

HISTOPATHOLOGICAL ANALYSIS OF COLORECTAL CANCER SPECIMENS IN A TERTIARY HOSPITAL IN PUDUCHERRY: A PROSPECTIVE STUDY

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ABSTRACT

Objective: According to GLOBOCAN 2020, colorectal cancer is the fourth most lethal cancer in infected patients worldwide, with 1.7 million new cases recorded each year. When we look at Indian population studies, their mortality, incidence, and prevalence rates are consistently increasing compared to other European countries. Only a few studies have been reported on the clinical profile of CRC in India. Compared to females, males are more affected. This study was carried out to study the age, sex, and size distribution of malignant colon cancer and correlate the histopathological spectrum of colonic biopsies with clinical findings.

Methods: Our study was a unicenter-based prospective study carried out over 2 years. All colonoscopic biopsies have been received in the Department of pathology, Aarupadai Medical College, and Hospital. Colonoscopies biopsies and colonic resection specimens are routinely fixed with 10% formalin and processed through an automatic tissue processor. Further, slides were stained with hematoxylin and eosin stains and examined for microscopic examination. Data generated from microscope observation were used for statistical analysis.

Results: Our study included 54 patients with colorectal cancer. Among the patients, males were outnumbered by female patients, having an M: F ratio of 1:7:1. The most common age group affected is between the ages of 61 and 70. Adenocarcinoma was the most common histological malignancy (83%), followed by mucinous adenocarcinoma (7%), neuroendocrine carcinoma (4%), signet ring cell carcinoma (4%), and malignant melanoma (2%).

Conclusion: Histopathological evaluation is the gold standard for the early detection of the gastrointestinal tract diseases, especially malignant diseases, which helps in the early prevention measures. Further, detailed studies on immunohistochemistry and molecular studies on colonoscopy biopsy specimens should be done in constant correlation with clinical features to help early detection of CRC and therapeutic prognostic purposes.

Keywords: Malignant lesions, Colon, Adenocarcinoma, Colonoscopy.

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INTRODUCTION

Colorectal cancer is globally recognized as a significant global problem, the 1st and 4th most common cause of mortality and morbidity in developing countries [1,2]. According to GLOBOCAN, India's cancer burden will more than double in the next 20 years, with 3–1.7 million new cases by 2035, possibly due to unorganized and poorly regulated cancer care hospitals [3]. Tuberculosis and infective colitis are the most common diseases reported in India, and bowel disease is challenging to diagnose [4].

Colonoscopy biopsies are an essential group of specimens obtained in the Department of Surgical Pathology in tertiary care hospitals in Puducherry. Intestinal neoplasms can often be presented with non-specific symptoms, including abdominal pain, vomiting, and constipation [5]. Nowadays, the burden of colorectal carcinoma in India has increased to 4.3 and 3.4 per 100,000 population of men and women, respectively [6].

Histopathological interpretation of colonic mucosal biopsies, related to clinical findings, helps in the definitive diagnosis and early treatment of patients with colonic lesions. Therefore, our study was undertaken to study the histopathological patterns of colonic biopsies and correlate them with their clinical features.

METHODS

The present study was a 2 year prospective study conducted from January 2019 to December 2020 at the Department of Pathology at Aarupadai Medical College and Hospital, Puducherry. This study was done in 54 colonoscopic biopsies which were taken from the patients who came to the Gastroenterology Department, AVMCH to get treated for gastrointestinal malignancy. The patient's age, gender, current complaints, and relevant history were noted, and a colonoscopy was performed. Biopsies taken were immediately preserved in a 10% neutral buffered formalin solution. Tissue fragments were counted, measured, and processed according to standard histopathological procedures. Each paraffin block was sectioned into 3–5 µm thick sections using a rotary microtome. All slides were, then, stained with hematoxylin and eosin stain. All slides were examined in detail under a light microscope. This study was approved and permitted by the Institutional Ethics Committee.

Inclusion criteria

Patients with primary malignant tumors of the colon and rectum were included in the study.

Exclusion criteria

Patients with Metastatic malignant tumors, post-chemotherapy, and post-radiotherapy were excluded from the study.

Data generated from the microscopic examination were used for statistical analysis. The AVMC and H committee approved the Institutional Ethical Clearance.

RESULTS

Age and sex distribution

A total of 54 colonoscopic biopsies were examined during the stipulated period. Out of 54 cases, 63% were male, and 37% were female (Fig. 1). The male and female ratio was found to be 1.7:1.

The age and sex incidence of colorectal carcinomas are shown in Table 1. The age groups of 61–70 years (37%), 71–80 years (22%), and 50–59 years (19.7%) had the most cases, while those over 80 years (1.3%) had the fewest.

