

Histopathological Study of Neoplastic and Non-Neoplastic Lesions in Colorectal Region

B. Victor Paul¹, B.P. Prasanna², Sunil Kumar Didgi³, G. Sudhakar^{4*}

^{1,2}Assistant Professor, Department of Pathology, Government Medical College, Ongole, A.P, India

³Consultant Pathologist, B.LAL Hospital and Trauma Research Centre, Sanchore, Rajasthan, India

^{4*}Associate Professor, Department of Pathology, Government Medical College, Ongole, A.P, India

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Corresponding author: Dr. G. Sudhakar

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Abstract:

Aims and Objectives: To study various non-neoplastic and neoplastic colorectal lesions to assess the age and sex distribution. To determine the various histological variants and to provide a diagnosis and comment on various colorectal lesions wherever possible by histopathological examination for a period of two years in a tertiary care hospital

Methods: This retrospective and prospective clinicopathological study of was conducted in a tertiary care hospital. The material for the study was resected and biopsied specimen of colorectal lesions including tumors and tumor-like lesions received for a period of 2 years. Paraffin sections are stained using Haematoxylin and Eosin stains. Special Stains and immunohistochemistry did wherever necessary.

Results: In the present study among 70 colorectal biopsies 34 cases were Non neoplastic and 30 cases were malignant, 6 cases were benign neoplasms. Majority of cases seen in 11-40 years and 81-90 years age groups with slight male predilection. Chronic diarrhea or bleeding per rectum is chief complaint along with other symptoms. On histopathological examination 25 cases of chronic colitis were noticed in non-neoplastic group. 30 cases of adenocarcinoma were seen among malignant lesions.

Conclusion: Among all colorectal lesions colorectal cancer is associated with poor prognosis. Early diagnosis prevents the progress of disease when removed endoscopically. Pathological diagnosis is very important and comprehensive pathology report should include TNM staging, histological typing of tumour, grade, extent of invasion and metastasis plays vital role in patient care and the assessment of prognosis.

Keywords: Colorectal lesions, Non neoplastic and neoplastic, Histopathology.

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Introduction

The study of colorectal lesions is fascinating as they constitute a wide variety of both neoplastic and non-neoplastic lesions. Colorectal carcinomas vary considerably throughout the world, being one of the leading cancer sites in the developed countries.[1] Carcinoma of the large bowel is common in Northwest Europe, North America, and other Anglo-Saxon areas and low in Africa, Asia and some parts of South America. [2] These large geographic differences in colorectal cancer incidence are most likely explained by different environmental and dietary exposures.[3] As per WHO it is the third most common cancer in men and the second most common in women.[4]

Cancer of the colon is not a very common disease in our country and the incidence is much lower than in the western world. The incidence in India is about 7/1,00,000.[4] The colon and rectum can be sites for infections, Inflammatory Bowel Diseases, vascular disorders, motor and mechanical

conditions and various neoplasm. Most carcinomas arise from their precursor lesions. These precursor lesions occur sporadically or as a part of polyposis syndrome.[3] These colorectal carcinomas remain asymptomatic for years. Symptoms develop insidiously and frequently have been present for months to years before diagnosis. Most often present with fatigue, weakness as these bulky lesions bleed readily and cause anemia.[5] Surgical resection is the primary treatment modality for colorectal cancer, and the pathologic assessment of the resection specimen provides data that is essential for patient management, including the estimation of postoperative outcome and the rationale for adjuvant therapy.

