Study of histopathological spectrum of colorectal lesions in a tertiary care centre

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Abstract

Background:The colon and rectum are the sites for variouslesions like infections, Inflammatory Bowel Disease (IBD), vascular disorders andneoplasms. Frequently occurring non-neoplastic lesions are IBD, tuberculosis (TB), ischemic colitis, and pseudomembranous colitis. Colorectal carcinoma (CRC) is the third most commonly diagnosed neoplastic lesion of large intestine worldwide.

Aim:The study was carried out to study and correlate histopathologicalspectrum of neoplastic and non-neoplastic lesions of colon and rectum with age,sex, and site of distribution with clinical details.

Settings and Design:This study was conducted in the Department of Pathology, North DMC Medical College and Hindu Rao Hospital, Delhi from September 2019 to August 2020. The study was analytical cross-sectional type.

Material and Methods: All the specimens were fixed in formalin, processed as per routine histopathological processing, stained with hematoxylin & eosin (H&E) stain and examined for histopathological diagnosis.

Statistical Analysis: The data was collected in a proforma and entered into excel sheet, and then transferred to Statistical Package for Social Services (SPSS). The data was expressed as percentage. Statistical test was chi-square test.

Results: Out of 126 cases, 88 were non-neoplastic lesions and 38 were neoplastic.In non-neoplastic lesions majority of the cases were of ulcerativecolitis. Among neoplastic lesions, 15 cases were benign and 23 were malignant cases. Most common symptom was bleeding per rectum and/or anemia. Rectum was the commonly involved site.

Conclusions: The studies of the histopathological spectrum of colorectal lesions with clinical correlation are important for early diagnosis, management and, follow up.

Keywords: Colorectal lesions, Histopathology, IBD, Adenocarcinoma

Key Messages:A rising trend in the incidence and prevalence of inflammatory bowel disease in Asia which was considered to be rare in the Indian population. It was also observed that the majority of well differentiated adenocarcinomas were seen in young and middle-aged individuals.

Introduction

The small intestine and colon are frequently affected by various non-neoplastic and neoplastic disorders which extend from idiopathic, infectious, IBD, polyps and tumors. Colorectal lesions have varying incidence and mortality rates around the world with differences in risk factors like age, race, sedentary lifestyle, unhealthy diet, smoking, obesity, alcohol, positive family history and radiation therapy. [1-3]

Most common non-neoplastic lesions of large bowel are IBD, TB, pseudomembranous colitis, and infective colitis.[3] IBD includes mainly Crohn's disease (CD) and ulcerative colitis (UC). The similarity of histopathological changes in CD, UC and other intestinal inflammation causes diagnostic confusion. An increased risk of colorectal cancer is shown by epidemiological studies in patients suffering from CD and UC.[3-8]

The incidence of infection has increased in recent years. C.difficile is a major cause of nosocomial gastrointestinal disease. The risk factors of C. difficile infection are older age, antibiotic use, and immunosuppressant use.[9,10]Mycobacterium tuberculosis (M. TB) affects the gastrointestinal tract mostly in immunocompromised individuals. About 15% of those with gastrointestinal TB have concomitant pulmonary symptoms.[11]

CRC is a third most commonly diagnosed neoplastic lesion of large intestine worldwide. The majority of CRC is sporadic and largely attributable to the constellation of modifiable environmental risk factors characterizing westernization such as obesity, physical inactivity, poor diets, alcohol drinking, and smoking. The CRC is shifting towards low-income and middle-income countries as they become westernized. The rising incidence of CRC at younger ages is an emerging trend.[12] The difference in incidence rate appears to be attributable to differences in dietary and environmental exposures that are imposed upon a background of genetically determined susceptibility.[13] There are several recommended methods for CRC screening, including both visual examinations and stool-based tests.[14]Colonoscopy is currently considered to be gold standard for cancer surveillance.[15] A principal benefit of colonoscopy is that it allows full examination of the colon and rectum in a single session and for the detection of colorectal polyps and cancers accompanied by biopsy or polypectomy.[16]

We aim to provide herein an understanding of normal and abnormal histology and describe commonly encountered abnormal histological patterns into more comprehensible and rational content.