Histological classification and grading of colorectal cancer

Histologically, adenocarcinoma is divided into conventional adenocarcinoma, mucinous adenocarcinoma, and signet ring cell carcinoma. The presence of mucin in more than 50% of tumors qualifies it for inclusion in the mucinous category. Signet ring cell carcinoma is defined by the presence of more than 50% of tumor cells with prominent intracytoplasmic mucin.

Well-differentiated adenocarcinoma accounted for (44%), followed by moderately differentiated (26%) and poorly differentiated (13%). Others were mucinous adenocarcinoma (7%), neuroendocrine carcinoma (4%), signet ring cell carcinoma (4%), and malignant melanoma (2%). Fig. 2 represents the histological classification of colorectal carcinoma tumors. The most common type of malignancy was adenocarcinoma (83%). Based on the degree of differentiation of the tumor, well-differentiated adenocarcinoma accounts for 44%, with glandular structure in > 95% of tumors, followed by moderately differentiated adenocarcinoma (26%), with glandular structure

in 50–95% of tumors, and poorly differentiated adenocarcinoma (13%), with glandular structure in <50% of tumors. In our study, no undifferentiated carcinoma was found. The colorectal cancer grading system is depicted in Fig. 3.

Anatomic site distribution

Among colonoscopic biopsies taken from malignancies, the rectum was the most common site involved (37%) followed by the descending colon (15%), cecum (13), ascending colon (7%), sigmoid colon (6%), hepatic flexure (2%), and transverse colon (2%). Fig. 4 summarizes the results of anatomic site distribution.

DISCUSSION

Adenocarcinomas constitute more than 95% of colorectal cancers. Colorectal cancer is the third most common type of cancer in the world. Incidence rates for rectal cancer are higher than for other colon cancers in all parts of India [7]. Colorectal carcinoma incidence peaks between the ages of 61 and 70. Around 11% of cases of cancer occur before the age of 50. The risk of CRC increases significantly after the age of 50 years. The

Table 1: Age and sex incidence of colorectal carcinomas

Age and sex incidence of colorectal carcinomas		
Gender		
Age	Male (%)	Female (%)
0–40	2 (4)	1 (2)
41–50	4 (7)	1 (2)
51–60	6 (11)	4 (7)
61–70	11 (20)	7 (13)
71–80	7 (13)	5 (9)
>80	4 (7)	2 (4)
Total	34 (63)	20 (37)

