Original Article

Colorectal Biopsies and Surgical Resection Specimens: A Two-Year Audit at a Public Sector Hospital in Lahore

Madiha Iqbal[1], Asima Naz[1], Absar Nazir[2], Aliya Muzaffar[1], Asmaa Qureshy[1], Muhammad Ayub Naich[3]
[1]Department of Pathology, Fatima Jinnah Medical University, Lahore, Pakistan, [2]Department of Surgery, Fatima Jinnah Medical University/Sir Ganga Ram Hospital, Lahore, [3]Department of Gastroenterology, Fatima Jinnah Medical University/Sir Ganga Ram Hospital, Lahore
Correspondence to: Madiha Iqbal, Email: madiha.1983@hotmail.com

ABSTRACT

Background: The colorectum hosts a multitude of pathologies, ranging from non-neoplastic to neoplastic lesions. The aim of the study was to evaluate the histopathological spectrum seen in colorectal biopsies and surgical resection specimens, taking into account their clinical presentation and colonoscopic findings.

Methods: This retrospective study was conducted at the Department of Pathology, Fatima Jinnah Medical University, Lahore. Patients of all ages and both genders were included in the study. All the colorectal biopsies and resection specimens presenting to the department from January 1, 2023, to December 31, 2024, were included in the study. Data collection included demographic profile of the patients, signs and symptoms, colonoscopic findings, type of surgery done and histopathological report of the specimen. SPSS version 22 was used for data analysis.

Results: This study comprised 223 colorectal specimens in total. Patients varied in age from 03 years to 90 years. The commonest specimen was an endoscopic colorectal biopsy (n = 172, 77.1%). The commonest clinical presentation was chronic diarrhea (n = 128, 57.41%). The most common colonoscopic finding was an altered vascular pattern (n = 130, 58.29%). On histopathology, 40 cases (17.93%) were neoplastic, and 183 cases (82.06%) were non-neoplastic. The commonest histopathological finding was chronic nonspecific colitis (n = 98, 53.6%). The commonest malignancy was colorectal adenocarcinoma (n = 22, 55%).

Conclusion: An early colonoscopy followed by endoscopic biopsy/surgical resection is recommended in all colorectal lesions to differentiate between benign and malignant causes, detect high-grade dysplasia and incidental findings.

Keywords: Colorectal neoplasms, Adenocarcinoma; Biopsy; Medical audit; Histopathology; Colonoscopy; Colitis

INTRODUCTION

The colon extends from the cecum to the rectum. The major function of the colon is to absorb excess water and salts from the undigested intestinal contents and convert them into fecal material. The colon also hosts complex immune mechanisms interacting with the varied antigens present in food and gut flora.[1] The rectum lies between the sigmoid colon and the anal canal. The main function of the rectum is fecal storage, controlling defecation and maintaining continence.[2]

The colorectum witnesses a wide spectrum of pathologies, ranging from non-neoplastic lesions like congenital lesions, hamartomas, inflammation (infectious or immune-mediated), hyperplastic processes, and neoplastic growths. The neoplasms may be benign or malignant.[3]

According to WHO statistics published in July 2023, cancer of the colorectum is the third most common cancer across the globe, nearly responsible for 10% of all cancer cases. It causes the second-largest number of cancer deaths worldwide. More than 1.9 million new cases of colorectal cancer were diagnosed in the year 2020, and more than 935,000 deaths were reported globally. By 2040, the colorectal malignancy burden will increase to 3.2 million new cases annually (an increase by 63%) and 1.6 million deaths per annum (an increase by 73%).[4]

According to the fact sheet published by The Global Cancer Observatory of WHO, 9447 new cases of colorectal CA were diagnosed, and 5235 deaths were reported due to colorectal CA in Pakistan in 2022. Colorectal CA was more common in males than in females.[5] A study conducted at Agha Khan University hospital in Karachi revealed that 32% of the patients with Colorectal cancer (CRC) were younger than 40 years of age in Pakistan.[6]

Colorectal lesions commonly present with complaints of chronic fatigue and weight loss, change in

