

MORPHOLOGICAL STUDY OF INTESTINAL POLYPS WITH CLINICOPATHOLOGICAL CORRELATION - 2 YEARS OBSERVATIONAL STUDY AT A TERTIARY CARE CENTRE OF SOUTH INDIA

Shiny Padinjarayil Manakkad¹, Rema Priyadarshini², Bindu V³

¹Assistant Professor, Department of Pathology, Government Medical College, Kozhikode.

²Additional Professor, Department of Pathology, Government Medical College, Alappuzha.

³Assistant Professor, Department of Social and Preventive Medicine, Government Medical College, Kozhikode.

ABSTRACT

BACKGROUND

Polyps of the intestine are common specimens and do not have symptoms unless they cause obstruction or bleed.¹ There are many types of intestinal polyps. Among all polyps, most frequently occurring are adenomatous polyps. Adenomas are considered precursor lesions to invasive carcinoma. Colorectal cancer stands second to lung cancer as the most common cause of cancer mortality. The basic aim of management of patients with adenomatous polyps in the large bowel remains to prevent the development of cancer by detection and removal of precancerous lesions.

The objective of this study is to classify intestinal polyps and identify prevalence of each morphologic type. To study the gross and histopathological features and to correlate with clinical data.

MATERIALS AND METHODS

This prospective study was conducted for a period of two years in Department of Pathology. The material included 46 intestinal resections, 61 polypectomies and 53 mucosal biopsies. Collected data entered in MS-Excel and analysed using SPSS-16.

RESULTS

160 intestinal polyps were studied during a period of two years. Neoplastic polyps (79%) were common than non-neoplastic polyps (21%). Among the neoplastic polyps, adenomatous polyps (81%) constitute majority of cases. Among the non-neoplastic polyps, juvenile polyps were common. Majority of cases of neoplastic polyps (55.6%) were in older age group, while majority of non-neoplastic polyps (73.5%) in younger age group. Male predominance was seen. Majority of polyps (86.8%) were in large intestine and most of them were pedunculated polyps (66.25%). Most frequent presenting complaints were bleeding per rectum. Among larger polyps, 91.5% of cases were neoplastic.

CONCLUSION

This study summarises various types of intestinal polyps. Adenomatous polyp presented the majority type and showed an increase in incidence in older age group. This shows that risk factor for development of adenomatous polyps and hence colorectal malignancy increases as age advances. Majority of adenomatous polyps were in distal part of large intestine. Distal predominance of adenomatous polyps support adenoma-carcinoma hypothesis. Adenomas with increased size (> = 1 cm) have a much higher malignant potential. The main purpose of screening is to detect such lesions before they become malignant. In younger children, most common polyps of the colon were juvenile polyp which is a non-neoplastic polyp.

KEYWORDS

Neoplastic Polyps, Non-Neoplastic Polyps, Adenomatous Polyps, Malignant Potential.

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BACKGROUND

Polyps of the intestine are one of the common specimens for the practicing pathologists. Intestinal polyps are mucosal projections from the epithelial lining into the lumen of any part of intestine.

These polyps vary in size, shape and histopathology. They usually do not cause symptoms unless they cause obstruction or bleed. There are many types of intestinal polyps and accurate histological assessment is important for accurate

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Corresponding Author:

Dr. Shiny Padinjarayil Manakkad,

Vinodini Vihar,

(PO)-Kolathara, Calicut.

E-mail: shinypath77@gmail.com

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diagnosis and appropriate management of the patients. Therefore, all polyps must be excised to achieve a final diagnosis. Polyps are classified into non-neoplastic and neoplastic polyps. Among all polyps neoplastic polyps are common, of which most frequently occurring are adenomatous polyps.¹ Non-neoplastic polyps or tumour-like lesions were previously thought to have no malignant potential. These views of the totally harmless nature of non-neoplastic polyps are no longer true. Juvenile polyposis syndrome and Peutz Jeghers polyposis syndrome have malignant potential through adenomatous change. Among all polyps, most frequently occurring are adenomatous polyps.^{2,3}

Precursor lesions to invasive carcinoma are adenomatous polyps. Adenomas more than 10 mm are called adenomas with advanced pathology. Risk of malignancy increases with increase in size. The main aim of diagnosis of adenomatous polyps is to remove those lesions and prevent the development of cancer.⁴ So effective screening strategies are

very important. So present study is aimed to classify intestinal polyps, to know proportion of each morphological type, to correlate age, sex, site of clinical features and histology of the polyps.