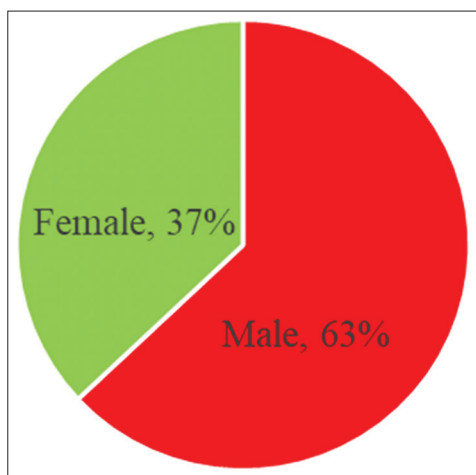


Fig. 1: The gender distribution of colorectal carcinoma

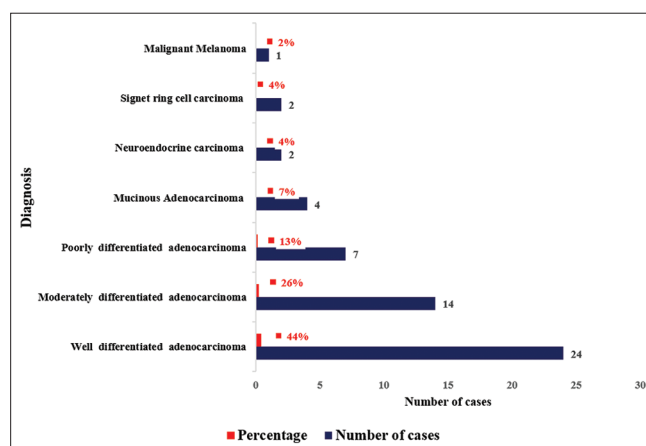


Fig. 2: The histological classification of colorectal carcinoma

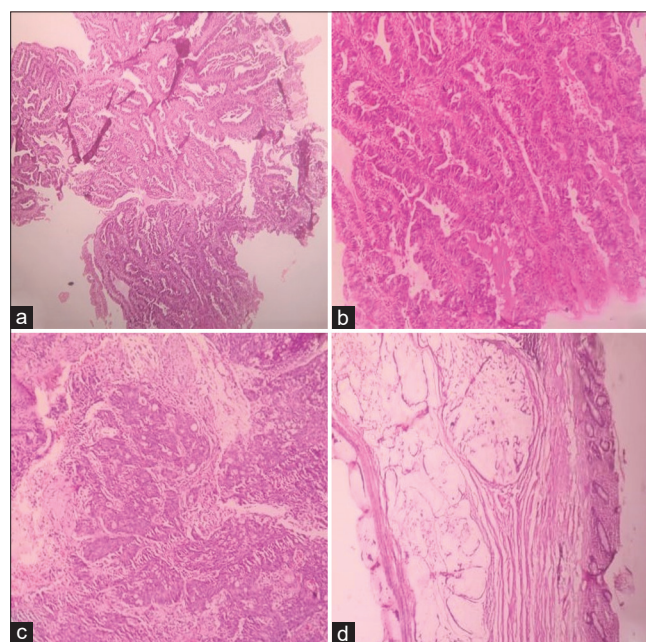


Fig. 3: Photomicrographs of well-differentiated adenocarcinoma: (a) Well-differentiated adenocarcinoma colon (×4), (b) Well differentiated Adenocarcinoma – Rectum (×40), (c) Poorly differentiated Adenocarcinoma – Rectum (×10), and (d) Mucinous adenocarcinoma – colon (×10)

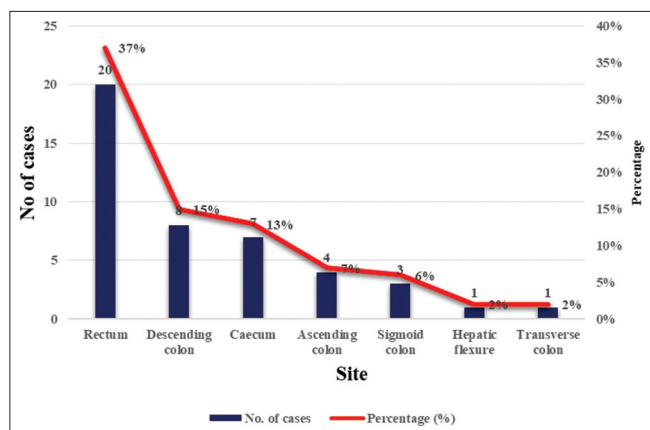


Fig. 4: Anatomic site distribution

age range of the malignant tumor was 15–88 years, with a mean age of 56 years, which correlates with the earlier studies that got similar results Dakubo *et al.*, and Fazeli *et al.* [8,9]. The study shows a male preponderance compared to females with M: F ratio of 1.7:1, compared with other Indian studies [10-12]. The majority of patients in our study had colorectal tumors in the rectum. Adenocarcinoma was the most common, accounting for 83% of malignancies, consistent with other studies' findings [12,13].

The most common site of cancer occurrence was found to be the rectum, with 38 cases (55.9%), followed by the descending colon, with eight cases (11.8%), and seven cases each in the Sigmoid and ascending colons (10.3%). These findings are in concordance with other studies by Saidi *et al.* [14], Gurjeet *et al.* [15], and Ritesh *et al.* [16]. Histological grading of adenocarcinoma varies according to the study. The most common type was found to be well-differentiated adenocarcinoma (83.7%), followed by the moderately differentiated (26%) and the poorly differentiated type (13%). Others were mucinous adenocarcinoma (7%), neuroendocrine carcinoma (4%), signet ring cell carcinoma (4%), and malignant melanoma (2%). The findings were following the studies of Chaitanya *et al.* [17] and in contrast to the studies done by Laishram *et al.* [18] Shefali *et al.* [19], and Sulegaon *et al.* [16].

CONCLUSION

Colorectal cancer was previously seen mainly in developed countries. However, in developing countries like India, there is an epidemiological change with an increased burden. Due to changes in lifestyle and eating habits, the present study found an increase in the incidence of intestinal cancer in the older age group, especially among men in Puducherry. Therefore, the diagnostic yield of a colonoscopic biopsy is very high. Consequently, it should be considered a vital examination stage in patients with rectal bleeding, abdominal pain, or other gastrointestinal symptoms. A colonoscopy can help detect malignant transformation in patients with Crohn's disease and adenomas, thereby reducing colorectal carcinoma mortality. It is thus necessary to examine this issue, considering the genetic basis, environmental factors, and the effect of progesterone on males.

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CONFLICTS OF INTEREST

No conflicts of interest

AUTHORS' CONTRIBUTIONS

All authors reviewed and accepted the manuscript.

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