

## Histopathological Study of Neoplasms of Lower Gastro Intestinal Tract

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### Abstract

**Background:** Gastrointestinal tract (GIT) is the important site for wide variety of lesions especially malignant tumors. GIT cancers constitute 15-25% of all cancer burdens. Lower gastrointestinal tract disorders are one of the most commonly encountered problems in clinical practice. The definitive diagnosis of upper gastrointestinal disorders rests on the histopathological confirmation and is one of the bases for planning proper treatment. We undertake this study to determine spectrum of the neoplasms of lower gastro intestinal tract, make definite histopathological diagnosis of various neoplastic and non-neoplastic lower GI tract lesions and to correlate them age, sex and and to know the incidence of lesions with reference to age and sex in rural tertiary care hospital. **Method:** A prospective descriptive study of eighty endoscopic biopsies and surgically resected specimens of lower GIT tumors were carried out at a Narayana Medical College in Nellore, during 2014 to 2015. Brief clinical history was noted when the specimen is received. The biopsy samples were subjected to histopathological studies to determine the neoplastic and non neoplastic incidence. **Results:** Amongst 80 cases, 34 cases were benign and 46 cases (57.5%) were malignant. The peak age distribution was in 4-6<sup>th</sup> decade. Males out numbered females with a male to female ratio of 2.2:1 in benign lesions, however a slight female preponderance was observed in colorectal cancer. The most common benign lesion was adenoma, followed by juvenile polyp. The occurrence of gastrointestinal tumors were highest in the colon and rectum. Majority of adenocarcinomas were Moderately differentiated. The most common age group affected is 3<sup>rd</sup> decade (42.85%) followed by 5<sup>th</sup> decade(28.57%),and 4<sup>th</sup> and 2<sup>nd</sup> decade(14.28%). Females(57.14%) are more commonly affected than males(42.85%) with male to female ratio of 0.73 : 1. Majority of the adenomas was found in age group of 51-80 years 9 cases(75%). Peak incidence was seen in 41-50 years; with 11 cases in this age group. **Conclusion:** The tumors of gastrointestinal tract show a wide variation in the histological type making the histopathological examination a must in the diagnosis of these tumors. Our study of gastrointestinal tract lesions throws a light on early diagnosis by histopathology beneficial for the patients in the rural area.

**Keywords:** Neoplastic; Biopsy; Gastrointestinal Tumors; Adenoma; Malignancy.

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### Introduction

Gastrointestinal tumors accounts for a great fraction of all neoplasms [1]. The lower gastrointestinal neoplasms include the tumors occurring from ligament of Treitz to anal canal [2]. Out of all malignant tumors, colorectal cancer is the third most common

tumors after carcinoma lung, and carcinoma breast, seen in the most of patients worldwide, accordingly to world cancer report of 2012 [3]. Malignant tumors were responsible for 12 % of the nearly 56 million deaths worldwide from all causes and many countries, more than a quarter of deaths are attributable to cancer [4]. There is world wide variation in the distribution of these neoplasms, which appear largely due to exogenous causes rather than genetic causes [5].

Small bowel, which represents 75% of the length of the alimentary tract, constitutes 2% of all malignant

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neoplasms of the gastrointestinal (GI) tract occur in the small intestine. Most commonly found lesions are NHL etc [5]. Virtually 90 % of all cancers in the large intestine are adenocarcinomas. They arise as polyps and produce symptoms relatively early and at a stage generally curable by resection. Non neoplastic polyps are classified as hyperplastic, hamartomatous, juvenile & Peutz jehgers polyp, inflammatory & lymphoid polyp. Other benign conditions are adenoma, lipoma, neuroma, angioma, etc. Hirschsprung disease, enterocolitis & various ulcers like amoebic and inflammatory bowel disease (IBD), can cause septicaemia, perforation peritonitis & electrolyte imbalance. Inflammatory bowel diseases like Crohn's disease & Ulcerative colitis are premalignant conditions, hence their early diagnosis is necessary to avoid further consequences & for proper treatment. Bowel infarction is a grave disorder that imposes 50-70% death rate. If not detected early patient may progress to shock & vascular collapse.