MATERIALS AND METHODS

The study was conducted in Department of Pathology. The material included 46 intestinal resections (28.8%), 61 polypectomy specimens (38.1%) and 53 mucosal biopsies (33.1%). The study was approved by Ethics Committee of the institution. Specimens were fixed in 10% formalin, processed and sections were stained with haematoxylin and eosin. If necessary, special stains (trichrome stain) and immunohistochemical studies (LCA, CD20 and CD3) were done.

All statistical analysis was done with SPSS-16. Chi square value and P value were calculated. P value < 0.05 was significant.

RESULTS

During a period of two years, one hundred and sixty cases of intestinal polyps were studied. Neoplastic polyps (126 cases) were found to be common than non-neoplastic polyps (34 cases).

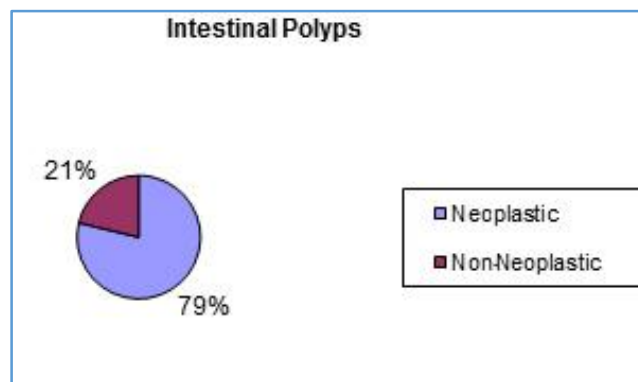


Figure 1. Types of Intestinal Polyps - Neoplastic vs. Non-Neoplastic

Age

The age of patients ranged from 2 - 85 years. Most frequent age group affected in our study was 40-49 years (18.1%). Majority of cases of neoplastic polyps were in older age group (51 and above), while majority of non-neoplastic polyps in younger age group (< 30 yrs.). Mean age was 47.14 with standard deviation of 22.13. Among adenomatous polyps, majority of cases were in older age group. Majority of cases of juvenile polyps were in first decade. Distribution of different types of polyps based on age groups are shown in Table 1.

Age	Type of Polyp					
	Based on Clinical Behaviour		Sub-Classified Based on Histopathology			
	Neoplastic (N=126)	Non-Neoplastic (N=34)	Adenomatous (N=102)	Non-Adenomatous Neoplastic Polyps (N=24)	Juvenile (N=25)	Others* (N=9)
0-29 (n = 33)	8 (24.2%)	25 (75.8%)	5 (15.2%)	3 (9.1%)	24 (72.7%)	1 (3%)
30-50 (n = 52)	48 (92.3%)	4 (7.7%)	35 (67.3%)	13 (25%)	1 (1.9%)	3 (5.8%)
51 and above (n = 75)	70 (93.3%)	5 (6.7%)	62 (82.7%)	8 (10.7%)	0	5 (6.7%)
P value - 0.000 (< 0.05)			P value - 0.000 (< 0.05)			

Table 1. Age Distribution of Intestinal Polyps

*Others - non-neoplastic polyps like Hyperplastic polyp, Peutz-Jegher polyp, inflammatory myoglandular polyp and Angiogenic polyp.

Sex

Male predominance was seen in both neoplastic and non-neoplastic polyps. In both males and females, the incidence of adenomatous polyps increases with age. Distribution of different types of polyps based on gender are shown in Table 2.

Sex	Type of Polyp					
	Based on Clinical Behaviour		Sub-Classified Based on Histopathology			
	Neoplastic (N=126)	Non-Neoplastic (N=34)	Adenomatous (N=102)	Non-Adenomatous Neoplastic Polyps (N=24)	Juvenile (N=25)	Others (N=9)
M (n = 93)	71 (76.3%)	22 (23.7%)	61 (65.6%)	10 (10.8%)	18 (19.4%)	4 (4.3%)
F (n = 67)	55 (82.1%)	12 (17.9%)	41 (61.2%)	14 (20.9%)	7 (10.4%)	5 (7.5%)
P value - 0.249			P value - 0.141			

Table 2. Sex Distribution in Intestinal Polyps

Clinical Features

Most frequent presenting complaint was bleeding per rectum (49.37%), which was also the case with adenomatous polyps and adenocarcinoma. Distributions of clinical features of different types of polyps are shown in Table 3.

