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Histopathological spectrum of colorectal carcinoma in civil hospital, Ahmedabad, Gujarat

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Abstract

Background: Colorectal cancer is the third most common cancer worldwide with increasing incidence in the Asian countries. This study was done to assess the prevalence of colorectal cancer recorded in Civil hospital, Ahmedabad, Gujarat in accordance with histological type, American Joint Committee on Cancer (AJCC) prognostic stage, anatomical site, age and sex.

Materials & Methods: This study was conducted on the resected colonic specimens received in histopathology department, B.J. Medical college, Civil hospital, Ahmedabad. A total of 110 cases were studied during the period of June 2023 to May 2024. Received specimens were fixed in 10% neutral formalin, processed in automatic tissue processor and slides were stained with H&E. Microscopic assessment and final diagnosis with stage of tumor (AJCC prognostic stage) was reported.

Results: According to this study maximum number of cases belong in 61-80 years (47 cases) followed by 41-60 years (44 cases). Out of 110 cases 65 male were and 45 were female. Most common anatomical site involved was cecum (29 cases) and the most common histological type was Moderately Differentiated Adenocarcinoma (64 cases).

Conclusion: The incidence of colorectal cancers is increasing in India due to the lifestyle modification and westernization. Hence this study will be helpful to estimate the disease burden among a particular region in Gujarat, thus emphasizing the need for creating awareness among the population about Colorectal cancer and its screening modalities, thus leading to an early diagnosis and better clinical outcome.

Keywords: Colorectal carcinoma (CRC), Adenocarcinoma, AJCC prognostic stage

Introduction

Colorectal cancer (CRC) is the third most common cancer worldwide and the fourth most common cancer in India, accounting for about 10% of all cancer cases. It is also the second leading cause of cancer related deaths worldwide. The age-standardized incidence rate (ASR) of CRC in India is 15.2 per 100,000 people. By 2040 the burden of colorectal cancer will increase to 3.2 million new cases per year (an increase of 63%) and 1.6 million deaths per year (an increase of 73%)^[1]. Recent epidemiologic trends indicate an increasing CRC burden in low and middle income countries, especially countries like India that are going through a demographic and economic transition^[2]. Majority of the colon cancers are adenocarcinoma, its cause and pathogenesis are related to established risk factors such as consumption of red meat, processed food, alcohol consumption, sedentary lifestyle and excess body fat. Genetic predisposition is an important risk factor depending on the type of mutation and with 100% risk in patients with familial adenomatous polyposis. Other well established risk factors are chronic bowel inflammation as seen in Crohn's disease and Ulcerative Colitis, Pelvic irradiation, Cystic Fibrosis and Ureterosigmoidostomy^[1,3].

Gross examination of the specimen, histopathology examination and IHC is essential for accurate diagnosis, appropriate patient management, prognosis assessment and family counselling^[1]. This article is based on the study that was undertaken to evaluate the histopathological spectrum of colorectal cancer with respect to the histological type, AJCC stage, age-sex distribution and site of the tumor in cases reported in B.J Medical College, Civil hospital, Ahmedabad and to compare it with other studies.

Materials and Methods

This is a hospital based retrospective study conducted on 110 cases over a period of 12 months from June 2023 to May 2024 in the Histopathology section, Department of pathology, B.J Medical college, Ahmedabad. All resected colorectal specimens received were examined grossly for any lesion. The bowel was opened using scissors along the uninvolved colonic wall in specimens with identifiable lesion and along the antimesenteric border in specimens with no identifiable lesion. Specimens were fixed in 10% neutral buffered formalin solution for over 24 hours. Multiple sections were taken from the area of involvement after which routine tissue processing and paraffin embedding was done. Sections of 4-5 micrometre were cut by rotary microtome and stained with Hematoxylin and eosin. Special stains and tests such as Periodic Acid-Schiff, Alcian blue and IHC were used whenever required. Final diagnosis was reported with the details of microscopic findings and stage of tumor as per AJCC prognostic stage as shown in the Table.

Results

In present study 110 resected colonic specimens were examined. The age of the subjects ranged from 18 to 81 years. Maximum number of cases belonged to the 61-80 years (47 cases), followed by 41-60 (44 cases). Out of 110 cases 65 were male and 45 were female.

The most common type of malignancy reported was adenocarcinoma predominantly the Moderately differentiated type followed by other variants like Mucinous carcinoma, Signet ring cell carcinoma, Neuroendocrine, mixed type (moderately differentiated adenocarcinoma and neuroendocrine differentiation), Well differentiated type and metastatic cancer to colon.

Males are more affected with colorectal cancer compared to females. Moderately differentiated type being most common in males and Mucinous carcinoma in females. Most common site involved was cecum. AJCC prognostic stage IIA is the most commonly found stage of tumor in males and stage IIIB being most common in females.