The peak incidence of colorectal carcinoma is 60-70 years of age and fewer than 20% of cases occur under 50 years [6]. Colorectal carcinoma in patients under 40 years usually has a poor prognosis. Apart from that, dysplastic polyp, ulcerative colitis, granulomatous lesions are also found.

Tumors arising from the small intestine and large intestine include epithelial tumors, lymphomas, carcinoids and mesenchymal tumors. All the tumors are incurable when metastasis is present without any exception.

However, effective treatment in case of lymphomas and stromal tumors is likely to result in cure.<sup>1</sup> Both macroscopic and microscopic appearance when correlated with clinical data helps in a definitive diagnosis of the lesion, which helps in early treatment and better outcome of the patient.

This study is undertaken to determine the relative frequency of various tumors of lower GIT and a knowledge about their prognosis which aid the clinician in effective management of patient.

## Materials & Methods

A prospective histopathological evaluation was conducted between September 1<sup>st</sup> 2014 and August 31<sup>st</sup> 2015 in the department of Pathology, Narayana Medical College, Nellore, Andhra Pradesh. All endoscopic biopsies and surgically resected specimens of lower GIT tumors were included. Brief clinical history like pain abdomen, bleeding per

rectum, constipation, and systemic manifestations such as weight loss and anaemia along with clinical findings were noted when the specimen is received. The specimen was then dissected and the gross feature of the tumor was described. Standardized tissue bits were sampled from the tumor, surgical margins and lymph nodes if present. The biopsy material either from endoscopic biopsies or from dissected tumors was kept in 10% formalin for 12-36 hours to allow rapid fixation without shrinkage. The fixed biopsy material is wrapped in a piece of filter paper and processed in a perforated cassette. After processing, the biopsies were unwrapped and embedded in paraffin with mucosal surface perpendicular to the cutting surface. 4 to 5  $\mu$  thick sections are cut and about 5-6 sections are taken on each slide, stained with Hematoxylin and eosin (H & E) and studied.

Special stains and Immunohistochemistry are used wherever necessary. Correlation of clinical, endoscopic findings and histopathological findings was done. After detailed study of the sections under the light microscope the final diagnosis was given. Then, data was analysed and results were obtained.

## Results

### *Distribution of Neoplasms of Lower GIT*

A total of 80 specimens were received for histopathological examinations. These were either resected segments or biopsy specimens. The resected specimens are 32 cases (40%) and biopsy specimens 48 cases (60%). Out of 80 specimens 34 cases (42.5%) were benign and 46 cases (57.5%) were malignant.

### *Clinical Features of Neoplasms of Lower GIT*

The most common symptom was bleeding per rectum affecting 74 cases (92.50%) followed by pain abdomen 68 cases (86.25%) constipation 46 cases (57.50%), weight loss 28 cases (35.00%), anemia 20 cases (25%).

### *Age and Sex Incidence of Lower G.I. Neoplasms*

The age of the patients in this study ranged from 03 yrs to 80 Yrs. Out of 80 cases, 57 (71.25%) were males and 23 cases (28.75%) are females. Most common age group affected was 41-50 (20%), 61-70 years (20%) followed by 51-60 years (18.75%) and least affected groups were 11-20 years (2.5%) and 21-30 years (2.5%). Males were more affected than females in all age groups (Figure 1).