ARTICLE INFO
Article history: Received: 20th July 2025 | Accepted: 21 January 2025
Conflict of Interest: The authors declared no conflict of interest exists.
Funding: None.
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Citation: Iqbal M, Naz A, Nazir A, Muzaffar A, Qureshy A, Naich MA. Colorectal biopsies and surgical resection specimens: A two-year audit at a public sector hospital in Lahore. J Fatima Jinnah Med Univ. 2025; 19(4):211-216.
DOI: http://doi.org/10.37018/RDFE5487

bowel habits, chronic diarrhea, bleeding per rectum, rectal pain, something hanging out of the rectum and haemorrhoids.[7] Workup for colorectal lesions includes thorough clinical examination, stool examination, colonoscopy, followed by advanced imaging techniques (USG, CT scan and MRI). Flexible colonoscopy provides visual inspection of the lesion along with biopsy.[8] Histopathological evaluation of the lesion remains the gold standard for diagnosis. [9,10]

The rationale of the study was to evaluate the histopathological spectrum seen in colorectal biopsies and surgical resection specimens, taking into account their clinical presentations and colonoscopic findings. However, formal concordance analysis between clinical/endoscopic presentation and the histopathological findings was not a primary aim of the study. As the prevalence of colorectal cancer is rising in Pakistan, early diagnosis and treatment of malignant and premalignant colorectal lesions can help improve patient care, better disease management and decrease tumour burden in our population.

SUBJECTS AND METHODS

It was a two-year retrospective study conducted at the Department of Pathology, Fatima Jinnah Medical University, Lahore. The study period spanned from January 1, 2023, to December 31, 2024. The study gained approval from the Combined Institutional Ethical Review Board (Ref. No. 350- Synopsis/Path/ERC).

The study was done in collaboration with the Gastroenterology and Surgical Units of Sir Ganga Ram Hospital, Lahore. Patients of all ages and both genders were included in the study. All the patients presenting to the Gastroenterology Unit with complaints of per rectal bleeding or chronic diarrhea, not responding to medical treatment, were subjected to colonoscopy. Their colonoscopic biopsies were sent to the Pathology Department.

Patients presenting to the Surgical Unit had variable presentations like per rectal bleeding, acute, subacute or chronic intestinal obstruction and something coming out of the rectum. All the colorectal biopsies and resection specimens (including abdominoperineal resection, pan-colectomy, right or left hemicolectomy and low anterior resection) sent to the Pathology department from the Surgical unit were included in the study (consecutive sampling method). Gut specimens received as part of staging laparotomies for malignancies of other organs and blocks received from other institutions for review and immunohistochemistry were also included in the study. Inadequate/autolyzed specimens, anal canal and appendiceal specimens were excluded from the study. Cases on which a conclusive diagnosis could not be made and were referred to other centers for Immuno-histochemistry and molecular studies were not entered in the study.

The specimens were processed. Formalin-fixed paraffin-embedded sections were prepared. Slides were stained using Haematoxylin and Eosin stains. Histopathological reporting of the cases, along with Immunohistochemistry (wherever needed), was done. Data from all the cases was entered on a predesigned proforma. Data included age and gender of the patient, ward, clinical presentation, colonoscopic findings, type of surgery done, and complete histopathology report of the patient, along with Immunohistochemistry (if done). Data was analyzed using SPSS version 22.

RESULTS

Our study comprised 223 colorectal biopsies and surgical resection specimens in total. Patients ranged in age from 03 years to 90 years. The mean age was 40.6 ± 16.2 years. 111 patients were male, and 112 were female. Among the males, 89 (80.1%) patients had non-neoplastic lesions, and 22 (19.8%) patients had neoplastic causes. Among the females, 94 (84%) patients had non-neoplastic lesions, and 18 (16%) had neoplastic causes. Age distribution of the lesions is summarized in Table 1. Cross tabulation was done, and the chi–square test was applied to determine the relationship between age and gender of the patient with the type of Pathology. The p-value was insignificant in both cases.