Aim

1. To study the histopathological spectrum of neoplastic and non-neoplastic lesions of colon and rectum.

2. To study age, sex, and site of distribution with clinical details of colon and rectum lesions.

Settings and Design

This study was conducted in the Department of Pathology, North DMC Medical College and Hindu Rao Hospital, Delhi from September 2019 to August 2020. The study was analytical cross sectional type included incisional biopsies, excisional biopsies and resected specimens of colon and rectum irrespective of patient's age. Inadequate biopsy material, poorly fixed specimens,

and small intestine and anal canal lesions were excluded from study.

Material and Methods

All the data pertaining to age, sex, clinical details and gross features of specimen received, were noted and all the specimens were fixed in 10% formalin. Thick serial sections (3-5 micron) were prepared and stained with H&E. Detailed study of all the slides were done under light microscope and an attempt was made to correlate the histopathological diagnosis with colonoscopic diagnosis obtained. Special stains like ZN, PAS and MT stains were done wherever necessary. Based on a previous study [17] where proportion of non-neoplastic lesions was 76%. Using following formula, we obtained a sample size of 126 patients. $N = \left(\frac{Z_{\left(1-\frac{\alpha}{2}\right)}}{E}\right)^2 P$

Statistical Analysis

The data was collected in a proforma, entered into excel sheet, and then transferred to SPSS. The data was expressed as percentage. Statistical test was chi-square test. Comparison between non-neoplastic and neoplastic categories was done by Wilcoxsan rank sum test, and Kruskal Wallis rank sum test used for age difference between subcategories. Quantitative variables like age described as a mean and standard deviation. Qualitative variables like gender described as proportions. P-value <0.05 were treated as statistical significance.

Ethical Issues (conflicts of interest): None

Results

Total 126 specimens were included in study (117 colonoscopic biopsies and 9 resected specimens of colon and rectum. Patients of all age groups, ranging from 3 years to 80 year were included. The maximum cases were seen in 31-40 years of age followed by the age group of 21-30. Mean age was 36.3 years. There were 72 male patients (57.14%) and remaining 54 patients were females (42.86%). All patients had either bleeding per rectum and/or diarrhea as chief symptom. In the present study of 126 cases, 88 (70%) cases were diagnosed as non-neoplastic lesions and 38 (30%) cases were neoplastic.

Non-neoplastic Lesions

Non-neoplastic lesions were seen in patients of all age groups, ranging from 7 years to 80 years. The maximum numbers of cases were seen in 21-30 & 31-40 years. Mean age in non-neoplastic lesions was 38.6 years. Majority of lesions were encountered in 51 (58%) males and remaining 37 (42%) were females. Most of the patient presented with bleeding per rectum, diarrhea and/or anemia as their chief complaints followed by weight loss, fever, pain abdomen and altered bowel habit. Out of 126 colorectal specimens, 88 cases were diagnosed as non-neoplastic lesions. Out of which 37 (42.05%) cases of UC, 24 (27.27%) cases of acute non-specific colitis (NSC), 16 (18.18%) cases of TB, 5 (5.68%) cases of amoebic colitis and 4 (4.55%) cases of solitary rectal ulcer syndrome (SRUS), 1 (1.14%) case of lymphocytic colitis and melanosis coli were encountered.

Neoplastic Lesions

Benign Neoplastic Lesions

In our study, 38 cases were diagnosed as neoplastic lesions, of which 15(40%) cases were benign, and 23(60%) were malignant. Most of the benign lesions were seen in the age group of 0-10 years. Benign neoplastic lesions were encountered in 9(60%) males and remaining 6 (40%) were females. Out of the 15 benign cases, 14 (93%) cases were of juvenile rectal polyp (JRP) and 1 (7%) case was of tubulovillous adenoma (TVA).

Malignant Neoplastic Lesions

Malignant neoplastic lesions were distributed between 11-80 years with maximum number of cases were seen in 31-

40 years of age groups. Out of the 23 malignant cases, 14 cases were of well differentiated adenocarcinoma and, 4 cases were of poorly differentiated adenocarcinoma. We did not encounter any cases of moderately differentiated carcinoma. Out of 23 malignant neoplastic lesions, 12 were in males (52%) and remaining 11 were in females (48%).Most of the patient presented with either bleeding per rectum and/or anemia as their chief complaints, followed by diarrhea, altered bowel habit and weight loss. In the present study , out of 23 malignant lesions, 14 (60.86%) cases were of well differentiated adenocarcinoma, 4 (17.39%) were of poorly differentiated cases, 2 (8.70%) cases were of signet ring carcinoma and 1 (4.35%) case was each of mucin secreting adenocarcinoma, squamouas cell carcinoma and melanoma.