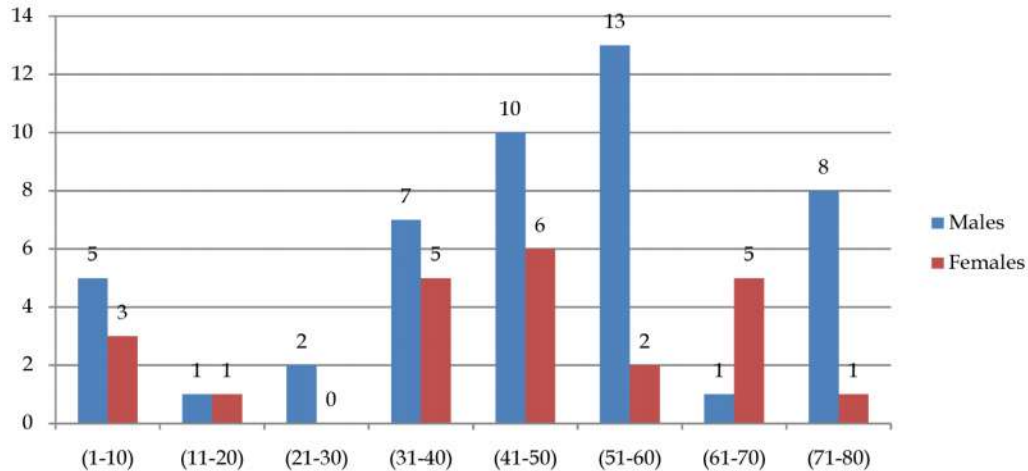


Fig. 1: Bar diagram shows age and sex incidence of Lower G.I. Neoplasms

*Age Incidence of Benign Neoplasms in Lower GIT*

Majority of benign neoplasms of lower GIT were affected in 61-70 years. Adenomatous polyps were

commonest neoplasms followed by juvenile polyp. Most commonly affected age group was 1-10 years in juvenile polyps (Table 1).

Table 1: Age incidence of benign neoplasms in Lower GIT

S. No	Neoplasms	Age Group								Total	Percentage
		1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80		
1	Adenoma	1	0	0	0	2	3	3	3	12	35.29%
2	Hyperplastic polyp	0	0	0	5	1	0	3	2	11	29.41%
3	Inflammatory polyp	0	0	0	0	1	0	2	0	3	8.90%
4	Juvenile polyp	7	0	0	0	0	0	0	0	7	20.50%
5	Lipomatous polyp	1	0	0	0	0	0	0	0	1	2.95%
6	Squamous papilloma	0	0	0	0	0	0	1	0	1	2.95%
	Grand total	8	0	0	5	4	3	9	5	34	100%

*Incidence of Malignant Tumor of the Small Intestine*

Adenocarcinoma(57.15%) was the commonest malignant tumor of the small intestine, followed by lymphoma (28.57%) and others.

(16.66%) were tubulovillous adenomas and 1 case (8.33%) villous adenoma and 9 cases (75%) tubular. Tubular is the most common type. Majority of the adenomas was found in age group of 51-80 years 9 cases (75%). Adenomas were found with commonly in left colon followed by rectum and right colon.

*Age and Sex Incidence of Malignant Neoplasms in Lower GIT*

The most common age group affected is 3<sup>rd</sup> decade (42.85%) followed by 5<sup>th</sup> decade (28.57%), and 4<sup>th</sup> and 2<sup>nd</sup> decade (14.28%). Females (57.14%) are more commonly affected than males (42.85%) with male to female ratio of 0.73:1. Ileum (71.43%) is more commonly affected than jejunum(28.57%)

Size and Shape of Adenomas: The size of the adenomas ranged from 1cm to 4.5cm. 4 being sessile, other eight were pedunculated.

**Tumors of Large Intestine**

*Benign Tumors*

Adenomas: Out of 12 cases of adenomas, 2 cases

Majority of them are pedunculate type, 8 cases (67%) adenomas and size also ranged from 1.0-1.9cms (Table 2).

Site wise distribution of Hyperplastic polyps: the most commonest location is rectosigmoid (45.45%), followed by descending colon (45.45%) and caecum(9.1%). Hyperplastic polyps are seen more in males than in females. The common age group affected

**Table 2:** Size and shape of adenomas

S. No.	Size (cms)	Pedunculated	Sessile	Total	Percentage
1	0.4-0.9	-	2	2	16.66%
2	1.0-1.9	4	2	6	50.00%
3	2.0-2.9	2	0	2	16.66%
4	3.0-3.9	2	0	2	16.66%
5	>4.0	0	0	0	-
Total		8	4	12	100%

is 31-40 years. 4 males, 2 females in 31-40; 1 male in 41-50; 1 male & 1 female in 61-70 and 2 males in 71-80 age groups were observed.