The most common specimen was endoscopic colorectal biopsy (n = 172, 77.1%), followed by right hemicolectomy (n = 40, 17.9%) and abdominoperineal resection (n = 5, 2.2%), pancolectomy, left hemicolectomy, and low anterior resection were 02 cases each (n = 02, 0.9%). The commonest clinical presentation was chronic diarrhea (n = 128, 57.4%), followed by

Table 1: Age distribution of the patients

Age (in years)	Number of Neoplastic cases(n)	Number of Non-neoplastic cases (n)	Total	p-value
0-20	1 (2.5%)	16 (8.7%)	17 (7.6%)	0.457
21-40	17 (42.5%)	86 (47%)	103 (46.2%)	
41-60	15 (37.5%)	64 (35%)	79 (35.4%)	
61-80	7 (17.5%)	16 (8.8%)	23 (10.3%)	
>81	0 (0.0%)	1 (0.5%)	1 (0.4%)	

Table 2: Histopathological diagnosis of non-neoplastic colorectal lesions

Histopathology	Number of cases	Percentage
Chronic nonspecific colitis	98	53.6%
Active colitis	25	13.7%
Gangrene/volvulus	22	12.0%
Chronic Granulomatous Inflammation (TB)	17	09.4%
Juvenile retention polyp	7	03.8%
Inflammatory polyp	5	02.7%
Solitary rectal ulcer	5	02.7%
Lymphocytic colitis	3	01.6%
Sessile serrated lesion	1	0.5%

Table 3: Histopathological diagnosis of Neoplastic Colorectal lesions

Pathology	Number of cases	Percentage
Colorectal CA – Adenocarcinoma NOS	13	32.5%
Colorectal CA- Mucinous adenocarcinoma	09	22.5%
Gastrointestinal stromal tumor	3	07.5%
Non-Hodgkin lymphoma	3	07.5%
Well-differentiated Neuroendocrine tumor (Grade 1)	3	07.5%
Metastatic CA	2	05.0%
Villous adenoma with high-grade dysplasia	2	05.0%
Tubular adenoma	2	05.0%
Melanoma	2	05.0%
Intestinal lipoma	1	2.5%

Table 4: Comparison of patients' age with grade and stage of colorectal CA

Age Group (years)	Tumor grade					AJCC tumor stage					
	G1 n (%)	G2 n (%)	G3 n (%)	Total	p-value	I n (%)	II n (%)	III n (%)	IV n (%)	Total	p-value
0–20	1 (14.3)	0 (0.0)	0 (0.0)	1 (4.3)	0.852	1 (25.0)	0 (0.0)	0 (0.0)	0 (0.0)	1	0.985
21–40	1 (14.3)	5 (45.5)	3 (60.0)	9 (39.1)		1 (25.0)	2 (40.0)	5 (50.0)	2 (50.0)	10	
41–60	3 (42.9)	4 (36.4)	1 (20.0)	8 (34.8)		1 (25.0)	2 (40.0)	3 (30.0)	1 (25.0)	7	
61–80	2 (28.6)	2 (18.2)	1 (20.0)	5 (21.8)		1 (25.0)	1 (20.0)	2 (20.0)	1 (25.0)	5	
>80	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0	
Total	7 (100.0)	11 (100.0)	5 (100.0)	23		4 (100.0)	5 (100.0)	10 (100.0)	4 (100.0)	23	

intestinal obstruction, acute, subacute or chronic (n = 55, 24.7%), per rectal bleeding (n = 35, 15.7%) and something coming out of the rectum (n = 05, 2.2%).

The most common colonoscopic finding was hyperemic mucosa/ altered vascular pattern (n = 130, 58.3%). Intestinal polyp/ mass (n = 70, 31.4%), ulcer (n = 13, 5.8%) and normal (n = 10, 4.5%) were other colonoscopic findings. In the present study, out of 223 cases, 183 cases (82.06%) were non-neoplastic (non-tumor) and 40 cases (17.93%) were neoplastic (tumor).

Among the non-neoplastic lesions, the most common histopathological finding was chronic nonspecific colitis (n = 98, 53.6%), followed by active colitis (n = 25, 13.7%). Gangrenous gut/ volvulus, intestinal tuberculosis and polyps were less commonly seen (Table 2). Among the malignant cases, colorectal CA was the commonest n = 22, 55%. The histological variants were adenocarcinoma NOS (n = 13, 32.5%), followed by mucinous adenocarcinoma (n = 09, 22.5%). Other malignancies were metastatic CA, neuroendocrine tumors grade 1 (NET, G1), non-Hodgkin lymphoma, malignant GIST, and melanoma (Table 3).