The pathologist plays a very important role in the management of patients with an endoscopically removed malignant colorectal polyp to resected colon carcinoma specimens. The essential elements of the pathological assessment of colorectal cancer

resection specimens include the pathologic determination of TNM stage, tumor type, histologic grade, status of resection margins, and vascular invasion.[6]Pathologic assessment of the colorectal carcinoma resection specimen is of critical importance for a number of reasons. It remains the gold standard for determining local extent of disease, decisions made regarding adjuvant therapy are based upon the pathologic findings, and important prognostic factors may be obtained from the pathologic examination.[7]

Materials and Methods

The present histopathological study is a retrospective and prospective study. The material for the study comprised of resected specimens and biopsied specimen of colon and rectum with tumors and tumor-like lesions received in the department of pathology, Government medical college, Ongole, during the period of 2 years, i.e., from January 2021 to December 2022. Routine stains Haematoxylin and Eosin were used for staining. Whenever there was necessity special stains like mucine stains and immunohistochemistry were used for study the lesions. All the cases irrespective of age and sex who presented to the department of surgery with various gastrointestinal symptoms

were subjected to colonoscopy or surgery for colorectal pathology between January 2021 to December 2022 were included for the study. All colonoscopic biopsies and resected specimen biopsies were taken from colon to the pectinate line of the rectum.

Tiny inadequate biopsies and biopsies from the anal region were excluded. A total of 70 cases were studied during the study period of 2 years from January 2021 to December 2022

Results

The present study was conducted from January 2021 to December 2022 in department of pathology, Government medical college, Ongole. 70 colorectal biopsies were studied. Among 70 cases, 34 cases were Non neoplastic, 36 cases were Neoplastic. Out of all neoplastic, 30 cases were malignant, 6 cases were benign neoplasms.

The present study involved 70 cases of wide age groups, ranging from an 11 years old male child to 82 years old female. There was a clustering of cases between 41 to 80 years with maximum cases seen in 11-40 & 81-90 years of age groups each having 21 cases . Zero number of cases was seen in the extremes of age group 0-10 (Table-1).

Table-1: Age Distribution of all Colorectal Cases

Age group	Number of cases	Percentage
0-10	0	0%
11-20	7	10.0%
21-30	4	5.7%
31-40	9	12.8%
41-50	6	8.5%
51-60	28	40.0%
61-70	5	7.1%
71-80	10	14.2%
81-90	01	1.4%
Total	70	100%

The majority of cases were males (38 cases - 54.2%) as compared to females (32 cases- 45.8%) (Figure 1).

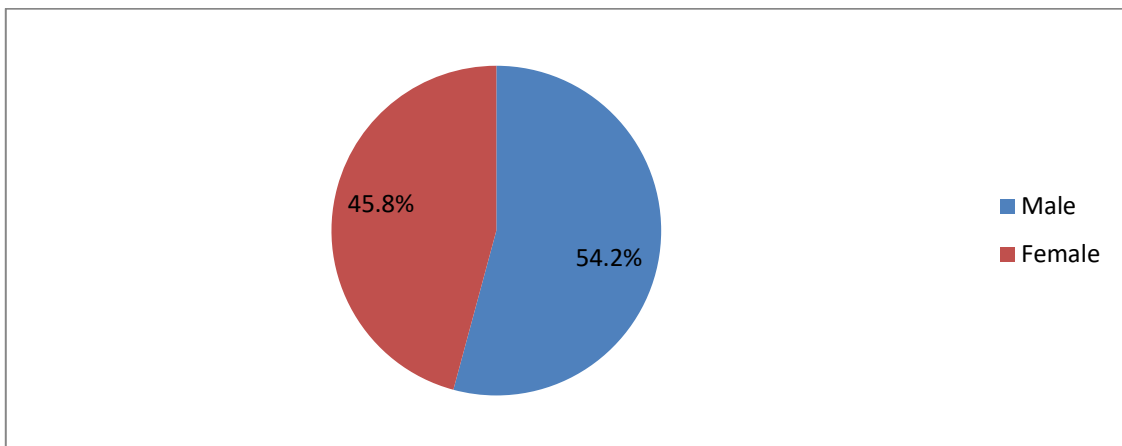


Figure 1: Pie diagram showing sex distribution of all cases

As shown in the table 2, in the present study comparing 70 cases, 33 (47.2%) patients were vegetarians and 37

(52.8%) patients were non-vegetarians. This is a reflection of the dietary habits of the target population on whom the study was conducted, which is predominantly non-vegetarian community.