Juvenile polyp is seen more in males than in females. Majority of the juvenile polyps are located in sigmoid and rectum and 2 cases were seen in other sites.

#### *Malignant Tumors of Large Intestine*

Age range of malignant tumors was 20 to 80 years with a mean age of 51.2 years.

Majority of tumors were observed between 31-70 years of age. Peak incidence was seen in 41-50 years; with 11 cases in this age group. Males showed a higher incidence of colorectal cancer as compared to females with a M:F: 1.6:1.(Table 3). Rectum was commonest location (Table 4).

#### **Microscopy**

Histologically adenocarcinoma were further divided into three groups based on mucin production

**Table 3:** Age and sex incidence of colorectal carcinomas

S. No.	Age in years	Males	Females	Total
1	1-10	0	0	0
2	11-20	0	1	1 (2.56%)
3	21-30	0	2	2 (5.12%)
4	31-40	2	2	4 (10.25%)
5	41-50	6	5	11 (28.20%)
6	51-60	9	1	10 (25.64%)
7	61-70	4	3	7 (17.94%)
8	71-80	3	1	4 (10.25%)
Total		24(61.53%)	15(38.47%)	39 (100%)

**Table 4:** Location and histological type of colorectal carcinoma

S. No	Location	Adenocarcinoma	Mucinous Carcinoma	Signet Ring cell Carcinoma	Total
1	Caecum	1	0	0	1 (2.56%)
2	Acending colon	3	0	1	4 (10.20%)
3	Hepatic flexure	0	0	0	0
4	Transverse Colon	1	1	0	2 (5.10%)
5	Splenic flexure	0	0	0	0
6	Descending colon	1	0	0	1 (2.56%)
7	Sigmoid colon	9	1	0	10 (25.60%)
8	Recto sigmoid	4	0	0	4 (10.20%)
9	Rectum	14	1	1	16 (41.02%)
10	Anal canal	1	0	0	1 (2.56%)
Total		34	3	2	39 (100%)

**Table 5:** Morphology and site of colorectal carcinomas

Nature	Right colon	Transverse colon	Left colon	Total No. of cases	Percentage
Polypoidal	2	2	9	13	33.33%
Ulcerative	0	0	0	0	
Ulceroproliferative	5	2	14	21	53.84%
Constrictive	0	0	5	5	12.82%
Linitis plastic	0	0	0	0	
Total	7	4	28	39	100%

and presence of signet ring cells. The 3 types are adenocarcinoma, mucinous adenocarcinoma and signet ring cell carcinoma. The criteria to include a

tumor under mucinous adenocarcinoma was presence of mucin comprising > 50% of tumor. Signet ring cell carcinoma was defined by the presence of > 50% tumor

cells with prominent intracytoplasmic mucin. Out of the 39 malignant tumors, 21 cases were ulceroproliferative, 5 cases were constrictive and remaining 13 cases were polypoidal. Majority of these tumors were located in the left colon, 28 cases (71.79%) (Table 5).

The most common age incidence of colorectal carcinomas was 41-70 years (27 cases). Mean age was 51.2 years. Out of 39 cases, 3 cases (7.69%) were Mucinous Adenocarcinoma and remaining 36 cases (93.29%) were Non-mucinous carcinoma.