Clinical Features	Type of Polyp					
	Based on Clinical Behaviour		Sub-Classified Based on Histopathology			
	Neoplastic (N = 126)	Non-neoplastic (N = 34)	Adenomatous (N = 102)	Non-Adenomatous Neoplastic Polyps (N = 24)	Juvenile (N = 25)	Others (N=9)
Bleeding per Rectum (n = 78)	55 (70.5%)	23 (29.5%)	47 (60.3%)	8 (10.3%)	21 (26.9%)	2 (2.6%)
Abdominal Mass (n = 2)	2 (100%)	0	2 (100%)	0	0	0
Abdominal Pain (n = 32)	29 (90.6%)	3 (9.4%)	15 (46.9%)	14 (43.8%)	0	3 (9.4%)
Mass per Rectum (n = 2)	2 (100%)	0	2 (100%)	0	0	0
Mucus per Rectum (n = 6)	5 (83.3%)	1 (16.7%)	4 (66.7%)	1 (16.7%)	1 (16.7%)	0
Asymptomatic (n = 40)	33 (82.5%)	7 (17.5%)	32 (80.0%)	1 (2.5%)	3 (7.5%)	4 (10%)
P value - 0.196			P value - 0.000 (< 0.05)			

Table 3. Clinical Features of Intestinal Polyps

Site of Involvement

Majority of polyps (86.8%) were present in large intestine. All the adenomatous polyps were seen in large intestine (100%), which was statistically significant (P value - <.05). They displayed left-sided predominance (85.5%); 74% of adenomatous polyps in rectum and 85.7% of adenomatous polyps in anal canal showed larger size (> 1 cm), which was statistically significant (p value - .03). Only 6% of polyps were seen in right-sided colon, of which 70% of cases were adenomatous polyps. Among the adenomatous polyps in right-sided colon, 85.7% of the cases were in older age group. Majority of juvenile polyps were seen in rectum (88%).

Distributions of sites of different types of polyps are shown in Table 4.

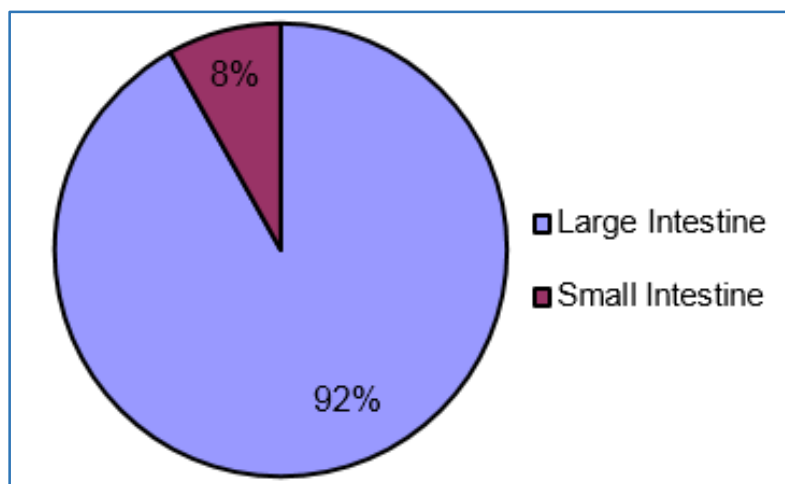


Figure 2. Distribution of Polyps by Site

Site	Type of Polyp					
	(Based on Clinical Behaviour)		(Sub-Classified Based on Histopathology)			
	Neoplastic (N=126)	Non-Neoplastic (N=34)	Adenomatous (N=102)	Non-Adenomatous Neoplastic Polyps (N=24)	Juvenile (N=25)	Others (N=9)
Rectum (n = 67)	44 (65.7%)	23 (34.3%)	39 (58.2%)	5 (7.5%)	22 (32.8%)	1 (1.5%)
Descending Colon (n = 54)	47 (87.0%)	7 (13%)	41 (75.9%)	6 (11.1%)	3 (5.6%)	4 (7.4%)
Ascending Colon (n = 10)	10 (100%)	0 (0%)	7 (70%)	3 (30%)	0	0
Small Intestine (n = 13)	10 (76.9%)	3 (23.1%)	0	10 (76.9%)	0	3 (23.1%)
Diffuse (n = 8)	8 (100%)	0 (0%)	8 (100%)	0	0	0
Anal Canal (n = 8)	7 (87.5%)	1 (12.5%)	7 (87.5%)	0	0	1 (12.5%)
P value - 0.014 (< 0.05)			P value - 0.000 (< 0.05)			

