Unlike the other parts of the gastrointestinal tract the large intestine generate large numbers of polyps.[8] Majority of colorectal cancers develop from a benign adenomatous polyp, through a sequence of identified genetic alteration and histological grades to invasive cancers.[9] Almost 80-90% of all colorectal cancer develop over a protracted period along the polyp cancer sequence. Early detection and the removal of precancerous polyp with subsequent surveillance has the potential not only to improve cancer survival but also to prevent colorectal cancer development and reduce future incidence. The colorectal polyps have been extensively studied in the world especially by Western and Japanese scientists.[9-12]

In view of differences in dietary habits as compared to West it was felt that the prevalence of polypoid lesions might be different in our population. To our knowledge a comprehensive study of the polyps of the gastrointestinal tract has not yet been made in our country. Few reports available have been on endoscopically removed polyps in children. This study was done to observe the frequency/ types of polypoid lesions of the gastrointestinal tract in the population of Karachi, to observe the frequency of dysplastic/ malignant change in these polyps, and to compare the results of our study with those done in other countries in the world.

MATERIALS AND METHODS

This study was based on the review of polypoid lesions of gastrointestinal tract, received in the Department of Pathology BMSI, JPMC from January 1991 to December 2003. The cases were received from attached hospital of the institute, Pakistan Medical Research Council and small numbers from private clinics of Karachi.

All the cases diagnosed as "polyps" in gastrointestinal tract were retrieved from the surgical pathology registers of Department of Pathology JPMC. A total of 152 polypoid lesions were found in entire gastrointestinal tract. Clinical data, including age, sex, anatomic site, duration, endoscopic findings and clinical diagnosis were recorded. Preserved paraffin embedded blocks were taken out from the record and fresh sections cut and stained with haemotoxylin and eosin stain. Various special stains like Periodic Acid-Schiff(PAS) and trichrome were applied in few cases. The stained sections were studied by light microscope using 4 X, 10 X and 40 X dry objectives. All the cases were divided according to site into neoplastic and non-neoplastic polyps. Neoplastic or adenomatous polyps were classified as tubular, tubulovillous and villous. Tubular polyp was defined as a polyp composed of straight or branched tubules of adenomatous (dysplastic) epithelium. Tubulovillous polyps were characterized by the presence of both tubular and villous components, villous components between 25% and 75%. Villous polyps were defined by the presence of pointed blunted finger like process of lamina propria covered by dysplastic epithelium, villous component greater than 75%.[13] The presence or absence of stalk and degree of dysplasia were assessed histologically in all cases. Dysplasia were classified into low and high grade.[14] Malignant polyp was defined as adenomatous polyps in which carcinoma invaded across the muscularis mucosae.[15] Juvenile polyps were classified as hamartomatous, defined by the presence of hypercellular stroma, large mucin filled cysts, lack of a smooth muscle core and flattened epithelium with no signs of hyperplasia. Associated ulceration, inflammation and degree of dysplasia were also noted.[16]

Peutz Jeghers polyp was characterized by

prominent arborizing pattern of smooth muscles derived from the underlying muscularis mucosae with overlying epithelial cells typical of the involved segment of gastrointestinal tract with normal cellularity of lamina propria. Inflammatory polyps were defined by variable amount of inflammatory infiltrate, ulceration, oedema and granulation tissue.

RESULTS

Out of 152 polypoid lesions of gastrointestinal tract 142(93.42%) were present in large intestine. 100(65.78%) were Juvenile, 18(11.8%) were adenomatous polyps, 18(11.8%) were inflammatory (non-specific) with out any cause and 3(1.98%) were inflammatory polyps with ulcerative colitis. Miscellaneous group representing 3(1.98%) consisting of one (0.66%) fibrolipoma, lipomatous and lymphoid polyp each. Stomach represents second common site, 6(3.9%) polyps, in a total of 152 polyps, including 5(3.3%) hyperplastic and one (0.66%) non-Hodgkin's lymphoma. 3(1.98%) polyps were present in small intestine including, Peutz Jeghers polyp, inflammatory polyp and Heterotopic pancreas. In esophagus one fibrovascular polyp (0.66%) was found. (Table-I)

Table-I: Distribution of 152 polypoid lesions of gastrointestinal tract

Site	*Type of Polyp*	*No. of Polyp*	*Percentage*	
Esophagus	Fibro vascular	1	0.66	0.66
Stomach	Hyperplastic	5	3.33	
	Non Hodkin's Lymphoma	1	0.66	3.99
Small intestine	Peutz Jeghers	1	0.66	
	Inflammatory	1	0.66	1.99
	Heterotopic pancereas	1	0.66	
Large Intestine	Juvenile	100	65.8	65.8
	Adenomatous Polyp			
	•Tubular	10	6.6	
	•Tubulovillous	3	1.97	11.8
	•Villous	5	3.3	
	Inflammatory (nonspecific) polyps	18	11.8	11.8
	Inflammatory with uncreative colitis	3	1.90	1.98
	Others			
	Lipoma	1	0.66	
	Lymphoid Polyp	1	0.66	1.98
	Fibrolipoma	1	0.66	
		142	-	**93.42**
Total:	-	**152**	-	**100.00**