The age range of colorectal CA spanned from 18 years till 80 years, with a mean age of 45.5 ± 16.9 years. The male-to-female ratio was 7:4. The commonest age group was 41-60 years (n = 9, 40.9%), followed by 21-40 years (n = 8, 36.4%).

Cross tabulation was done between age of the patients and Grade and AJCC Stage of the tumor and Chi-square test was applied. However, no statistically significant association was found between these (Table 4).

Chi-square test was also applied to compare patients' gender with the Grade and AJCC Stage of colorectal CA. Interestingly, statistically significant relationship was found between male gender and higher tumor grade ($p < 0.05$), however no statistically significant association was found between the gender and tumor stage (Table 5).

Table 5: Comparison of patients' gender with grade and stage of colorectal CA

Gender	Tumor grade					AJCC tumor stage					
	G1 n (%)	G2 n (%)	G3 n (%)	Total	p-value	I n (%)	II n (%)	III n (%)	IV n (%)	Total (stage)	p-value
Male	2 (28.6)	7 (63.6)	5 (100.0)	14 (60.9)	0.043	1 (25.0)	4 (80.0)	5 (50.0)	4 (100.0)	14 (60.9)	0.112
Female	5 (71.4)	4 (36.4)	0 (0.0)	9 (39.1)		3 (75.0)	1 (20.0)	5 (50.0)	0 (0.0)	9 (39.1)	
Total	7 (100.0)	11 (100.0)	5 (100.0)	23 (100.0)		4 (100.0)	5 (100.0)	10 (100.0)	4 (100.0)	23 (100.0)	

DISCUSSION

In our study, patients presented in a vast age range from 3 years till 90 years. The mean age was 40.6 ± 16.2 years. This is comparable to the demographic features seen in a study conducted in Maharashtra, India.[11] It can be readily explained by the fact that colorectum is subject to multiple pathologies in different age groups and no age is immune to colorectal pathology.

The commonest clinical presentation in our study was chronic diarrhea (n = 128, 57.4%), followed by intestinal obstruction (n = 55, 24.7%), per rectal bleeding (n = 35, 15.7%) and something coming out of the rectum (n = 05, 2.2%).This is in contrast to a study conducted in Nigeria[12], where bleeding through rectum was the primary presentation (28.4%) followed by altered bowel habits (19.8%) and constipation (13.6%).This disparity can be explained by the fact that in the Nigerian study, colorectal CA was the commonest diagnosis, whereas in our study non-neoplastic causes took the lead.

In our study, the commonest colonoscopic finding was hyperemic mucosa/ altered vascular pattern (n = 130, 58.3%) followed by Intestinal polyp/ mass (n = 70, 31.4%), ulcerated lesion (n = 13, 05.8%) and normal (n = 10, 4.5%). The results are discordant with the study conducted by Shrestha et al,[9] in which ulcerated growth had the highest frequency (24%) on colonoscopy. This is because in their study adenocarcinoma was the commonest histopathological finding (34.7%) but in our study chronic colitis and active colitis were the most common lesions.

Non-neoplastic lesions (82.06%) were more common than the neoplastic lesions (17.93%) in our study. Chronic nonspecific colitis (cases showing crypt architectural distortion, lympho-plasmacytic infiltrate in the lamina propria and basal plasmacytosis) was the commonest non-neoplastic lesion in our study (53.6%) followed by active colitis (13.7%). Cases of active colitis showed neutrophilic inflammation with cryptitis, crypt abcesses or surface ulceration. Our results are strengthened by a 7 years study conducted by Saleem A et al [13] in Pakistan, who reported an increasing trend of Inflammatory Bowel disease (IBD) in Pakistani Population. These results are similar to two different studies carried out in India by Rajeswari et al [14] and Geetha et al[15]. Rajeswari et al reported non-neoplastic lesions were 60% and neoplastic lesions were 40%. Most common non-neoplastic lesion in their study was also chronic non-specific colitis (25%). Geetha et al[15] showed similar results. Intestinal tuberculosis was an eminent finding in both our study (09.4%) and study by Geetha et al[15] (06.6%) showing the prevalence of Tuberculosis in the Subcontinent.