Of these cases, 16 (47.05%) were well differentiated adenocarcinomas while moderately and poorly differentiated adenocarcinomas constituted 17 (50%) and 1 (2.95%) respectively. Lymphnodal metastasis in different histological grades of Colorectal Carcinoma. (Figure 2)

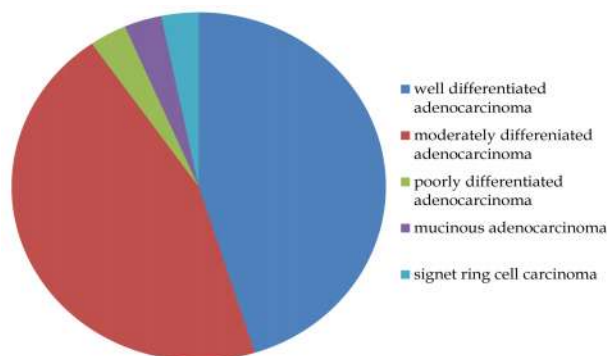


Fig. 2: Out of 39 cases, 31 cases (79.48%) showed peritumoral lymphocytic infiltration.

## Discussion

The present study was undertaken for a period of 2 years, from September 2013 to August 2015; during which 80 specimen of lower gastrointestinal tract were studied in the Department of Pathology, Narayana Medical College, Nellore.

### Distribution of Cases & Age/Gender

Out of 80 cases, 34 cases (42.5%) were benign and 46 cases (57.5%) were malignant. In a study done by B.V. Saiprasad et al [7], malignant cases were more than benign cases. In this study, 57 cases (71.25%) were males and 23 cases (28.75%) were females with a M:F ratio of 0.4:1. The present study shows maximum no of cases (68%) in 4<sup>th</sup>-6<sup>th</sup> decades which was well correlated with the studies done by Mohsin ul rasool et al [8] and Sarvesh et al [9] whereas maximum number of cases were seen in the age group of 51 - 65 years in the study done by Rajesh et al [10].

### Clinical Features

The most common presenting feature in this study was bleeding rectum (74 cases), followed by pain abdomen (68 cases), constipation (46 cases), weight loss (28 cases) and anemia (28 cases). In a study done by Sarvesh B et al [9], the most common presenting symptom was bleeding rectum.

### Benign Neoplasms of Lower GIT

#### Polyps

In the present study, the most common benign lesion was adenomatous polyps in 12 cases (15%), hyperplastic polyps in 11 cases (13%), Juvenile Polyp in 7 (20.50%), Lipomatous Polyp in 1 case and Inflammatory Polyp in 3 cases were observed. Thus our results were similar to those seen in studies done by Rex et al [11] and Ansher A F et al [12]. The percentage of adenomatous polyps is 70% and hyperplastic polyps is 15% in the study done by Rex D et al whereas in the study done by Ansher et al, 10.3% were adenomatous polyps and 9% were hyperplastic polyps.

#### Juvenile Polyps

In our study, juvenile polyps, 7 cases (20.50%) were the next common benign lesions after adenomatous and hyperplastic polyps. In the present study juvenile polyps were more common in males with male to female ratio of 4:1, whereas other studies done by Latt TT et al [13] and Franklin R et al [14] show almost

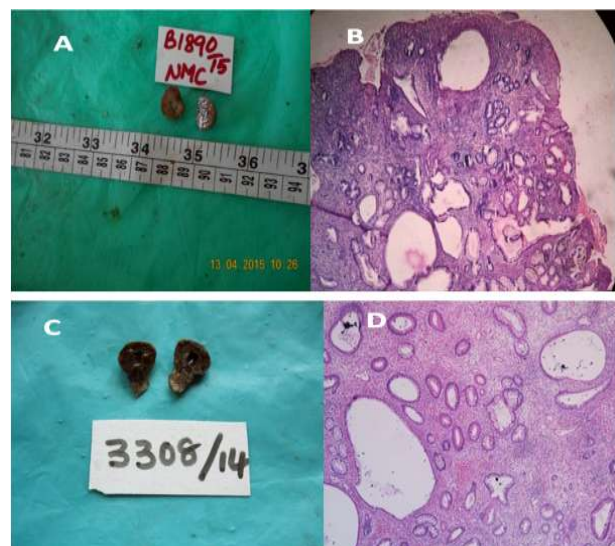


Fig. 3: Photomicrograph showing Juvenile Polyp & Hyperplastic Polyp. A. Gross : Polypoidal lesion with granular surface; B. Ulcerated mucosa with cystically dilated glands superated by edematous stroma (H & E, X40); C. Gross : Pedunculated polyp. ; D. Elongated glands with serrations - Saw toothed appearance (H & E, X40).



equal incidence in both the sexes (Figure 3).