Table 4. Distribution of Intestinal Polyps by Site

Gross Feature

Twenty nine cases (17.6%) presented with multiple polyps. Both the neoplastic and non-neoplastic polyps were presented as single polyps.

Distribution of gross features (No. of polyps) of different types of polyps are shown in Table 5.

No. of Polyp	Type of Polyp					
	Based on Clinical Behaviour		Sub-Classified Based on Histopathology			
	Neoplastic (N=126)	Non-Neoplastic (N=34)	Adenomatous (N=102)	Non-Adenomatous Neoplastic Polyps (N=24)	Juvenile (N=25)	Others (N=9)
Single (n = 131)	100 (76.3%)	31 (23.7%)	79 (60.3%)	21 (16%)	24 (18.3%)	7 (5.3%)
Multiple (n = 29)	26 (89.7%)	3 (10.3%)	23 (79.3%)	3 (10.3%)	1 (3.4%)	2 (6.9%)
P value - 0.086			P value - 0.150			

Table 5. Number of Polyps

Sessile/Pedunculated

Majority of the non-neoplastic polyps (94.1%) and majority of juvenile polyps (96%) were pedunculated, which was statistically significant.

Distributions of gross features of different types of polyps are shown in Table 6.

Gross Morphology	Type of Polyp					
	Based on Clinical Behaviour		Sub-Classified Based on Histopathology			
	Neoplastic (N=126)	Non-Neoplastic (N=34)	Adenomatous (N=102)	Non-Adenomatous Neoplastic Polyps (N=24)	Juvenile (N=25)	Others (N=9)
Sessile (n = 54)	52 (96.3%)	2 (3.7%)	39 (72.2%)	13 (24.1%)	1 (1.9%)	1 (1.9%)
Pedunculated (n = 106)	74 (69.8%)	32 (30.2%)	63 (59.4%)	11 (10.4%)	24 (22.6%)	8 (7.5%)
P value - 0.000 (< .05)			P value - 0.001 (< .05)			

Table 6. Gross Morphology of Intestinal Polyps

Size

Among larger polyps 91.5% were neoplastic, while only 8.5% were non-neoplastic. This finding showed statistical significance; 61.8% of adenomatous polyps were of size >= 1 cm, which was statistically significant (P value = 0.01); 78% of adenomatous polyps in females were of larger size, while in males both smaller and larger polyps were in equal proportion (P value = 0.005). Distributions of size of different types of polyps are shown in Table 7.

Size (cm)	Type of Polyp					
	Based on Clinical Behaviour		Sub-Classified based on Histopathology			
	Neoplastic (N=126)	Non-Neoplastic (N=34)	Adenomatous (N=102)	Non-Adenomatous Neoplastic Polyps (N=24)	Juvenile (N=25)	Others (N=9)
< 1 (n = 49)	40 (81.6%)	9 (18.4%)	39 (79.6%)	1 (2%)	6 (12.2%)	3 (6.1%)
1 - 2 (n = 52)	32 (61.5%)	20 (38.5%)	30 (57.7%)	2 (3.8%)	16 (30.8%)	4 (7.7%)
> 2 (n = 59)	54 (91.5%)	5 (8.5%)	33 (55.9%)	21 (35.6%)	3 (5.1%)	2 (3.4%)
P value - 0.000 (< 0.05)			P value - 0.000 (< 0.05)			

Table 7. Size Distribution of Polyps

Histopathology

Among the neoplastic polyps, epithelial polyps (105 cases, 65.63%) accounted for maximum number of cases with adenomatous polyps constituting 102 (63.76%) cases. Lipomatous polyps were mostly seen in the fifth decade in left-sided colon with almost equal incidence in males and females. Inflammatory fibroid polyps were seen in the third, fifth and sixth decade, and most common site being the small intestine. There was one case each of leiomyomatous polyp and gastrointestinal stromal tumour, which were located in the small intestine.

