

Benign and Malignant Colorectal Diseases: A Clinic Pathological View to Assess the Frequencies in Pakistani Population

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ABSTRACT

Objective: To calculate the frequencies of various histopathological types of colorectal diseases and to assess the grade of the colorectal cancer.

Study Design: A cross sectional observational study.

Place and Duration of Study: This study was conducted at the Department of Pathology, Pakistan Navy Station Shifa Hospital Karachi from March 2016 to March 2019.

Materials and Methods: 223 colorectal specimen including, biopsies and colectomy specimen were included in the study. Paraffin embedded sections were stained with routine Hematoxylin and Eosin method. The cases were diagnosed as benign or malignant and then further sub classified. Clinical records were reviewed in order to collect data regarding age, gender, clinical diagnosis and grades of tumor. H&E slides of all diagnosed cases were reviewed by two histopathologists with the aim to collect information about histological pattern and differentiation of tumor. Data was analyzed by SPSS version 23.0. Frequencies were calculated in terms of percentage.

Results: Out of total (n=223) cases there were 77.1 % (n=172) benign and 22.86 % (n=51) malignant cases. Among the benign colorectal lesions 43.6% were diagnosed as Rectal polyps, 40.6 % as Colitis and 15.6 % were reported as Proctitis. As regards the microscopic variants, among 51 colorectal carcinomas, 32(62.7%) were diagnosed as adenocarcinoma, 16(31.4%) cases were mucinous-signet ring type carcinomas, 2(3.9%) were poorly cohesive and the remaining 1(2.0%) case showed cribriform pattern. Grade-I well differentiated tumors (62.7 %%) were most frequently diagnosed. Most cases of benign diseases were diagnosed between 30-40 years and malignant between 50-59 years. Both of benign and malignant colorectal pathologies showed male preponderance and mostly involved the right colon.

Conclusion: Colorectal polyps were the most common benign colorectal pathologies followed by colorectal carcinoma. The great majority was observed as (grade -I) well differentiated adenocarcinoma.

Key Words: Colorectal polyps, Colitis, Proctitis, Colorectal carcinomas, Histological variants

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INTRODUCTION

The large bowel comprises of terminal 1–1.5 m of the whole gastrointestinal tract. It starts at the terminal ileum as cecum then continues to become the left colon and terminates into the fifth part of the large intestine which is sigmoid colon. Further the sigmoid colon connects the descending colon to the rectum.^{1,2}

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Normal colonic epithelium, alongside the crypt axis is controlled by multiple homeostatic signals within precise boundaries. Derangement in the sequenced program of growth where the DNA is not suppressed by the lining epithelial cells causes development of colon tumors. Additional abnormal properties may be developed by these colonic epithelial cells which enable them to be retained in the mucosa and cause various types of benign lesions like colorectal polyps, colitis (Inflammation of the colon), proctitis (Inflammation of the rectum) and different types of adenomatous lesions. A colorectal polyp is a general term for all neoplasms that protrude into the colorectal cavity, including both neoplastic polyps and non-neoplastic polyps. Neoplastic polyps are mainly divided into adenomas and serrated lesions. The incidence of benign and malignant diseases increases with age. Pathological changes of colitis are evident mostly in men, in 3rd to 5th decade of life whereas estimated rates of juvenile rectal polyp are apparent in male gender younger than 10 years of age.³ Colorectal cancer has been identified as the most common cancer of the digestive tract.⁴ Colorectal cancer appears as a primary malignancy which arises

from the colonic mucosal cells. Histopathological study of colectomy samples or biopsies is essential for the diagnosis and management of patient.⁵ The histologic tumor grading depends on glandular formation, which is characteristic of conventional adenocarcinoma. Adenocarcinoma can be divided in to three grades on the basis of cellular arrangement with regard to the degree of tubular (acinar) formation as well-differentiated tumors termed as grade- I, moderately differentiated - grade -II and poorly differentiated tumors - grade- III. As per World Health Organization (WHO) there are several histological variants of the colorectal cancers including mucinous, signet ring cell, medullary, micro papillary, serrated, adenosquamous, adenocarcinoma, cribriform comedo-type, spindle cell, and undifferentiated patterns.⁶

Colorectal cancer (CRC) is a heterogeneous disease which emerges through several important pathways. Both environmental and genetic factors are responsible for the development of the pathogenesis.⁷ However there is a continuous rise of colorectal carcinoma in those under the age of 50.⁸ Incidence of colorectal cancer in males are significantly greater than in females. Recently, a large number of developing countries have shown an acute increase in the incidence of colorectal cancer.⁹ In Pakistan CRC accounts for 52% of all gastrointestinal tumors in comparison to other countries. The estimated rates of incidence, mortality, and prevalence are consistently higher in the USA.¹⁰ In USA the estimated 5-year survival rate for all stages of the colorectal carcinoma being 65%.¹¹ Multiple innovations have been recognized and implemented into daily practice over the last thirty years, changing the diagnostic and therapeutic options and notably improving the oncologic outcomes for CRC patients.¹⁰ The economic cost burden of colorectal diseases in general and carcinoma in particular has risen significantly due to availability of a variety of diagnostic and therapeutic modalities. We conducted this study in our institute to calculate the frequency of benign and malignant colorectal diseases and to assess the grade of colorectal cancer. This study will provide a base for future analytical studies and will contribute in establishing a larger data for frequencies of colorectal lesions in Pakistan.