Table 2: dietary habits of all cases

Diet	Number of cases	Percentage
Vegetarian	33	47.2%
Non-vegetarian	37	52.8%
Total	70	100%

In the present study all 70 cases had either chronic diarrhea or bleeding per rectum as chief complaint or as an associated symptom. The duration of complaints ranged from 1 month to 2 years. Out of these 70 cases 26 cases were accompanied with pain abdomen and 28 cases were associated with loss of weight and appetite (Figure 2).

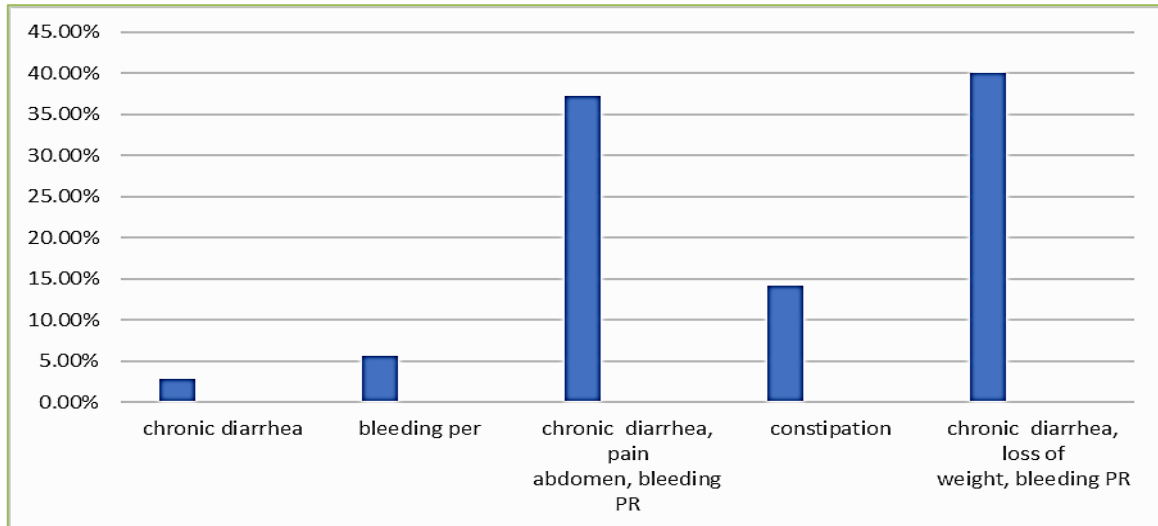


Figure 2: Bar diagram showing Clinical Features of all cases

In the present study of 70 colorectal biopsies, 34 cases were diagnosed as non-neoplastic lesions, 30 cases were neoplastic lesions, and 6 cases were diagnosed as benign neoplastic lesions (Figure 3)

