

HISTOPATHOLOGICAL SPECTRUM OF GASTROINTESTINAL TRACT TUMORS: A STUDY OF 2.5 YEARS

Pathology

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ABSTRACT

Introduction: The tumors of the gastrointestinal tract are a cause of great deal of morbidity and mortality. Histopathological evaluation of GI lesions is the gold standard for providing essential diagnostic and prognostic information to clinicians for the best and timely management of each patient. **Aim:** To study the pattern of gastrointestinal neoplastic lesions and the correlation between age, sex, and site distribution of various lesions. **Material and Methods:** This is a descriptive cross-sectional study over a period of 2.5 years (from July 2020 to November 2022). Biopsies and resected specimens of the gastrointestinal tract were fixed in 10% Formalin. These specimens were then; processed in a tissue processor. Routine Hematoxylin and Eosin stain and special stains, including immunohistochemical stains were done; wherever indicated. The slides were examined and the data generated from observations was used for statistical analysis. **Results:** Out of the total 119 cases, 68 were males and 52 were females with a male-to-female ratio of 1.33:1. The most common age group involved was 5th decade. The commonest site for tumor was the Esophagus constituting 55 cases (46.3%), followed by tumors of Colo-Rectum which constitutes 38 cases (27.73%). Adenocarcinomas and squamous cell carcinomas were equally common in gastrointestinal tract and accounted for 44.6% of cases each. The most common tumor of the esophagus was squamous cell carcinoma whereas adenocarcinoma was common in the colo-rectum. The majority of squamous cell carcinomas and adenocarcinomas were moderately differentiated. **Conclusion:** Tumors of the GI tract show a wide variation in the morphology, making the histopathological examination crucial for the diagnosis & prognostic purpose. Early diagnosis and treatment are beneficial for better management and is imperative in providing better quality of life to the patient.

KEYWORDS

Gastrointestinal, Adenocarcinoma, Squamous Cell Carcinoma

INTRODUCTION

Gastrointestinal tumors account for a large proportion of all neoplasms. In India, according to the National Cancer Registry 2020-cancer of lung, mouth, stomach and oesophagus were the most common cancers in men while oesophageal cancer ranks seventh among women.¹

There is a worldwide variation in the distribution of various neoplasms. These international differences appear largely due to exogenous factors rather than due to inherited differences between populations.

Esophageal, gastric, and colorectal cancers have aetiological relationships with specific environments.² Risk factors for oesophageal carcinoma are alcohol and tobacco use, poverty, caustic esophageal injury, achalasia, tylosis, Plummer-Vinson syndrome, diets that are deficient in fruits or vegetables, and frequent consumption of very hot beverages, previous radiation to the mediastinum also predisposes and history of barrett oesophagus. Risk factors for gastric carcinoma are lower socioeconomic classes, pernicious anemia and people with blood type A or a positive family history, high-fat, high-salt and high-nitrogen diets, a history of infection with *Helicobacter pylori*, EBV virus, genetic factors, pre-malignant stomach lesions and tobacco use.³

Risk factors associated with colorectal cancer are familial and hereditary conditions like FAP and HNPCC, as well as environmental lifestyle-related risk factors such as physical inactivity, obesity, smoking, and alcohol consumption. Inflammatory bowel diseases also show increased risk of colorectal carcinoma.⁴

This study is undertaken to determine the relative frequency of various histopathologic types of tumors of GIT and to analyse the data on the basis of various parameters like age, sex, location, histological type etc.

MATERIALS AND METHODS

This is a descriptive cross sectional study over a period of 2.5 years

(from July 2020 to November 2022) carried out at Department of Pathology of Baroda medical college and SSG hospital. Ethical approval from the Institutional Review Committee was obtained. 119 cases of GIT Tumor biopsies and resection specimens received in the Histopathology section of Department of Pathology of Baroda medical college and SSG hospital, Vadodara during a time period of 2.5 years from July 2020 to November 2022 were included in the study. Tumors of esophagus, gastresophageal (GE) junction, stomach, small intestine and large intestine were included in the study. Tumors of oral cavity, pharynx, appendix were excluded. Inadequate biopsies and inflammatory lesions, recurrent tumors were also excluded.

A detailed history of each patient regarding age, sex, chief complains and other relevant findings were taken. Tissue Section of 3 to 4 micrometre thickness were cut, processed by routine paraffin embedding technique and stained by hematoxylin and eosin stain. Histopathological diagnosis was given and statistical analysis was done. Tumors were classified and staged according to World Health Organization Classification of Tumors (fifth edition).⁵

Histologic grading for adenocarcinoma and squamous cell carcinoma was done using protocols from College of American Pathologists.⁶⁻⁸

STATISTICAL ANALYSIS

Data was initially entered in MS-Excel, refined and finally analysed by SPSS 26.0. Variables like age at presentation, gender, site, histological type, differentiation and pathological stage at presentation were analysed. The results tabulated and were expressed as frequencies and percentages.