However, our study showed higher incidence of gangrenous gut/ volvulus (12%) as compared to the above mentioned studies[14,15]. This may be partly explained due to different life styles and eating habits in India and Pakistan. 17 cases of hamartomatous and inflammatory colorectal polyps were seen. They demonstrated their characteristic morphologies with no evidence of dysplasia.

The premalignant cases in present study included 07 cases of active colitis which were labelled as Ulcerative colitis after clinical and serological workup and 2 cases of villous adenoma with high grade dysplasia and 1 sessile serrated lesion. Tahiliani et al[10] also reported ulcerative colitis was the most frequent premalignant lesion in their study.

A total of 15 cases of active colitis were negative for dysplasia and 3 cases were reported indefinite for dysplasia (cases where distinction between dysplasia and reactive epithelial atypia could not be made). Both the villous adenomas demonstrated a villous architecture with high grade dysplasia. 1 sessile serrated lesion was seen along with a mucinous adenocarcinoma in a right hemicolectomy specimen. The Benign tumors included tubular adenomas and intestinal lipoma. The intestinal lipoma presented as a submucosal 2.5cm polyp, causing obstruction.

Among the malignant cases, colorectal CA was the commonest n = 22, 55%. Our study results showed that colorectal CA was more common in males as compared to females in a ratio of 7:4.The most common age group was 41-60 years (40.9%) but an alarming number of colorectal CA presented in patients younger than 40 years of age (43.47%). The youngest patient of colorectal CA was an 18 years female. Male gender was found to be associated with higher grade tumors. Our results are comparable to the factsheet published by Global Cancer Observatory, WHO[5]. The study conducted at Agha Khan University Hospital [6] also raised concern and anxiety about the younger age of presentation of colorectal CA.

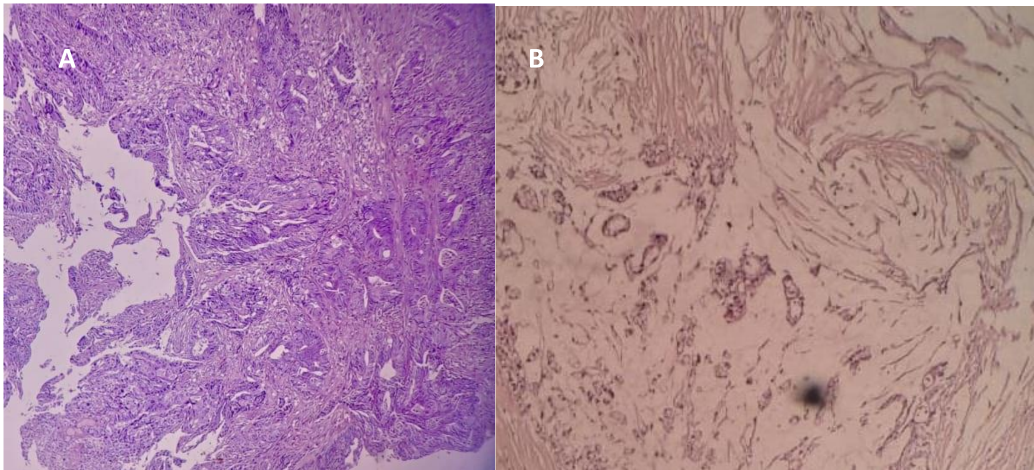

Figure 1: A) Adenocarcinoma NOS. B) Mucinous adenocarcinoma

The histological variants were Adenocarcinoma NOS (n = 13, 32.5%), followed by Mucinous Adenocarcinoma (n = 09, 22.5%). This correlated with the study by Geetha et al[15] in which adenocarcinoma NOS was the most common cancer (69.5%).A 5 years study from Ethopia[16] showed 90% of their malignant cases were adenocarcinoma NOS. In the study by Rajeswari et al[13], 72.72% of the malignant cases were Adenocarcinoma NOS. Both these studies[14, 16] showed less common variants were mucinous adenocarcinoma and signet ring cell CA.