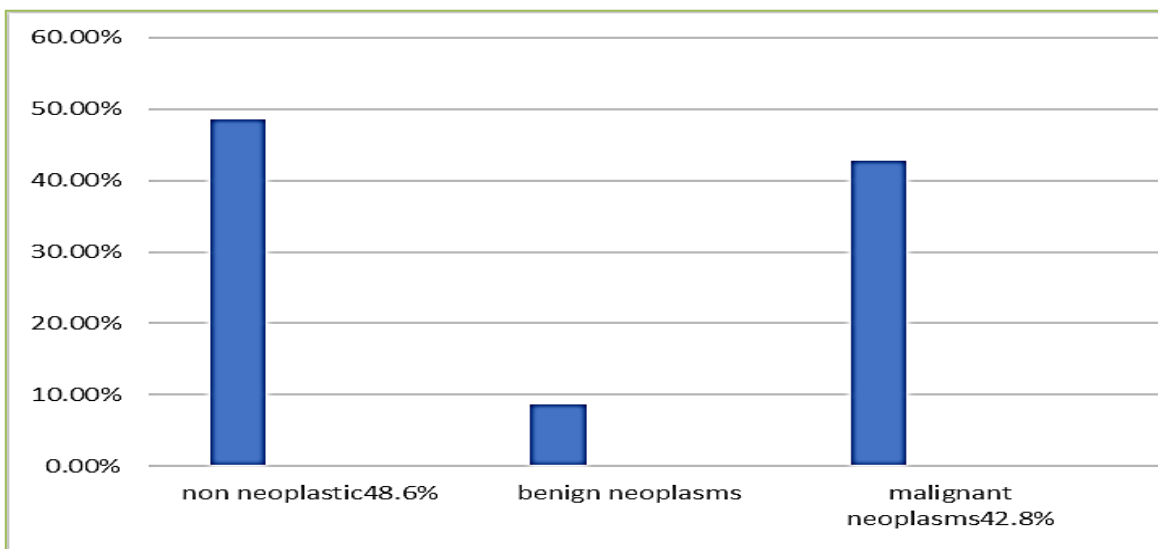


Figure 3: Bar diagram showing distribution of all lesions

In the present study of 70 colorectal biopsies, 34 cases were diagnosed as non-neoplastic lesions. out of which 25 cases of chronic colitis, 3 cases of ulcerative colitis, 1 cases of acute colitis, 1 cases of tuberculosis, 2 cases of Cohn’s colitis, and 2 case of inflammatory polyp were encountered (Figure 4).

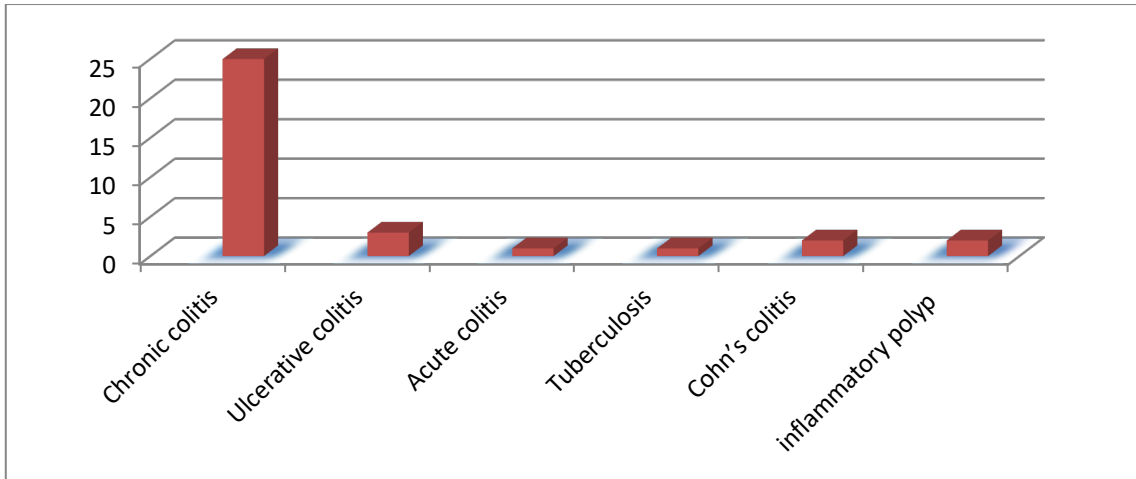


Figure 4: Bar chart showing distribution of Non Neoplastic lesions

In the present study, 36 cases were diagnosed as neoplastic lesions, of which 6 cases were benign, 30 were malignant (Figure 5).