There were three cases of Non-Hodgkin Lymphoma in the second, sixth and eighth decade. Two of them were in the large intestine and one in the small intestine; 2 cases of Non-Hodgkin lymphoma were of MALT type category and one of diffuse large B cell lymphoma.

Among the non-neoplastic polyps, juvenile polyps were the most common. There were one case each in inflammatory myoglandular polyp and angiogenic polyp. Inflammatory

myoglandular polyp was in the age group 60 - 69 yrs. and located in large intestine angiogenic polyp in 30 - 39 yrs. and located in small intestine.

Histopathologies of different types of polyps are shown in Table 8.

Type of Polyp	Number	Percentage
Neoplastic	126	78.75
Epithelial	105	65.63
Adenomatous Polyp	102	63.76
Adenocarcinoma	3	1.88
Mesenchymal	21	13.13
Inflammatory Fibroid Polyp	7	4.38
Lipomatous Polyp	9	5.63
Leiomyomatous Polyp	1	0.63
Non-Hodgkin Lymphoma	3	1.88
Gastrointestinal Stromal Tumour	1	0.63
Non-Neoplastic	34	21.25

Juvenile Polyp	25	15.63
Hyperplastic Polyp	2	1.25
Peutz-Jeghers Polyp	4	2.5
Inflammatory Myoglandular Polyp	1	0.63
Angiogenic Polyp	1	0.63
Fibroepithelial Polyp	1	0.63
Total	160	100

Table 8. Histopathology of Different Types of Polyps

Photomicrographic pictures of intestinal polyps are shown below in Figures 3 - 9.

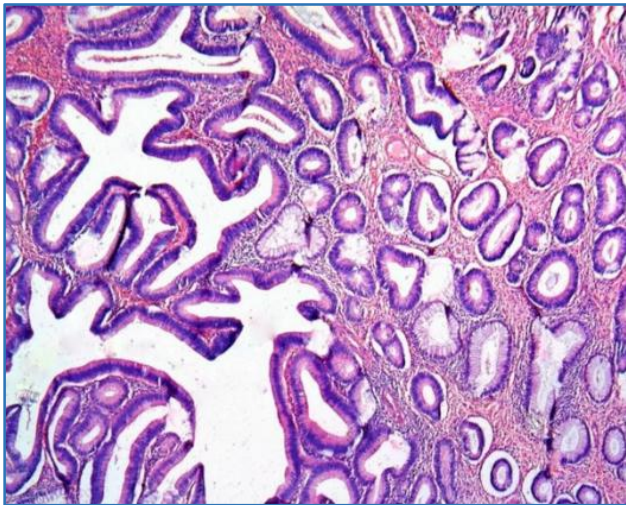


Figure 3. Adenomatous Polyp (H & E x 40)

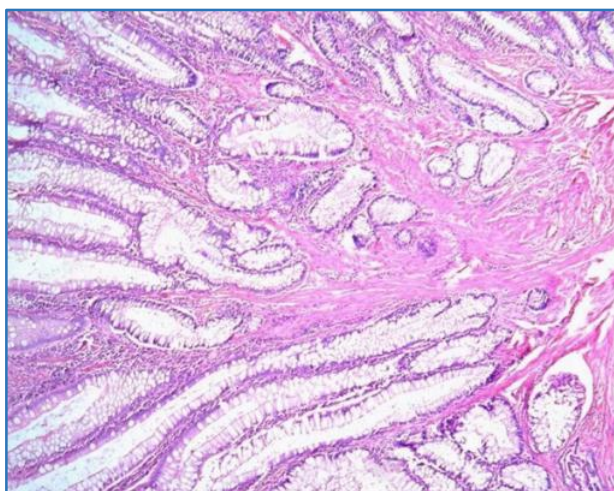


Figure 4. Inflammatory Myoglandular Polyp: Showing Inflammation, Smooth Muscle Proliferation and Hyperplastic Glands (H & E x40)