Juvenile polyps were the commonest, polyps in the current study (Figure-1). They were more common 54(76.1%) in female population as compared to male 46(64.8%) (Table-II). The age of patients ranged from 3 to 60 years with maximum number 48 (48%) in the first decade. Majority 78(78%) of patients were under 20 years of age (Table-III). Low grade dysplasia was found in 8(8%) of Juvenile polyps. None of the Juvenile polyp showed malignant change. Statistically the Juvenile polyps were significantly high under 20 years 78 (89.6%) as compared to older age (>20 Years). Out of 142 polyps of large intestine, 18(12.7%) were adenomatous polyps. The ages ranged from 15-55 years with maximum numbers 6(46.2%) in 4th decade (Table-III). Adenomatous polyps were more common in females 10 (14.1%) as compared to the male, 8(11.3%), with male to female ratio 1:1.2 (Table-II). 10(55.5%) polyps were tubular, 3(16.7%) tubulovillous and 5(27.8%) were villous polyps (Table-IV) Figure- II,III High grade dysplasia was present

Table-II: Sex distribution of 142 polypoid lesions of large intestine (n= 142)

Type	*Male*		*Female*		*Total*	
	No.	*%*	*No.*	*%*	*No.*	*%*
Juvenile Polyp	46	64.8	54	76.1	100	70.4
Adenomatous	8	11.3	10	14.1	18	12.7
Inflammatory Polyp (non specific)	12	16.9	6	8.4	18	12.7
Inflammatory Polyp (ulcerative colitis)	2	2.8	1	1.4	3	2.1
Fibrolipoma	1	1.4	0	0	1	0.7
Lipoma	1	1.4	0	0	1	0.7
Lymphoid	1	1.4	0	0	1	0.7
Total	71	100.0	71	100.0	142	100.0

in 3(16.7%) and malignant change in one (5.6%). Stalk was free in 17(94.4%) and infiltrated in one (5.6%) polyp. Table-V. The size of the polyps range from 0.5-2.5 cm.

In inflammatory polyps (non-specific) the patients ages ranged from 3-58 years with maximum numbers 8(66.7%) in 5th decade. Patients ages in inflammatory polyp with ulcerative colitis ranges from 24-38 years, maximum cases 2(15.4%) were in 4th decade. Lipoma and lymphoid polyps were present in 1st decade and fibrolipoma in 3rd decade.

Table-III: Age distribution of 142 polypoid lesions of large intestine (n= 142)

Type	*Age (in years)*						
	0-10	*11-20*	*21-30*	*31-40*	*41-50*	*51-60*	*TOTAL*
Adenomatous	0	3(8.6)	4*(21.0)	6* (46.2)	2* (16.7)	3* (27.3)	18(12.67%
Juvenile Polyp	48**(92.3)	30**(85.7)	12(63.1)	3(23.1)	2(16.7)	5(45.4)	100(70.4%)
Inflammatory Polyp (non specific)	2(3.8)	2(5.7)	1(5.3)	2(15.4)	8*(66.7)	3*(27.3)	18(12.67%)
Inflammatory Polyp (ulcerative colitis)	0	0	1(5.3)	2(15.4)	0	0	3(2.11%)
Fibrolipoma	0	0	1(5.3)	0	0	0	1(0.7%)
Lipoma	1	0	0	0	0	0	1(0.7%)
Lymphoid	1	0	0	0	0	0	1(0.7%)
Total	52	35	19	13	12	11	142

*p<0.001 and ** P<0.01

Table-IV: Histological types of 18 adenomatous polyps

Histological Type	*Number*	*Percentage*
Tubular	10	55.55
Tubulovillous	03	16.67
Villous	05	27.78
Total	18	100

Table-V: Analysis of histological features of 18 adenomatous polyps

Histological types of Adenomatous polyp	*No.*	*Histological Features*						
		Stalk		*Dysplasia/ Malignant Change*			*Stalk/Resection Margin of Polyp*	
		Indentified	*Not Identified*	*Low*	*High*	*M.Ch*	*Free*	*Infiltrated*
Tubular	10	5	5	10	0	0	10	0
Tubulovillous	3	3	0	2	1	0	3	0
Villous	5	4	1	2	2	1	4	1
Total	18	12 (66.7%)	6 (33.3%)	14 (77.8%)	3 (16.6%)	1 (5.6%)	17 (94.4%)	1 (5.6%)