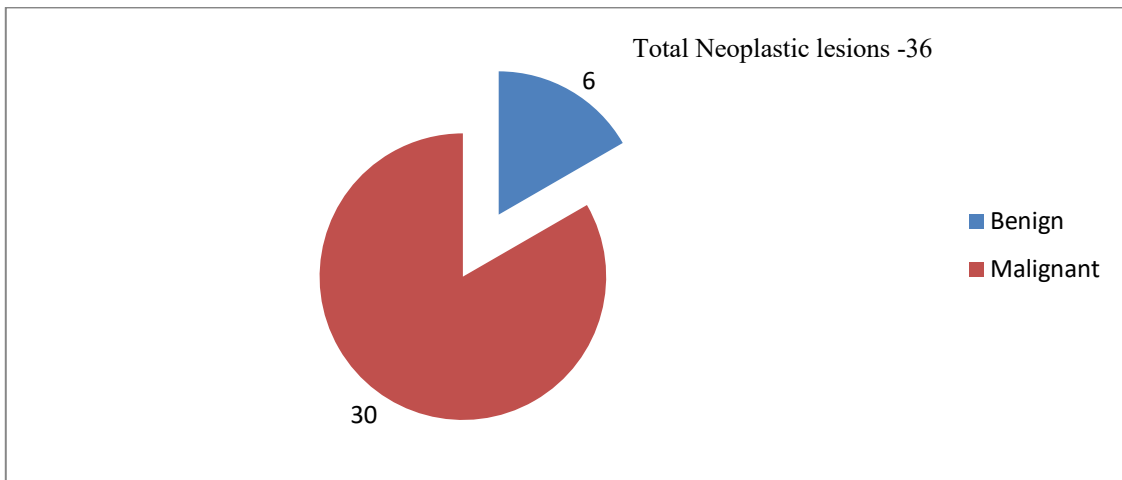


Figure 5: Pie chart showing incidence of benign and malignant lesions

Of the 6 benign cases, 2 cases were of Tubular adenomas, 2 cases were Tubulovillous adenoma, 1 each cases of Hyperplastic and Peutz-jeghers polyp (Figure 6).

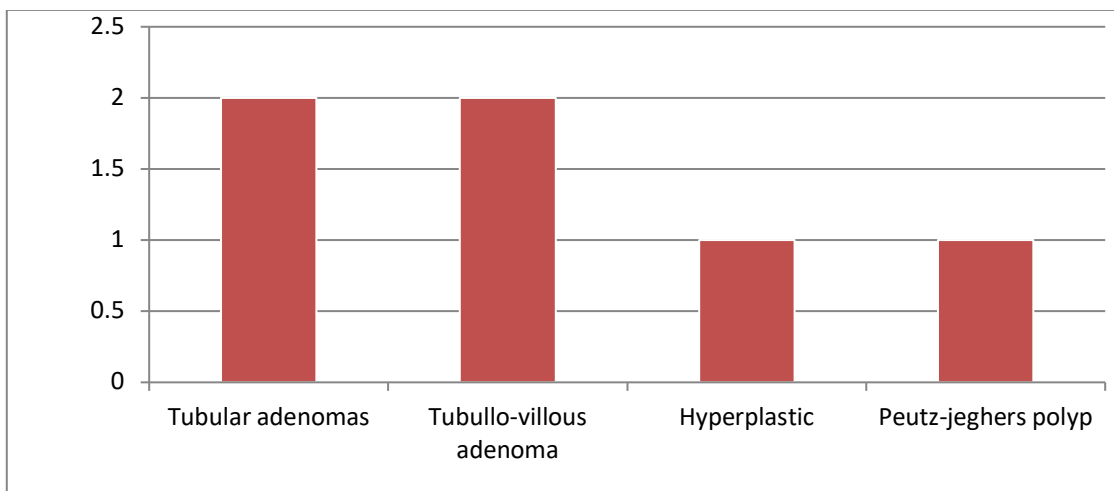


Figure 6: Bar diagram showing Distribution of Benign Neoplastic lesions

In the present study, out of 30 malignant lesions, 21cases were well differentiated adenocarcinomas, 3 cases were of moderately differentiated adenocarcinoma, 3 were poorly differentiated cases and 3 cases were of mucin secreting adenocarcinoma (Figure 7).