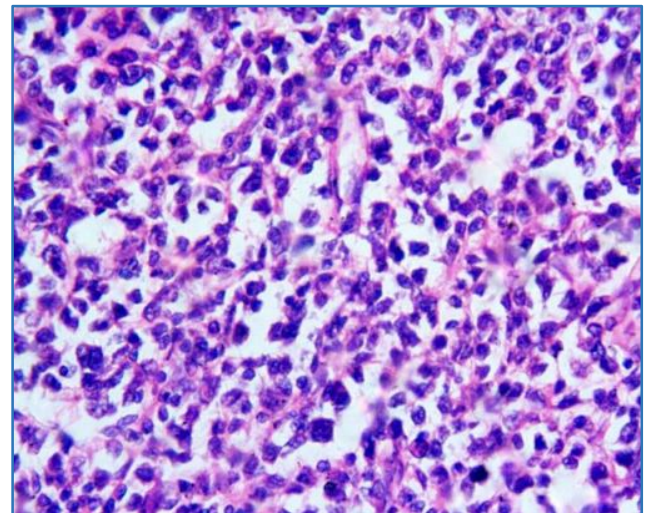


Figure 5. Non-Hodgkin's Lymphoma (H & E x400)

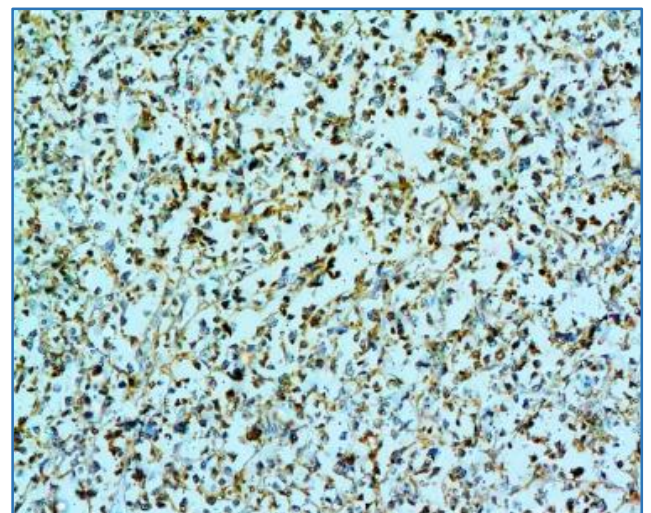


Figure 6. Non-Hodgkin's Lymphoma - IHC - CD20 (x 200)

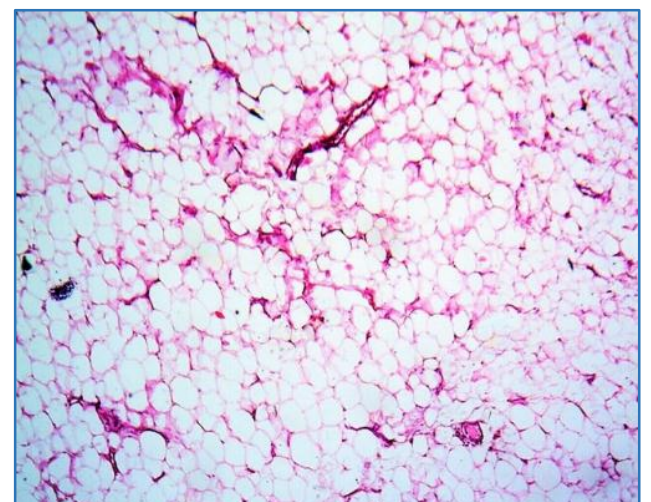
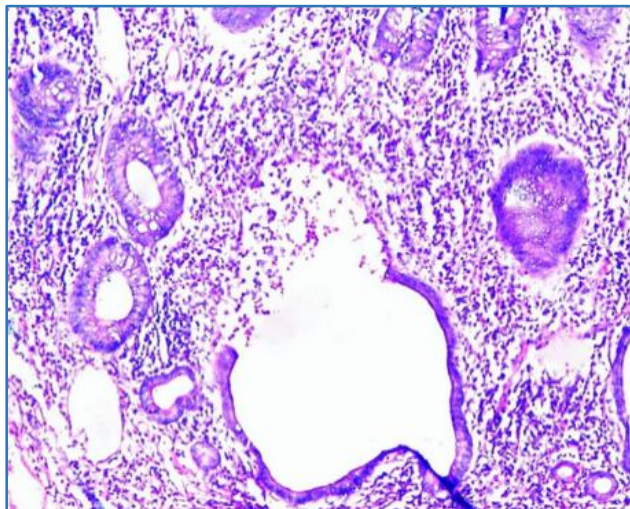
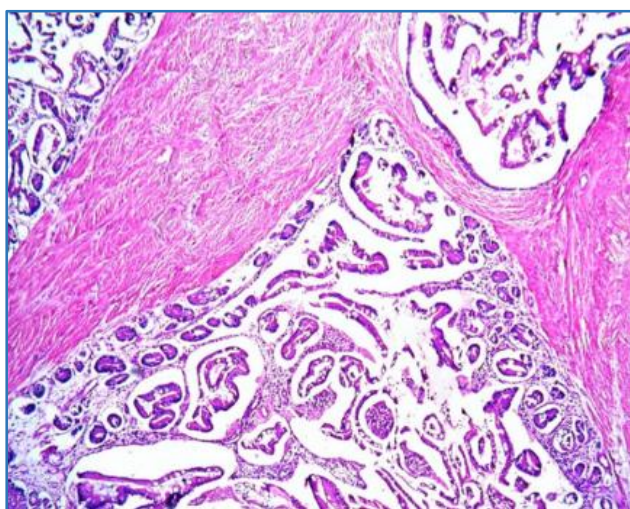