Comparison between Non-neoplastic and Neoplastic Lesions

The mean age of non-neoplastic and neoplastic colorectal lesions was 38.6 (SD 16.3) and 30.9 (SD 22.8) year respectively, which was statistically insignificant (p-value-0.06). Median age of non-neoplastic and neoplastic lesions was 36.5 years and 31 years, respectively. Out of total 88 non-neoplastic lesions, 37 were females and 51 were males. Among neoplastic lesions, 17 were females and 21 were males. The difference was statistically insignificant (p-value-0.9). The location difference was significant (p-value-0.01 Pearson's chi-squared test) between non-neoplastic and neoplastic lesions. The location difference was statistically significant (p-value= 0.008 Pearson's chi-squared test) among non-neoplastic, benign, and malignant categories. Out of 88 non-neoplastic lesions, 54 were on left side and 34 were on right side. Among 38 neoplastic lesions, 31 were present on left side and 7 were on right side. This was statistically found to be statistically significant (p-value-0.01 Pearson's chi-squared test with Yates continuity correction).

i) Age comparison between categories

a) Median age of non-neoplastic, benign, and malignant lesions was 36.5 years, 5 years and 45 years, respectively.

b) Age difference between non-neoplastic, benign, and malignant lesions was found to be statistically significant (p-value-<0.001) on Kruskal Wallis rank sum test.

c) Age difference between benign and malignant lesions was statistically significant (p-value-<0.001) on Wilcoxsan rank sum test.

d) Age difference between benign and non-neoplastic lesions was statistically significant (p-value<0.001) on Wilcoxsan rank sum test.

e) Age difference between non-neoplastic and malignant lesions was statistically insignificant (p-value-0.08) on Wilcoxsan rank sum test.

ii) Comparison of Clinical Features between Sub-categories

Difference between above mentioned categories was statistically insignificant (p-value range 0.1-0.06) on Pearson's chi-squared test.

iii) Gender Difference between Categories

The difference was statistically insignificant (p-value-0.9 Pearson's chi-squared test) among these categories.
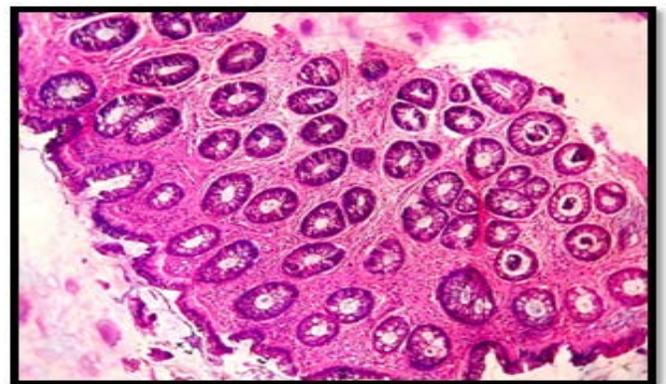

Figure 1: Photomicrograph of solitary rectal ulcer showing splaying of muscle fibres (HPE, H&E 100X)

Figure 2: Photomicrograph of solitary rectal ulcer showing splaying of muscle fibres (Masson Trichrome H&E 400X)

Discussion

Intestinal lesions show a wide spectrum of gross and histological variations. Colonic conditions like infections, IBD, polyps and colorectal tumors are important lesions which often require colonic biopsy for their conclusive diagnosis.[18] In the early stage colorectal lesions produce very non-specific symptoms. Colonoscopy is an important tool for screening, early detection, and management of colonic lesions.[19] A total number of 126 consecutive cases of colorectal lesions were included in the study. Age distribution of all colonic lesions was seen over a wide range of age (3 years to 80 years). In the present study highest distribution was seen in 31-40 (21.43%) followed by 21-30 (19.84%) years of age group having 27 and 25 cases, respectively which was consistent with the study by Karve SH et al, where peak distribution was seen in 4th decade.[8] These finding also corresponds with study of Sunilkumar D et al observed maximum cases in 4th decade (>25%) in their study of 46 cases. [21] However, the peak distribution was 6th decade in study done by Geetha C et al and 3rd decade by Hassan Abdulla et al.[19],[20] There were 57.14% males and remaining 42.86% patients were females. A male predominance was observed in this study with a male to female ratio of 1.3:1. These findings are consistent with studies of colorectal lesions done by Karve SH et al,B.Vani et al, Hassan Abdulla et al, and Makaju R et al where male predominance was observed.[8],[18],[20],[22]