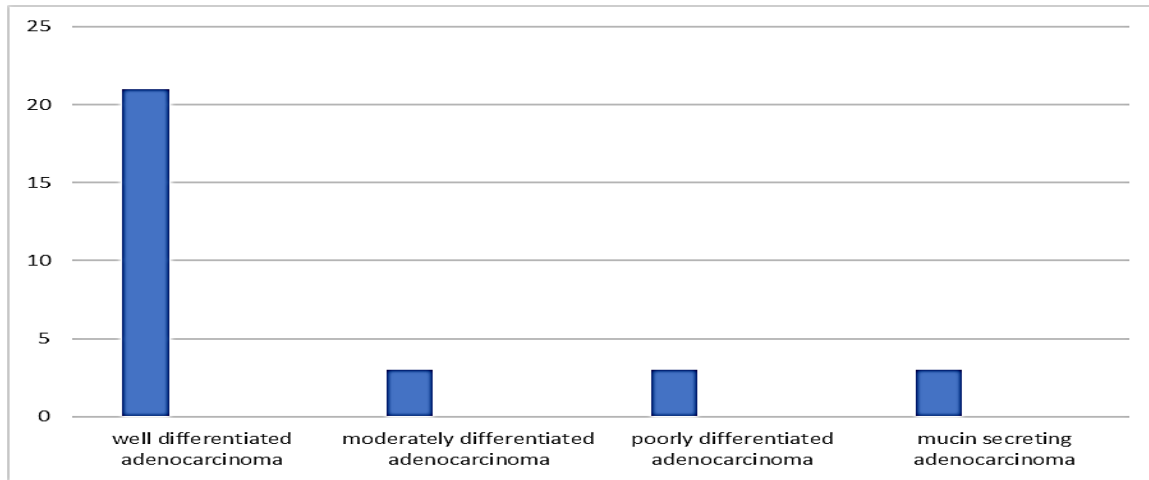


Figure 7: Bar diagram showing Distribution of Malignant Neoplastic lesions

In the present study anatomical distribution of malignant lesions was shown in the Table 3. Rectum was the commonest site in large intestinal tumors with 9(30.3%) cases followed by ascending colon with 6 cases (18.2%).

Table 3: Anatomical Distribution of Malignant Neoplastic lesions

S. No	Site	Number of cases	Percentage
1	Caecum	1	3.03%
2	Ascending colon	6	18.2%
3	Hepatic flexure	1	3.03%
4	Transverse colon	2	6.1%
5	Splenic flexure	1	3.03%
6	Descending colon	3	9.1%
7	Sigmoid colon	4	12.1%
8	Recto sigmoid colon	3	9.1%
9	Rectum	9	30.3%
	Total	30	100%

Discussion

Colonic conditions like infections, IBD, polyps, motility disorders and colorectal tumors are important lesions which often require colonic biopsy for their conclusive diagnosis. A study population of 70 was considered for colorectal biopsies from patients presenting with chronic diarrhea/bleeding per rectum as either a chief complaint or associated symptom were studied. Out of these 38 were males and 32 were females. Out of these 70 cases, 2 cases presented with chronic diarrhea, 4 cases were accompanied with bleeding per rectum, 26 cases were accompanied with pain abdomen and 28 cases were associated with loss of weight and appetite.

In our study clustering of cases between 31 to 70 years with maximum cases seen in 51-60(40%) & 31 to 40 (12.8%)years of age groups each having 37 cases This finding corresponds with study series of Hassan Abdulla Alaqli, which showed

clustering of cases between 21-60years with maximumcases seen in 21-30years(24.4%) and 31-40 years(23.2%).Out of 70 cases, 34(48.6%) cases were non neoplastic, and 36(51.4%) cases were neoplastic. This finding similar with the study series of R. Teague et al[5], Sidney J et al[8], Azar Qayyam et al[9] where non neoplastic lesions were maximum cases, followed by malignant neoplastic lesions and benign neoplastic lesions.

In the present study, of the 34 cases diagnosed as non-neoplastic lesions, 25(73.52%) cases comprised of chronic colitis, 1(2.94%) cases were acute colitis, 3(8.82%) of ulcerative colitis, 2(5.88%) cases of Crohn’s colitis.

Similar findings were encountered with the study series of A.L. Flick et al[10], R.J. Dickinson et al[11] where chronic colitis were maximum cases. In the present study, 36 cases were diagnosed as neoplastic, of which 6 cases were benign, and 30 cases were malignant. Out of the 6 benign lesions,

2 cases were of tubular adenomas, 2 cases were tubulo-villous adenoma, and 1 each case of hyperplastic and peutz-jegher polyp. Adenomas are the intra epithelial neoplasm that ranges from small, often pedunculated lesion to large neoplasms that are usually sessile.[5] Sessile adenomas were found to be significantly more cancerous (22.0%) than pedunculated (1.9%) and semi pedunculated (5.3%) adenomas.