Most of them were located in the rectum and sigmoid colon in our study, 4 cases (57.14%) and the remaining 3 cases (42.86%) were located in other site. In the study done by Latt et al [7] rectosigmoid was the most common site, 16 cases (66.7%) and also in the study done by Franklin et al majority of the polyps, 65 cases (65%) were located in the rectosigmoid region. Thus the findings in our study were in concordance with other studies.

### Adenomas

Adenomas are the intra epithelial neoplasms that range from small, often pedunculated lesions to large neoplasms that are usually sessile.

In present study 2 cases (16.66%) were seen between 41-50 years, 3 cases (25.00%) were in the age group of 51-60 years, 3 cases (25.00%) in 61-70 years age group and the remaining 3 cases (25.00%) were seen in the age group of 71-80 years. In this study left colon was the commonest site of adenomas which was also the commonest site in the study done by Mohammed javad Eshghi et al [15]. Thus our findings were similar to those seen in other studies.

### Histological Types of Adenomas

The most common type of adenoma in our study was tubular adenoma, 9 cases (75%) followed by tubulovillous, 2 cases(16.66%) and villous, 1 case (8.33%). Our findings correlated well with those in the study done by Chitale A.R. et al [16], where the tubular type was predominant, 260 cases(90.3%)

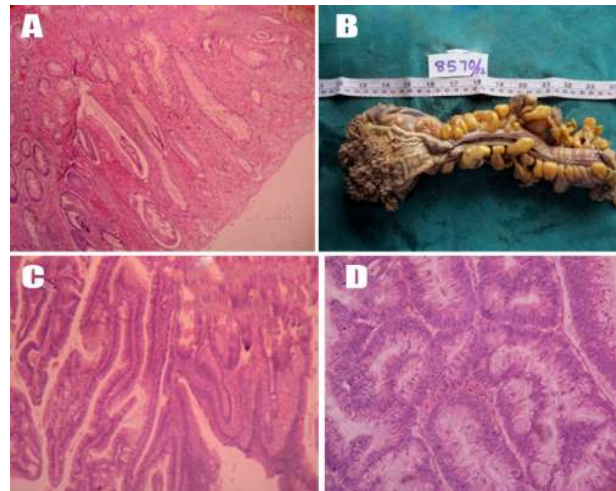
### Malignant Neoplasms

In the present study, malignant lesions of both large and small intestine accounted for 57.50%(46 cases) of the total cases. Majority of the malignant lesions were seen in the large intestine i.e 39(84.79%) cases and the remaining, 7(15.21%) cases were seen in the small intestine. This is in concordance with the findings in the studies done by Basnet et al and Kalyani et al [17]. In our study, Adenocarcinoma was the most common type of malignancy in both small and large intestine. This is also seen in all other studies.

### Small Intestine

In the small intestine, a total of 7 cases were reported as malignant in our study. Adenocarcinoma(57.15%) was the most common lesion, followed by Lymphoma (28.57%) and least common lesion was Carcinoid

(14.28%). Similar findings were also seen in the studies done by Sai Prasad et al [7], Mirna et al [18] and Lee et al [19] whereas in the study done by Tadashi et al [20], Carcinoids were the 2<sup>nd</sup> most common tumour after adenocarcinoma. In the present study, the mean age of presentation was 34.8 years and the M:F ratio was 3:4. In the study done by Saiprasad et al [7], the mean age of presentation was 53.8 years and M:F ratio was 2:1, whereas in the study done by Rajesh Kumar [10], the mean age of presentation was 52.17years with the M:F ratio of 1:1.2. Thus in our study, there was a female predominance and a younger age of presentation as compared to the other studies (Figure 4).