Figure 7. Lipomatous Polyp (H & E x 40)



**Figure 8. Juvenile Polyp
(H & E x100)**



**Figure 9. Peutz-Jegher Polyp: Glands with Arborizing
Pattern of Smooth Muscle (H & E x40)**

DISCUSSION

160 cases of intestinal polyps were studied during period of 2 years. Among them 126 were neoplastic and 34 were non-neoplastic.

Age

Majority of cases of neoplastic polyps were in older age group (51 and above), while majority of non-neoplastic polyps were in younger age group (< 30 Yrs.). The age group of adenomatous polyps ranged from 10 - 19 yrs. to 80 yrs. with maximum number of cases in age group 50 and above. This was comparable with the study conducted by Arnold et al.⁵ This indicates that the risk factor for development of colonic adenomatous polyps increases as age advances. According to Asia Pacific colorectal cancer working group, screening for colorectal cancer should be started at the age of 50 yrs.⁶ In study conducted by Jayadevan et al, there was a significant increase in incidence of polyps at age 40.⁷ According to this study, they proposed that screening colonoscopy should be started at age of 40 yrs. Among the non-neoplastic polyps, juvenile polyps constituted majority with majority of cases occurring in first decade. This was comparable with Irfan et al and Durno study.^{8,9}

Sex

In our study, adenomatous polyps showed male preponderance. Juvenile polyps also showed a male preponderance with maximum number of cases in the first decade. This was comparable with Irfan et al and Durno study.^{8,9} In our study, in both males and females the incidence of adenomatous polyps increased with age. But in an autopsy study conducted by Bombi, prevalence of adenomas increased with age and also according to sex. This increase in incidence with age was seen in men older than 60 yrs. In this study, actually the incidence was decreased in postmenopausal women. This may be due to the hormonal influence in pathogenesis of intestinal epithelial neoplasms.¹⁰

Clinical Features

Most frequent presenting complaint was bleeding per rectum.

Site

In our study, large intestine was the commonest site for the neoplastic polyps. This was in concordance with study conducted by Gurung et al and Rahat et al.^{11,12} In studies conducted by Gurung et al 83.6% of polyps were in large intestine and in studies conducted by Rahat et al 93% of polyps were in large intestine.

In this study, all the adenomatous polyps were in large intestine (100%). Adenomatous polyps displayed left-sided predominance. These findings were in agreement with Konishi and Morson study, although number of cases in rectum was higher.¹³ Distal predominance of adenomatous polyps (Region where most colon cancers arise) supports the adenoma-carcinoma hypothesis. In studies conducted by Eshgi et al, there is increasing right-sided prevalence of the adenomatous polyp with age.¹⁴ So they suggested that screening of proximal bowel is important in older patients. In our study also, majority of adenomatous polyps in right-sided colon were in older age group. Majority of the juvenile polyps were in the rectum, which was the same as in previous studies.^{8,9}