Table 1: Age and sex wise distribution of cases

Age group	Male	Female	Total	Percentage
0-20	1	0	1	1%
21-40	11	5	16	15%
41-60	20	24	44	40%
61-80	32	15	47	43%
81-100	1	1	2	2%
Total	65	45	110	100%

Table 2: Histomorphology with sex wise distribution

Histomorphology	Male	Female	Total	Percentage
Well differentiated Adenocarcinoma	2	3	5	4.5%
Moderately Differentiated	40	24	64	58.2%
Poorly Differentiated	5	3	9	8.2%
Mucinous type	9	10	19	17.3%
Signet ring cell type	6	1	7	6.4%
Neuroendocrine	2	2	4	3.6%
Mixed tumors	1	2	3	2.7%
Total	65	45	110	100%

Table 3: Anatomical site distribution

Site of tumor	Frequency	Percentage
Caecum	29	26%
Ascending colon	20	18%
Transverse colon	19	17%
Descending colon	5	5%
Sigmoid colon	21	19%
Rectum	16	15%
Total	110	100.0%

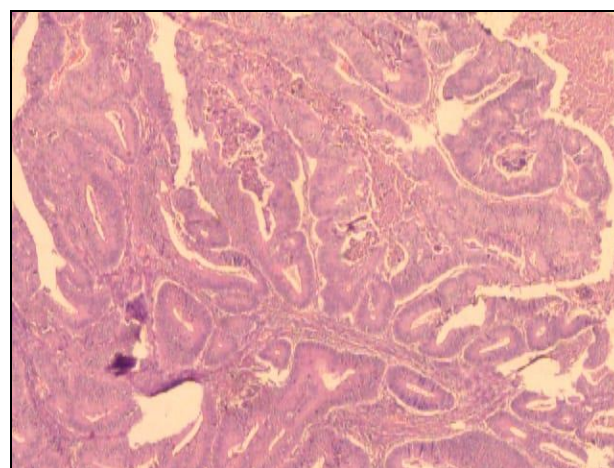


Fig 1: Moderately differentiated Adenocarcinoma

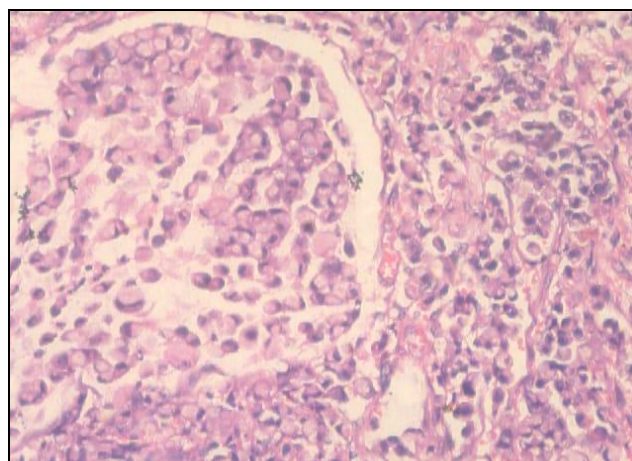


Fig 2: Signet ring cell carcinoma

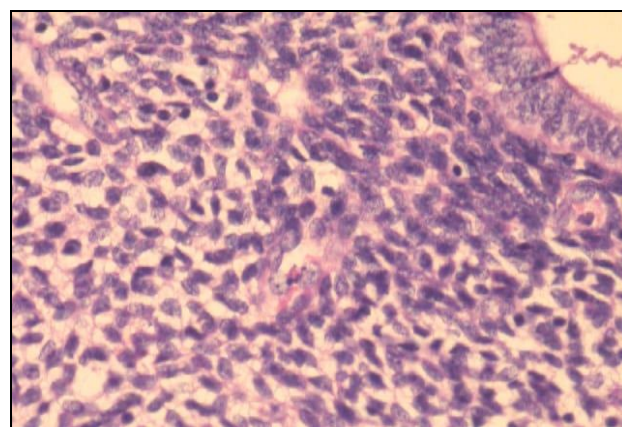


Fig 3: Mixed Neuroendocrine and Moderately differentiated Adenocarcinoma

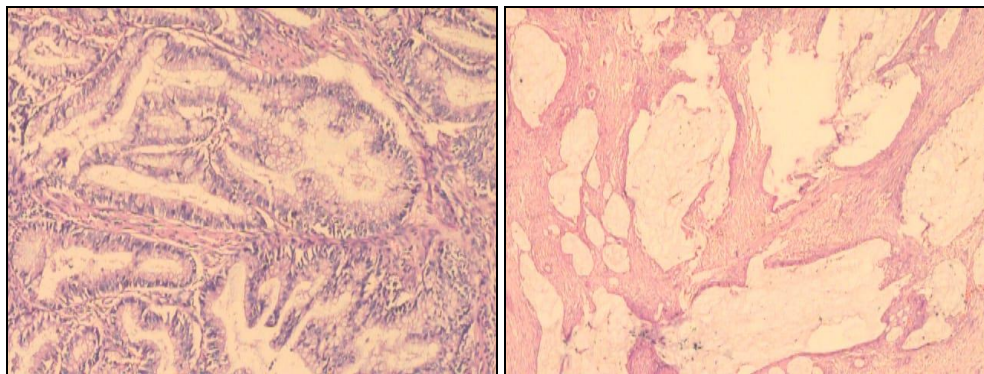


Fig 4: A. Mucinous carcinoma of colon, B. Mucin pools seen within tumor cells

Table 4: AJCC Prognostic stage distribution in accordance with sex

Stages	Male	Female
Stage I	11	8
Stage IIA	21	6
Stage IIB	4	0
Stage IIC	0	2
Stage IIIA	10	8
Stage IIIB	14	11
Stage IIIC	2	7
Stage IVA	2	2
Stage IVB	0	1
Stage IVC	1	0
Total	65	45

Discussion

More than 90% of all Colorectal tumors are adenocarcinomas that originate from epithelial cells of the mucosal layer [5]. Colorectal tumorigenesis occurs through acquisition of multiple driver mutation in genes like APC, KRAS, TP53, SMAD4, VHL and CTNNB1 following which the normal epithelial cell linearly transforms through a benign lesion (adenoma) into malignant tumor [6]. According to the World Health Organization (WHO) classification the histological variants of colorectal carcinoma are listed as mucinous, signet ring cell, medullary, micropapillary, serrated, cribriform comedo-type, adeno-squamous, spindle cell, and undifferentiated [4, 11]. Histologically conventional adenocarcinoma is characterized by glandular formation, which is the basis for histologic tumor grading. In well differentiated adenocarcinoma >95% of the tumor is gland forming, moderately differentiated adenocarcinoma shows 50-95% gland formation and poorly differentiated adenocarcinoma is mostly solid with <50% gland formation [1, 2]. Histological subtype is found to have an independent prognostic value and this could be an effect of microsatellite instability (MSI) rather than the tumor grade itself. The poorly differentiated, mucinous and signet ring cell type have poor prognosis and higher incidence of peritoneal dissemination and metastasis to other organs when compared to well and moderately differentiated CRC which has better prognosis and lesser incidence of metastasis [13]. Early detection of tumor play a great role in the prognosis of the patient, hence screening strategies like faecal occult blood testing and other screening methods like Fecal Immunochemical Test (FIT) and the FIT-DNA test (also referred to as the stool DNA test) are recommended [7]. In the present study, it was observed that 65 cases (59%) were males and 45 cases (41%) were females, which are