A: Tubulovillous, B: Small Intestinal Lymphoma, C: Carcinoid Tumor.

Fig. 4: Photomicrograph showing. A. Glands showing both tubular and villous pattern (H & E, X40); B. Intestine showing grey white fleshy growth; C. Salt and pepper appearance of Tumor cells (H & E, X40); D. Tumor cells showing Zellballen pattern (H & E, X40).

### Distribution of Lesions

Most the tumors of the small intestine in our study were located in ileum, 5 cases (71.43%) and the remaining 2 cases (28.57%) were located in the jejunum. In the study done by Rajesh Kumar [10], duodenum was the most common site with equal incidence of tumors in both ileum and jejunum.

### Large Intestine

In the Large intestine, 39 malignant cases were reported in our study. All of the cases were reported as Adenocarcinoma. Similar findings were also seen in the studies done by Saiprasad et al [7]. In the present study, the mean age of presentation was 51.2 years and the M:F ratio was 1.6:1. The mean age of presentation and the male:female ratio in the present study was comparable to the studies done by Saiprasad et al<sup>7</sup> where the mean age of presentation

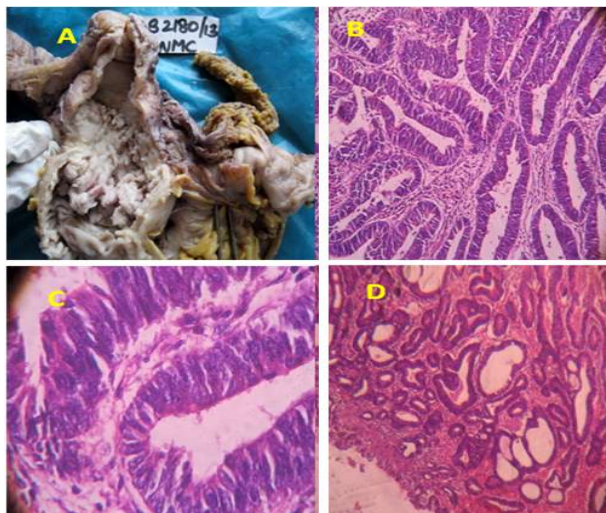
was 51.9 years and M:F ratio was 1:0.9, and also correlated well with the study done by Mohsin-ul-Rasool et al [8], wherein the mean age of presentation was 50.50 years with the M:F ratio of 1.3:1.

#### Location of Adenocarcinoma in the Large Intestine

In the present study, Rectum was the most commonly involved site for occurrence of colonic adenocarcinoma accounting to 51.22%, similar results were also seen in studies done by Saiprasad et al [7] and Mohsin-ul-Rasool et al [8] where rectum was involved in 50% and 40.14% of the cases respectively. In the present study following rectum, Sigmoid colon (10%) was next commonly involved, followed by ascending colon (10%) and transverse colon (5%).

#### Gross Features of Adenocarcinoma of Large Intestine

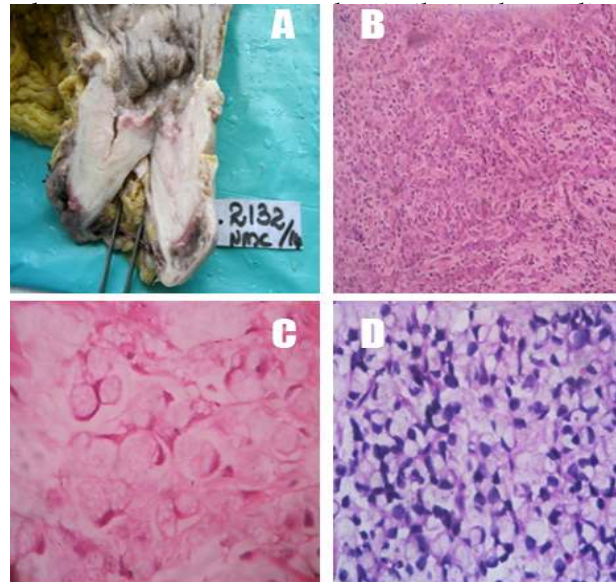
Most of the adenocarcinomas in this study were ulceroproliferative type, accounting for 21 cases (53.84%) which was also seen in studies done by Qizilbash et al [21] (54%) and Sarvesh et al [9] (62.5%). This was followed by Polypoid and Constrictive type of growths. This distribution of gross morphology of the colonic adenocarcinomas correlated with the findings on the study done by Qizilbash et al [21]. Polypoid in 33.33% and Constrictive 12.82% were observed after Ulceroproliferative.