In the present study, malignant neoplastic lesions were distributed between 51- 90 years with clustering of cases seen between 21 -50 years. The risk of colorectal cancer rises significantly after age 40 in both men and women and doubles in each succeeding decade until age 75. The median age at diagnosis was 71 years of age. [3] Age incidence of colorectal carcinoma was higher in present study with a mean of 45.7 years. A finding consistent with Fubaro SD et al (2005)[12]. In North America and Australia (areas with high rates of colorectal cancer) and in Japan and Italy (countries with rapidly rising rates), the age-adjusted incidence of colorectal cancer for men exceeds that of women.[3] With lesion in the rectum, the male to female ratio is 1.2:1. For more proximal tumors there is no gender differences.[5]

In the present study, male to female ratio was 1:2 for all colorectal cancers. Most colorectal carcinomas are located in the ascending colon and rectum, but there is evidence of changing distribution in recent years, with an increasing proportion of more proximal carcinomas.[1] In high-risk countries, colorectal carcinoma most commonly arises in the recto sigmoid region, but though we are in low risk countries we encountered more lesions in the distal region whether it was due to environmental factors, or easy approachability detected them at early stage, as many of these were well differentiated adenocarcinomas.

In the present study rectum was the commonest site in large intestinal tumors with 9(30.3%) cases followed by ascending colon with 6 cases (18.2%). Tumors in the proximal colon tend to grow as polypoid exophytic masses that extend along one wall of the capacious caecum and ascending colon. Distal colon carcinomas tend to be annular encircling lesions that produce so called Napkin – ring constriction of the bowel.[5] Bulky, fungating lesions often arise in the caecum and ascending colon, are basically papillary lesion with more ulceration.[3] Adenocarcinoma was the most common type of malignancy encountered in the colon accounting for 97.36% of the tumors, a finding consistent with the study by various authors Mucinous tumors are less common and account for 10% to 15% of colorectal carcinomas.[3]

In the present study mucinous adenocarcinoma constituted 10%, a finding similar to recent studies

by Abdul Kareem FB et al[13], Papadopoulos VN et al[14] and Fazeli SM et al[15]. However the findings varied in different studies. In the present study, out of 30 malignant lesions, 21(70%) cases were well differentiated adenocarcinomas, 3(10%) cases were of moderately differentiated adenocarcinoma, 3(10%) were poorly differentiated cases and 3(10%) cases were of mucin secreting adenocarcinoma. Present study shows higher incidence of well differentiated adenocarcinoma (70%) in contrast to other studies conducted by other authors.

The single most important prognostic indicator of colorectal carcinoma is the extent of the tumor at the time of diagnosis, the so called stage. Pathological TNM staging was carried out for 24 resected specimens in the present study. In the present study majority of cases belong to stage I and II with 66.6% cases each followed by stage III (25%). Lymphocytic infiltration of the tumor or peritumoral tissue is indicative of a host immunological response to the invasive malignancy and has been shown by multivariate analysis in several studies to be a favorable prognostic factor. 6 Patients whose tumors show a prominent peritumoral lymphocytic infiltrate, have an improved survival. Invasive growth pattern and lymphocytic infiltrate are the most subjective elements of Jass classification and their usefulness has been the subject of debate.

In the present study, of the total 24 resected specimens of adenocarcinoma 19(79.16%) had peritumoral lymphocytic infiltrate. Similar finding was reported by Qizilbash AH16, reporting peritumoral lymphocytic infiltrate in 75% of cases. When the closest approach of tumor is 5 cm from the closest transverse (proximal or distal) margin, anastomotic recurrences are very rare. 6 However, in the rectum, one may not have the luxury of such distances, and then one might wish to take advantage of the fact that most tumors do not extend further than 2 cm, unless they are already advanced lesions.[3] In the present study, grossly, inadequate proximal resected margin was seen in 6 cases and distal resected margin was inadequate in 8 cases. However, microscopically only one case showed involvement of distal resected margin.