In the present study, Adenocarcinoma NOS was more common in sigmoid colon and rectum. It was seen more in Abdominoperineal resections and Low anterior resections. On microscopy, they varied from well differentiated to poorly differentiated adenocarcinomas with little or no extracellular mucin (Figure 1A). Mucinous adenocarcinomas were more commonly seen in caecum and ascending colon. They were received as Right Hemicolectomy specimens. Histologically they showed destructive glands in extracellular pools of mucin (Figure 1B). One sessile serrated lesion of the right colon was seen as mentioned earlier. A single case of intramucosal CA (Tis) was reported arising in a background of villous adenoma with high grade dysplasia.

Our study reported 3 cases each of Non Hodgkin Lymphoma, malignant GIST and NET G1 and 2 cases of melanoma. Padma et al[17] reported 2 melanoma, 1 GIST and 1 NET G1. Khan A[18] also reported primary NonHodgkin Lynphoma of the colon made only 0.2-1% of the malignancies.

All the 3 Non-Hodgkin lymphoma cases presented as polypoidal masses causing obstruction. Two of them were Diffuse Large B-cell Lymphomas. Morphology showed sheets of large atypical cells with prominent nucleoli. Immunohistochemical profile was PAX 5-positive, CD20-positive, CD3-negative, CK-negative, Ki67 50-60%. One of them presented with widespread mediastinal and cervical lymphadenopathy. The third case was B lymphoblastic Lymphoma (B-ALL) presenting in a 5 years old boy. Morphology showed sheets of blast cells. Immunohistochemical profile was PAX-positive, CD20-positive, Tdt-positive, CD34-positive, CD 3-negative, CK-negative, and Ki67 85%.

The malignant GISTs presented as large masses (8 cm, 10 cm and 11.5 cm) attached to the serosal side or mesentery of colorectum and causing pressure effects. On histomorphology, they showed a malignant spindle cell neoplasm with brisk mitoses and necrosis. Final diagnosis were made with the help of Immunohistochemistry (CD34-positive, CD117-positive, S100-negative, SMA-negative, and desmin-negative).

The neuroendocrine tumors showed nests of cells with salt and pepper chromatin. Ki67 was less than 3%. Two neuroendocrine tumors were invading muscularis propria. One NET had regional lymph node metastasis.

Both the melanomas were rectal and heavily pigmented. Morphology showed nests of atypical cells with large eosinophilic nucleoli. Immunohistochemistry was Melan A-positive, S100-positive, CK-negative, CD 20-negative and CD 3-negative.

Unfortunately, due to the non-availability of mismatch repair (MMR) proteins immunohistochemistry (IHC) at our center, we could do not the workup for Microsatellite Instability (MSI) and Lynch Syndrome in cases of mucinous adenocarcinoma and sessile serrated lesion. However, a note advising for work up of Lynch Syndrome was added at the end of each report. Similarly, cases of GIST were referred to other centers for DOG 1 IHC and molecular studies.

Our study was a single center study. The authors wish a multicenter study may be conducted with the maximum possible sample size for more accurate and precise inference and interpretation of statistically significant data regarding colorectal pathologies and tumor grade /stage versus age/gender of the patients.

CONCLUSIONS

Descriptive trends seen in our study include that there is a wide range of pathologies affecting the colorectum ranging from non-neoplastic to neoplastic. No age and gender is immune. The non-neoplastic causes are more frequent than the neoplastic causes. The incidence of colorectal CA is increasing in Pakistan. It is more common in males and is increasingly presenting at a younger age group. Male gender is also associated with higher tumor grade. These observations made in our single center, reterospective cohort study cannot be interpreted as a generalized population level conclusion. Large multicenter studies are required to draw some statistically significant conclusions. Nevertheless, a nationwide campaign is needed to raise awareness about the signs and symptoms of the disease, along with screening programmes, to ensure early presentation of the patients. Timely detection and treatment can help improve patient care, survival rate and prognosis, thus decreasing the overall burden on public health in Pakistan.

Author Contributions

MI: Conceptualization, data analysis, manuscript drafting & editing.
AN: Conceptualization, data analysis, manuscript drafting and editing.
AN: Data interpretation & Analysis, drafting the manuscript.
AM: Data analysis, literature search, manuscript writing.
AQ: Data collection and analysis, final review of the draft.
MAN: Literature search, manuscript writing, final review of the draft.

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