**Fig. 5:** Microphotograph of well differentiated adenocarcinoma. **A.** Gross: Intestine showing ulceratoproliferative growth; **B.** Tumor cells arranged in glandular pattern (H & E, X40); **C.** Tumor cells showing hyperchromatic nuclei and altered N:C ratio. (H & E, X40); **D.** Adjacent tissue showing normal tissue. (H & E, X10)

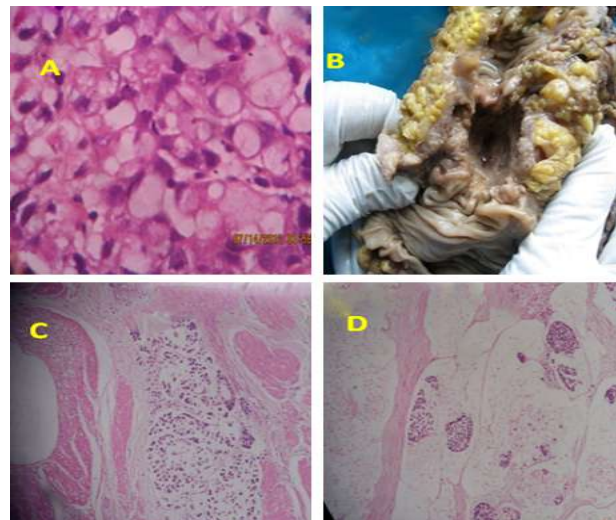
#### Histological types of Adenocarcinoma

Non mucinous type of adenocarcinoma was more common, 36 cases (92.31%) than mucinous



**A, B:** Poorly differentiated Adenocarcinoma  
**C, D:** Signet Ring Cell Adenocarcinoma

**Fig. 6:** Photomicrograph. **A.** Gross : Intestine showing constrictive growth; **B.** Tumor cells arranged in the form of solid sheets (H & E, X40); **C.** Signet ring adenocarcinoma (H & E, X40); **D.** Tumor cells showing signet ring appearance (H & E, X10)



**A:** Signet Ring cell Adenocarcinoma. **B:** Mucinous Adenocarcinoma. **C, D:** Mucinousadenocarcinoma.

**Fig. 7:** Photomicrograph. **A.** Tumor cells showing eccentrically placed nuclei and abundant cytoplasm (H & E, X40); **B.** Intestine showing polypoidal growth with mucinous areas; **C.** Tumor cells floating in mucinous pools (H & E, X10); **D.** Tumor cells having hyperchromatic nuclei (H & E, X40).

#### Peritumoral Lymphocytic Infiltrate in the Tumor Tissue

In the present study showed, 79.48% of tumors showed peritumoral lymphocytic infiltrate. In the study done by Qizilbash et al [21] the percentage of cases with peritumoral lymphocytic infiltrate was 75%, thus again correlating with our study.

## Conclusion

The tumors of gastrointestinal tract show a wide variation in the histological type making the histopathological examination a must in the diagnosis of these tumors. 80 cases of lower intestine were studied and 34(42.5%) were benign and 46(57.5%) cases were malignant neoplasms. The occurrence of gastrointestinal tumors were highest in the colon and rectum. Adenocarcinomas were common in the entire lower gastrointestinal tract, were moderately differentiated. So this study emphasises the need for early diagnosis of the disease through histopathology, which when correlated clinically will help the surgeon/clinician to implement the appropriate treatment and improve the survival of the patients.

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