Accurate determination of circumferential resected margin (CRM) status is essential since this is the single most important factor predicting the risk of local recurrences in patients with rectal cancer.[6] Multivariate analysis have suggested that tumor involvement of CRM may be the single most critical factor in predicting local recurrence in rectal cancer.[6] In our study CRM was free or more than 1mm in all 4 cases of rectal cancer.

Venous and lymphatic invasion represent crucial steps in the formation of micro metastases and

eventually macroscopic tumor growth at a secondary site.

Harrison JC et al[17] found that extramural venous invasion retained independent prognostic significance. Venous involvement correlates with regional lymph node involvement and poor differentiation and usually liver metastases[3]. Literature contains inconsistent results with respect to the impact of venous invasion. This is due in part to inconsistent ways of identifying venous spread. The presence of extramural invasion portends a worse prognosis than intramural invasion. A strong correlation exists between the presence of tumor in the extra mural veins and death due to metastatic disease. In the present study, lymphatic invasion was seen in 8 cases, 2 of these showed distant metastases to ovary whereas in 4 cases there were metastases to lymph nodes and in the rest 2 cases tumor was confined to bowel wall. Venous involvement was observed in a single case.

Perineural invasion is not routinely assessed or specifically reported in colorectal cancers, yet it has been shown by multivariate analysis in a number of studies to be an independent indicator of poor prognosis. 6 Incidence of perineural invasion significantly increases in stage III tumors, and significant differences exist in local recurrence rates. 5 years survival rate is also lower in patients with perineural invasion than in those without it (7% vs. 35%). [3] A single case of perineural invasion was reported in present study Neovascularization of tumors stromal is crucial in supporting tumor growth and high level of micro vessel density has been interpreted as an adverse prognostic factor.[1] Takebayashi Y et al[18] reported that angiogenesis is significantly concerned with tumor growth, development of metastasis, relapse of the disease and prognosis of patients with colorectal carcinoma.

In our study tumor angiogenesis was appreciated in 4 of the 24 resected segments. Of these 3 cases showed lymph node metastasis and one case with prominent angiogenesis showed extensive metastases to ovary. Patients who have tumor with pushing, rather than infiltrating, margins have a better prognosis (86% vs. 14%).[3] For colorectal cancer, the configuration of tumor at the advancing edge (tumor border) has shown to have a prognostic significance that is independent of stage and may predict liver metastasis. Specifically, an irregularly, infiltrating pattern of growth as opposed to a smooth pushing border has been demonstrated to be an independent adverse prognostic factor.[6] Of 24 resected segments tumor border was pushing / expanding in 18 cases and infiltrating in 6 cases . 1 of these cases showed perineural invasion. 4 showed extension of tumor

up to serosa and 1 was limited to muscularis propria.

Conclusion

Colorectal cancer is a common and lethal disease. The adenoma-carcinoma sequence offers a window of opportunity in which the precursor lesion or early carcinoma can be removed endoscopically to prevent systematic disease. The result of a careful and systematic examination of surgical specimens from patients with tumors of the colon plays a vital role in patient care and the assessment of prognosis.

The pathology report should include information on the site or sites of tumour, the size, configuration and circumference of the bowel wall involved, obstruction, distance of resected margin from the tumour, depth of infiltration, tumor grade, tumor margin, local inflammatory reaction, lymph node involvement and location and perineural and venous invasion. Despite promising findings with molecular and immunohistochemical analysis, the tumor stage is still regarded as the most important prognostic factor in colorectal cancer. The other stage independent prognostic factors include histologic grade, vascular invasion, perineural invasion, and tumor border configuration. The extent of the disease forms the basis for therapeutic decisions. Follow up of the patients is suggested to know the prognosis and further evaluation. Apart from applying usual methods like visualizations and palpation in lymph node dissection, the application of fat clearing agents and entire submission of the lesion can be used for better staging and also standardize the procedure.

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