MATERIALS AND METHODS

This cross sectional observational study was based on the analysis of colectomies and colonic biopsies received in the Department of Pathology, PNS Shifa hospital Karachi. Ethical approval was obtained from the Ethical Review Committee of Bahria University Medical and Dental College before commencing the study. Informed consent was signed by every patient before enrollment in the study. Sample size was calculated using software G- POWER (version 3.1.9.2) by taking 95% confidence interval, 5% margin of error.

During the study period, from March 2016 to March 2019, 223 colorectal samples were received at our setup. Both biopsies (n=99) and colectomy specimens (n=124) were analyzed for histopathological diagnosis. Among them 172 cases were reported as benign lesions while 51 cases were diagnosed as colorectal cancer. A Non probability convenient sampling technique was adopted for the proceedings.

All colonic surgical specimens including biopsies and colectomy specimens obtained prior to therapy and patients who were willing to participate in the study were included, whereas poorly fixed tissue, inadequate material, metastatic tumors, post radiotherapy specimens as well as patients who refused to participate in the study were excluded from this research. Specimen were received in 10% buffered formalin and processed in auto processor. Paraffin embedded sections were stained with routine Hematoxylin and Eosin method. The cases were diagnosed as benign or malignant and then further sub classified. Clinical records were reviewed in order to collect data regarding age, gender, clinical diagnosis and grades of tumor.

H&E slides of all diagnosed cases were reviewed by two histopathologists with the aim to collect information about histological pattern and differentiation of tumor. Data was analyzed by SPSS version 23.0 and is represented in tables.

RESULTS

In the 3-year study period, 223 cases of colorectal tissue including 124(55.6%) colectomies and 99 (44.3%) biopsy specimens were received in pathology laboratory. Out of total (n=223) cases there were 77.1 % (n=172) benign and 22.86 % (n=51) malignant cases. Among the benign colorectal lesions 43.6%7(n=75) were diagnosed as Rectal polyps, 40.6 % (n=70) as Colitis and 15.6 % (n=27) were reported as Proctitis. In the present study out of 51 colorectal carcinomas, 32(62.7%) were well differentiated adenocarcinoma, 14 (27.4%) moderately differentiated and the remaining 5(9.8%) were poorly differentiated tumors. As regards the microscopic variants, out of 51 colorectal cancers, 32(62.7%) were diagnosed as adenocarcinoma, 16(31.4%) cases were mucinous-signet ring type carcinomas, 2(3.9%) were poorly cohesive and the remaining 1(2.0%) case showed cribriform pattern.

For benign lesions the age of the patients ranged from 4-75 years whereas for colorectal carcinoma the age range was found to be 14-89 years. Most cases of benign diseases were diagnosed between 30-40 years and malignant between 50-59 years. In the present study out of 172 cases of benign colorectal diseases, 124(72.0%) cases were present in males, while the remaining 48(27.9%) cases of colorectal cancer were seen in females. Whereas out of 51 cases of colorectal carcinomas, 37 (72.5%) cases were present in males, while the remaining 14(27.4%) cases of colorectal cancer were seen in females.

Table No.1: Frequency of Benign Colorectal Diseases (N=172)

| Category | No of cases n = 172 | Percentage % |
|--------------|------------------------|-----------------|
| Rectal Polyp | 75 | 43.6% |
| Colitis | 70 | 40.6% |
| Proctitis | 27 | 15.6% |

Table No.2: Distribution of Colorectal Carcinomas According to Grades of Differentiation (N=51)

| Grade of differentiation | No of cases | % of total cases |
|----------------------------------|-------------|------------------|
| Well differentiated (G-I) | 32 | (62.7%) |
| Moderately differentiated (G-II) | 14 | (27.5%) |
| Poorly differentiated (G-III) | 5 | (9.8%) |

Table No.3: Benign and Malignant Colorectal Disease According to Type of Specimen (N=223)

| Type of specimen | Total number (%) | Benign Lesion (Polyps /Colitis /Proctitis) n (%) | Malignant Lesion (Colorectal Carcinoma) n (%) |
|------------------|------------------|--|---|
| Colectomies | 124(55.6%) | 102(82.2%) | 22(17.7%) |
| Biopsies | 99(44.3%) | 70(70.7%) | 29(29.2%) |

Table no. 4: Distribution of Benign and Malignant Colorectal Disease according to Clinic Pathological Features (n=223)

| Clinicopathological features | Total numbers | |
|------------------------------|-------------------------|-----------------------|
| | Benign Lesions (172) | Colorectal Cancer(51) |
| Age | 30-40 years | 50-59years |
| Gender | Male = 124(72.0%) | 37(72.5%) |
| | Female = 48(27.9%) | 14(27.4%) |
| Tumor Location | Right-sided = 40(23.2%) | 14(27.4%) |
| | Left-sided = 132(76.7%) | 37(72.5%) |