concordant with study done by Revathy, *et al.* with 63% males and 37% females. Nandish, *et al.* found 53.48% were males and 46.52% females in their study [8,9]. The incidence of CRC peaks between the age of 61 to 80 years which correlates with the studies done by Revathy, *et al.*, and Chang, *et al.* [5,9]. The most common histological type was found to be moderately differentiated adenocarcinoma which are in accordance with studies done by Revathy *et al* and Amrutraj, *et al.* [9, 10]. In the present study the most common site involved is caecum (29 cases) which is not in concordance with Revathy *et al* and Nandish *et al* which had rectum as the most commonly involved anatomical site [8, 9]. The most commonly found AJCC prognostic stage is stage IIA in males and stage IIIB in females which meant affected women have nodal spread at the point of diagnosis whereas males were diagnosed at a relatively earlier stage. Final diagnosis for the neuroendocrine tumor (4 cases) and poorly differentiated tumors (9cases) were given after confirmation with immunohistochemistry (IHC) which showed strong positivity for chromogranin, synaptophysin and cytokeratin CK20 respectively.

Table 5: Comparison of site of tumor with other studies

Site of tumour	Revathy, <i>et al.</i>	Amrutraj, <i>et al.</i>	Present study
Caecum	13%	22%	26%
Ascending colon	7%	15.27%	18%
Transverse colon	4%	6.9%	17%
Descending colon	15%	2.77%	5%
Sigmoid colon	6%	9.72%	19%
Rectum	37%	20.83%	15%

Conclusion

Colorectal cancers were mostly prevalent in developed countries previously. However, in developing countries like India, there is an epidemiological transition due to change in lifestyle and eating habits that has increased the incidence of colorectal cancer. This study shows that the prevalence of CRC is most commonly seen in males above the age of 40 years with most common site being involved is caecum which might be due to the right-sided shift in the distribution of colorectal cancer that has been occurring in the Asian counties or due to increased availability of colonoscopy which has led to an early diagnosis. It also indicates that preventive measures like lifestyle modifications such as change of dietary habits, consulting the physician when early symptoms such as drop in hemoglobin, abdominal pain and reduced appetite occurs and undergoing screening test should be instituted as early as possible. Utilisation of the available screening modalities will help in early diagnosis and better clinical outcome for

the population.

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Conflict of interest

The authors declare that they have no conflict of interest.

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