M.Ch: Malignant Change

DISCUSSION

Polypoid lesions of the gastrointestinal tract especially colorectal polyps are of interest to western scientists, because of the frequency of the adenomatous polyps and their malignant potential. The incidence of adenomatous polyps and carcinomas of the colon is high in Western Europe and United States in contrast to the low incidence of both among population of Afro Asian origin.[12,13] Colorectal carcinoma is the second most common cause of cancer deaths in the United States and on average approximately six people die every hour of every day as a result of this malignancy.[17,18] After considerable debate in the medical literature about the existence of denovo cancer and the classification of polyps and their relationship to cancer, the concept of the adenoma carcinoma sequence emerged in the 1970s as the dominant morphogenetic explanation of colorectal cancer. Colorectal cancer represents the final stage of a slow multistep carcinogenic process whose evolution involves the adenomatous polyp. Colorectal cancer is a disease for which screening and preventive measures have proven effectiveness. This malignancy has a significant incidence, is life threatening and has a long asymptomatic period during which it can be diagnosed in an early stage that is amenable to treatment.[9,19]

Figure-I: Photomicrograph of the Juvenile Polyp (H & E X 40)

Figure-II: Photomicrograph of the adenomatous (Tubular) Polyps (H & E X 100)

Figure-III: Photomicrograph of the adenomatous (Villous) Polyp (H & E X 100)

This study to our knowledge is first of its kind in our population. Large intestine was the commonest site as reported by others.[8] Juvenile polyps are the frequently occurring polypoid lesions in children, but also encountered in adults.[20] In our study the Juvenile polyps were the commonest polyps accounting 100 (65.78%). Low grade dysplasia was found in 8% of cases. In contrast to reported higher frequency in males,[20,21] this study showed female predominancy. The frequency of Juvenile polyps in this study is slightly lower then reported frequency 85.5%.[20] This was probably because these studies were essentially on paediatric cases.

The reported prevalence of adenomatous polyps varies in different geographic locations,

from 1.5% in Iran, a low adenoma prevalent area, 29.3% in Barcelona, an intermediate area and 37% and 64% in Liverpool and Hawaii (Japanese) respectively, high prevalent areas. The comparison of the adenomatous polyps with other countries showed that our population is in the low adenoma prevalent group with Iran (1.5%) and Cali 2.4% The frequency of adenomatous polyps in our population as compared to Hawaiian Japanese and US population and Australia is low. [22-25] Tubular polyps were the commonest finding in accordance to many reports.[26,27] The size and villous component were the important determinant for the malignant potential as reported in various reports.[15,26] The maximum numbers were present in 4th decade in contrast to reported average age 52 years.[27] Adenomatous polyps are commonly reported more in males.[25] In contrast in the current study adenomatous polyps were more common in females. In this study lipomatous polyp represent 0.66% which is lower than the reported (1.8%-4%) frequency.[22,25,28]

Benign esophageal polyps occur so infrequently that their true incidence rate in unknown. These are commonly reported in literature in the form of case reports.[29,30] We found one (0.66%) fibrovascular polyp in esophagus. Gastric polyps are not common. Their frequency at endoscopy is about 3% to 5%, of which hyperplastic polyps represent approximately 50% to 90% of the gastric polyps.[31,32] Our results 3.96% gastric polyps are in accordance to reported frequency of gastric polyps. Among them 83.4% were hyperplastic polyp. Peutz Jeghers polyp was present in small intestine and was associated with oral mucocutaneous pigmentation in 18 years male as reported by Jegers.[33] Pancreatic Heterotopia occurs most commonly in the duodenum stomach and jejunum. It has been reported in 0.6 to 5.6 percent of autopsies.[34] Current study is in accordance to reported frequency (.6%) of heterotopic pancreas.[33]

Familial adenomatous polyposis is an autosomal dominant disease with nearly complete penetrance and remarkable variation in phenotypic expression. Familial polyposis, one of several clearly defined precancerous lesions of genetic origin is characterized by the presence of numerous adenomatous polyps and a major risk of development of single or multiple adenocarcinoma at a younger age.[35,36] In this study there is no case of familial adenomatous polyposis. The possible reason may be the presence of a children hospital in neighborhood of our institute where the paediatric patients report. Complete absence of hyperplastic polyps in this study is remarkable. The possible reason for their complete absence is that they are small diminutive polyps, usually asymptomatic. They are mostly identified on autopsy survey or endoscopic procedure in high adenomatous polyps prevalent countries during screening, surveillance of patients, as an incidental finding.

CONCLUSION

The figures presented in this study are based on hospital admission and as such do not give any idea of the true incidence of the polypoid lesions in the population of Karachi. There is therefore a need for developing or establishing a registry for cases of polyps / polyposis, so that the true incidence of polypoid lesions in our population can be determined, and to form the bases for further study to determine the prognosis of the various polypoid lesions, various aspects of the clinical management, etiology and biology of the adenoma carcinoma progression in our population.

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