Majority of the colorectal lesions were left sided, involving rectum followed by cecum. Similar findings observed by Karve SH et aland Geeth C et al.[8],[19] The commonest clinical presentation of the patient was bleeding per rectum (57.14%) followed by diarrhea (50%) as chief complaint or as an associated symptom in this study. B.Vani et al, Geetha C et at, and Negi et al noticed similar symptoms where 86%, 49.3%, and 47.50% cases had bleeding per rectum, respectively.[18],[19],[23] These findings are not correlated with studies done by Karve SH et al, Rangaswamy R et al, Chandrakumari AS et al, and Pandey MS et al, where most common presenting symptoms were chronic diarrhea, colicky abdominal pain and/or constipation.[8],[17],[24],[25]

Out of 126 cases, majority of the cases were of non-neoplastic lesions (70%) and remaining 30% cases were of neoplastic lesions. Similar finding were observed by Geetha C et al, Sunil Kumar D et al, and Chandrakumari AS et al where non-neoplastic lesions were maximum in number (52.52%, 60.87%, and 60.80%).[19],[21],[24] These findings contrasted observations of Karve SH et al, B.Vani et al where neoplastic lesions were the commonest finding. [8],[18]

Non-neoplastic Lesions

Out of 126 cases, 88 cases were diagnosed as non-neoplastic lesions where majority of the cases were of UC (42.05%) followed by NSC (27.27%). UC though rare is an emerging disease in India, this condition portrays remissions and relapses. In the present study UC was found to be the commonest non neoplastic lesion

observed in 37 (42.05%) cases. Similar findings noticed by B.Vani et al in their study described 25% cases of UC which was commonest lesions out of 24 cases of non-neoplastic lesions.[18] These findings contrasted by Geetha C et al and Chandrakumari AS et al where NSC was the common finding followed by UC. Microscopically UC showed distortion of mucosal lining, cryptitis, crypt abscesses, increase in number of neutrophils, lymphocytes and plasma cells in the lamina propria.[19],[24]

A rising trend in the incidence and prevalence of IBD in Asia has been recognized for the past two decades. India, Japan and the Middle East have highest incidence rates and there exists a genetic predisposition of South Asians (Indians, Pakistanis and Bangladeshis) to UC.[18] IBD is associated with remissions and relapses which require early diagnosis and prompt treatment. Colonoscopy is important for the diagnosis and follow-up in a suspected case of IBD. It is also used to rule out dysplasia, and periodic surveillance helps in reducing the risk of CRC.[19] Present study observed male preponderance in cases of ulcerative colitis similar to previous studies done by Qayyum et al, Geetha C et al, Badmapriya et al,and Sood et al.[4],[19],[26],[27] Disease prevalence was high in patients between 21-30 years age group. Most common presenting symptom was bleeding per rectum followed by diarrhea, corresponding to studies of Badmapriya et al and Sood et al.[26],[27] Most common location of the UC lesions was rectum which is similar to Geetha C et al study.[19] In the present study acute NSC was the second most common lesions (27.27%). Geetha C et al and Chandrakumari AS et al found maximum cases of NSC in their study, which was in majority and does not correspond with our study.[19],[24]

Our cases predominantly showed neutrophilic/lymphoplasmacytic infiltrate in the lamina propria. No crypt abscess or decrease in goblet cells was observed.

In present study 18.18% cases were of TB characterized by confluent granuloma, aggregation of epithelioid cells, langhans giant cells and caseation necrosis in the mucosa. B.Vani et al found 16.16% cases of TB which corresponds with our study.[18] Most common symptoms were weight loss and fever. These findings contrasted with Geetha C et al where pain abdomen was the most common symptom.[19] Most common location was cecum and ascending colon. Geetha C et al observed cecum as a most common site.[19] TB is endemic in India and it's difficult to distinguish Crohn's disease from intestinal TB as both diseases have similar radiological, endoscopic and histologic features. Since treatment and prognosis of the two conditions are different, it is crucial to diagnose them correctly. Diagnosis is often made after a combined evaluation of investigations and response to therapy.[28]