Table No.5: Distribution of Colorectal Carcinomas According to Histological Variants (N=51)

| Clinicopathological features | No of cases | % of total cases |
|------------------------------|-------------|------------------|
| Glandular Adenocarcinoma | 32 | (62.7%) |
| Mucinous adenocarcinoma | 16 | 31.3 |
| Poorly cohesive | 2 | (3.9%) |
| Cribriform pattern | 1 | (2.0%) |

In the present study among 172 benign colorectal diseases, 132(76.7%) cases were confined to the left side whereas 40(23.2%) cases involved the right colon. Out of 51 malignant cases, 37(72.5%) cases were localized to the descending colon whereas 14(27.4%) cases involved the right colon. Most of the benign lesion as well as cancer of colorectal tissue was found to be in male gender as compare to females.

DISCUSSION

All over the world, colorectal diseases are responsible for significant morbidity and mortality among adult population with the preponderance in males. Most common benign diseases affecting parts of large intestine preferably the colon and rectum are rectal polyps. A colorectal polyp is a general term for all neoplasms that protrude into the colorectal cavity, including both neoplastic polyps and non-neoplastic polyps. Neoplastic polyps are mainly divided into (1) hyperplastic polyps (HPs), (2) sessile serrated adenoma/polyps (SSA/Ps), and (3) traditional serrated adenomas (TSAs) whereas the Non-neoplastic polyps are mainly divided into three categories: inflammatory polyps, hamartomatous polyps, juvenile polyps, Peutz–Jeghers polyps and other types of polypoidal lesions like Familial adenomatous polyposis (FAP) and Hereditary non polyposis colorectal cancer syndrome (HNPCC; Lynch syndrome).¹² Most polyps are symptomless, but they are capable to bleed because of twisting, obstruction, changes in bowel habits or intussusception. The polyps may appear as slight elevations of the mucosa to comparatively large masses and may progress in to bulky polypoidal tumor mass as a colorectal cancer. In our study the most common benign colorectal pathologies were of polyps which constituted the largest group. This is in accordance with observations of (Said et al (2017)¹³ and Tonolini et al (2019).¹⁴ Colitis (inflammation of colon) although necessary for damage repair and the battle against infections, can greatly impact proliferation, resistance to apoptosis, and cellular transformation to promote neoplasia.¹⁵ The inflammation in the intestine is promoted by consumption of dietary emulsifiers, a ubiquitous component of processed foods, which alter the composition of gut microbiot. The chronic gut inflammation is a foundation for tumor initiation and progression giving rise to the term "colitis-associated cancer". The development of colitis-associated cancer in patients suffering from inflammatory bowel disease is one of the best characterized examples of an association between intestinal inflammation and carcinogenesis.¹⁶ In the present study the second commonest benign lesion observed was colitis with 29.16% cases. These findings are in accordance with the study conducted by Stettner n et (2018)¹⁷ and Yin N, et al (2016).¹⁸

Being the most common malignancy of the digestive tract colorectal carcinoma constitutes third most common tumor in term of incidence and mortality in both genders.¹⁹

Estimated incidence levels in males for colorectal cancer are significantly greater than in female in significant areas of the globe.²⁰ In the present study the common ages for colorectal carcinoma was found to be in 50 - 59 years whereas the benign cases were reported in comparatively younger age group 30-40 years. Similar results were reported by Hussain et al (2016)²¹, Zahir et al (2014)²², Tsai et al (2018).²³ In the present study the benign colorectal lesions showed great preponderance in male gender whereas out of 51 cases of colorectal carcinomas, 37 (72.5%) cases were present in males and the remaining 14(27.4%) cases were seen in females. These findings are in accordance with the results of Elsabah and Adel (2013)²⁴, Alam & Khawaja (2014).²⁵

In the present study out of 51 colorectal carcinomas, 32(62.7%) were well differentiated adenocarcinoma, 14 (27.4%) moderately differentiated and the remaining 5(9.8%) were poorly differentiated tumors. As regards the microscopic variants, out of 51 colorectal cancers, 32(62.7%) were diagnosed as adenocarcinoma, 16(31.4%) cases were mucinous-signet ring type carcinomas, 2(3.9%) were poorly cohesive and the remaining 1(2.0%) case showed cribriform pattern. Our findings correspond to the figures documented in National cancer institute Cairo University Egypt (2013) which included 26 metastatic colorectal cancer cases in one study and observed histologies included, adenocarcinoma; 22(84.6%) cases, mucinous carcinoma; 2(7.7%) cases and signet ring carcinomas; 2(7.7%) cases. These findings are in contradiction with a study in which most of the cases of colorectal cancer were identified as moderate to poorly differentiated tumors.²⁶

CONCLUSION

Colorectal polyps was the most common benign colorectal pathologies followed by colorectal carcinoma. Most frequently diagnosed histological grade was (grade-I, well differentiated tumors. As regards the microscopic variants, the majority of observed cases were colorectal adenocarcinoma.

Author's Contribution:

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|----------------------------|-----------------------------------|
| Concept & Design of Study: | Hina Wasti |
| Drafting: | Hina Wasti, Saleha Masood, Rashid |
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