Size

In our study among larger polyps, majority were neoplastic, while only few cases were non-neoplastic. According to Atkin et al, polyps of size 1 cm or more have more chance of subsequent malignancy, while polyps of size less than 1 cm does not have chances to become malignant.¹⁵ In our study, larger adenomas were frequent in rectosigmoid colon. This was in concordance with an autopsy study conducted by Bombi.¹⁰ In this study, polyps > 1 cm size was seen only in rectosigmoid colon. In our study, adenomatous polyps in women were of larger size (≥ 1 cm) compared to those in men. The same finding was seen in studies conducted by Atkin et al. In studies conducted by Gentian et al, most of the intestinal polyps including adenomatous polyps were of size less than or equal to 1 cm. But the risk of high-grade dysplasia was more in tumours more than 1 cm.¹⁶

Histomorphologic Types of Polyps

In our study, adenomatous polyps represent 63.76% of all polyps studied. This was comparable with the study conducted by Eshghi et al and Geramizadeh B et al.^{14,17} While in study conducted by Deepa et al, juvenile polyps constituted the majority.¹⁸ In this study, majority of patient's age ranged from 1 - 17 yrs. This may be the reason why juvenile polyps

constituted the majority case. In study conducted by Irfan et al also, juvenile polyps constituted 67% of total polyps. According to study conducted by Cannon-Albright et al, incidence of adenomatous polyps was 12% in a study of unselected patients.² In another autopsy study, incidence was 30%.³

Among mesenchymal polyps, lipomatous polyp was the most common followed by inflammatory fibroid polyp. Incidence of colonic lipomas varies between 0.2% and 4.4%. In studies conducted in Spain, lipomatous polyp constituted for 4.1% of all polyps studied which was comparable to our study (5.63%).¹⁰ While in studies conducted by Rahat and Sadique, lipomatous polyp constituted only 0.66% of the polyps studied.¹² Inflammatory fibroid polyp usually occurs in the small intestine and can occur at any age.¹⁹ Majority of lesion show spindle cells, richly vascularised stroma and inflammatory cells.²⁰ In our study also majority of the cases were in small intestine. In previous studies of gastrointestinal lymphomas, MALT category was the most common type. In lymphomas presenting as polyps, usual histology was that of mantle cell lymphoma.^{21,22} In our study, Mucosa Associated Lymphoid Tissue (MALT) category was the common type.

In our study, the most common non-neoplastic polyps of the colon were the juvenile polyp. This was in concordance with the study conducted by Irfan et al.⁸ In studies conducted by Hiroshi et al, juvenile polyps occurred frequently in first decade with male predominance. They were found frequently in rectum and sigmoid colon.²³ Our study also showed similar finding. But in study conducted by Arnold et al, hyperplastic polyps accounted for majority of non-neoplastic polyps.⁵ There were four cases of Peutz-Jeghers polyps (25%) with 2 cases each in the small intestine and large intestine. According to study conducted by McGarrity et al, solitary Peutz-Jeghers polyps are rare and are associated with Peutz-Jeghers syndrome.²⁴

CONCLUSION

This study summarises various types of intestinal polyps. Adenomatous polyp presented the majority type. Thus, early diagnosis of adenomatous polyps helps in the long-term prevention of colorectal cancer. Adenomatous polyps showed an increase in incidence in older age group in both males and females. This shows that risk factor for development of adenomatous polyps and hence colorectal malignancy increases as age advances. So screening for colorectal cancer should be started at age of 50 yrs. or even earlier. All the adenomatous polyps were in large intestine with preference for sigmoid colon and rectum. Distal predominance of adenomatous polyps support adenoma-carcinoma hypothesis. Majority of adenomatous polyps in right-sided colon were in older age group. So screening of proximal bowel in addition is important in older patients. Among larger polyps (> 1 cm), majority were neoplastic. Adenomas with increased size (>= 1 cm) have increased incidence of malignancy. The main aim of screening is to detect early lesions. In younger children, most common polyps of the colon were juvenile polyp which is a non-neoplastic polyp.

The main limitation of this study is that sample sizes in different subgroups are small and family history and diet history were not studied in detail. The main strength is that

from a single institution, different types of polyps were studied. There is a need for developing a registry for all cases of polyps. This will help in estimating the true incidence of polypoid lesions in our population. This can form basis for further study.

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