In our study 5.68% cases were of amoebic colitis characterized by inflammatory exudates with trophozoites showing erythrophagocytosis. Rangaswamy R et al and Geetha C et al noticed 1.22% and 0.9% cases, respectively.[17],[19] Majority of the cases were in middle age males and most common location was the cecum. These findings are similar to the observation of Geetha C et al.[19] Present study observed 4.55% cases of SRUS comprising of mixed inflammatory infiltrates, epithelial hyperplasia with lamina propriafibromuscular hyperplasia. Karve SH et al, B. Vani et al, and Chandrakumari AS et al observed 5.8%, 8.33%, and 3.29% cases, respectively. [8],[18],[24] We noticed 1.14% case of each lymphocytic colitis and melanosis coli in the present study. Studies done by Karve SH et al, B. Vani et al, and Geetha C et al didn't encounter any case of

lymphocytic colitis.[8],[18],[19] B. Vani et al observed 2.63% cases of melanosis coli.[18]

Neoplastic Lesions

In the present study, 38 cases were diagnosed as neoplastic, of which 15 cases were benign, and 23 were malignant.

Benign Neoplastic Lesions

Majority of the cases (93%) were of JRP and 7% cases of TVA out of 15 cases of benign neoplastic lesions. B.Vani et al observed 15.78% cases whereas Sunilkumar D et al and Chandrakumari AS et al didn't encounter any case of JRP.[18],[21],[24] However B.Vani et al,Geetha C et al, Sunilkumar D et al, and Chandrakumari AS et al found 10.52%, 28.2%, 20%, and 13.63% cases of TVA, respectively in their study which corresponds with our study.[18],[19],[21],[24]

Malignant Neoplastic Lesion

In the present study, out of 23 malignant cases, 14 cases were of well differentiated adenocarcinoma, 4 cases were of poorly differentiated adenocarcinoma, 2 cases were of signet ring carcinoma and 1 case was each of mucinous adenocarcinoma, melanoma and squamouas cell carcinoma. Out of 23 cases, 52% were in males and 48% were in females. Most of the cases belonged to 31-40 years of age group. Karve SH et al noticed maximum cases in age group of 31-40 and 41-50 years which is in concordance with our findings.[8] Pandey MS et al observed majority of cases in the age group of 41-50 and 61-70 years where asSheikh B et al noticed maximum cases in the age group of 61-70 years which contrasted findings of present study.[25],[29]

Present study of malignant colorectal lesions observed slightly male preponderance. Male to female ratio was 1.1:1 similar to previous studies by Karve SH et al,Pandey MS et al, Deka J et al, and Sudarshan V et al.[8],[25],[30],[31]

Majority of the patients presented with bleeding per rectum and anemia as chief complaints. Rectum was the most commonly involved site constituting 56.52% of all colorectal cancers which was in conformity with studies by Karve SH et al, Deka J et al, and Rasool M et al.[8],[30],[32]

Most common type of carcinoma was adenocarcinoma. Majority of the lesions were observed in male patients. Out of total 23 malignant cases, 20 cases were of adenocarcinoma. In our study majority of the cases were of well differentiated carcinoma (70%) followed by poorly differentiated carcinoma (20%). Present study corresponds with B.Vani et al, Geetha C et al,and Chandrakumari AS et al, where majority of the cases were of well differentiated adenocarcinoma. [18],[19],[24] We did not encounter any case of moderately differentiated carcinoma. These findings contrasted observations of previous studies by B.Vani et al, Geetha C et al,and Chandrakumari AS et al where moderately differentiated carcinoma was 43.75%, 23.4%, and 38.88%, respectively. [18],[19],[24] We encountered 5% each case of mucinous carcinoma and signet-ring cell carcinoma. Study by B.Vani et al and Geetha C et al observed 12.50% and 3.10% cases of mucinous carcinoma.[18],[19] However Chandrakumari AS et al didn't encounter any case of mucinous carcinoma.[24] One (5%) case of signet-ring cell carcinoma was observed by present study and was in accordance with studies done by B.Vani et al, Geetha C et al, and Chandrakumari AS et al.[18],[19],[24]

Conclusions

The colorectal lesions have a broad spectrum ranging from non-neoplastic to neoplastic lesions. Bleeding per rectum and diarrhea were the chief complaints. Males were most commonly affected. In the Present study ulcerative colitis was the commonest lesion between 21-

30 years age group, which was considered to be rare in the Indian population. It was also observed that the majority of well differentiated adenocarcinomas were seen in young and middle-aged individuals. The studies of the histopathological spectrum of colorectal lesions with clinical correlation are important for early diagnosis, management and, follow up.

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