RESULTS

Total 119 cases of gastrointestinal tumors were taken in the study of 2.5 years. Out of 119 cases, 87 were received as biopsies, and 32 were resection specimens. The study showed there was a male predominance with 68 (57.1 %) males and 51 (42.9%) females, the male-to-female ratio was 1.33:1. Tumors of the Gastrointestinal tract

showed wide variation in age distribution, with peak occurrence in 5th decade. The mean age of presentation of tumors was 55 years.

Table/Figure: 1 Age Wise distribution

Age Group	Number of Cases	Percentage
21-30	2	1.7
31-40	12	10.1
41-50	36	30.3
51-60	33	27.7
61-70	26	21.8
71-80	7	5.9
81-90	2	1.7
91-100	1	0.8
Total	119	100

The commonest site of occurrence of tumors in the Gastrointestinal tract in our study was Esophagus which constituted 46.3% of all cases followed by Colon and rectum (27.73%).

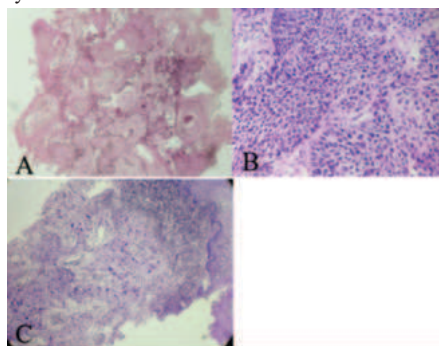
Amongst benign tumors, Adenomatous polyp was commonest (4.3%). 1 case of schwannoma was observed in small intestine. Amongst malignant tumors Adenocarcinoma (44.6%) and Squamous cell carcinoma (44.6%) were equally Common, while the rest of the cases were diagnosed as GIST (1.7%), B cell NHL (0.9%), Neuroendocrine Tumor (0.9%), and undifferentiated carcinoma (2.6%).

Table/Figure: 2 Histological Types of tumors and their anatomical locations.

Diagnosis	Esophagus	Stomach	Small Intestine	Colo-Rectum	Anal Canal	Total
Adenomatous Polyp	0(0)	0(0)	0(0)	5(100)	0(0)	5(4.3)
Adenocarcinoma	5(9.5)	9(17)	12(22.7)	25(47.2)	2(3.8)	53(44.6)
B Cell Non Hodgkin's Lymphoma	0(0)	0(0)	1(100)	0(0)	0(0)	1(0.9)
GIST	0(0)	2(100)	0(0)	0(0)	0(0)	2(1.7)
Neuroendocrine Tumor	0(0)	0(0)	1(100)	0(0)	0(0)	1(0.9)
SCC	50(94.4)	0(0)	0(0)	0(0)	3(5.6)	53(44.6)
Schwannoma	0(0)	0(0)	1(100)	0(0)	0(0)	1(0.9)
Undifferentiated Carcinoma	0(0)	0(0)	0(0)	3(100)	0(0)	3(2.6)
Total	55(46.3%)	11(9.2%)	15(12.6%)	33(27.7%)	5(4.2%)	119

Tumors of Esophagus

In our study majority of cases of esophageal tumors occurred in mid esophagus (47.27%) and Squamous cell carcinoma (90.9%) was the most common type of tumor found in the esophagus. The esophageal squamous cell Carcinoma were graded according to their histological differentiation and most of them (39 cases) were diagnosed as moderately differentiated.



Table/Figure: 3 (A) Photomicrograph of well-differentiated squamous cell carcinoma (10x, H&E Stain). There is marked keratinization and formation of keratin pearls, **(B)** Photomicrograph of Moderately differentiated squamous cell carcinoma (40x, H&E Stain), **(C)** Photomicrograph of Poorly differentiated squamous cell carcinoma (10x, H&E Stain). There is minimal keratinization and marked nuclear atypia.

Tumors Of Stomach

In our study majority of cases of Gastric tumors occurred in the Body (54.55%) followed by Antrum (36.36 %) and Pyloric canal (9.09%) and Majority of tumors in stomach were Adenocarcinoma (81.8%) 9 cases, followed by GIST (18.2%) 2 cases. Out of 9 cases of gastric adenocarcinomas, majority cases were of signet ring variant constituting 44.44 %.

Table/Figure: 4 Histological variants of Gastric Adenocarcinoma

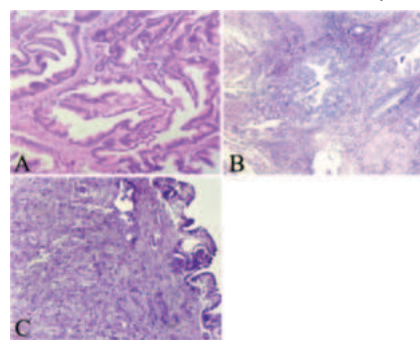
Histological variant	Number of Cases	Percentage (%)
Adenocarcinoma NOS	2	22.22
Mucinous Carcinoma	1	11.11
Signet Ring Adenocarcinoma	4	44.44
Mixed	2	22.22

Tumors of Small Intestine

Duodenum was the most common site involved in small intestine, consisting of 73.3% of small intestinal tumors. Adenocarcinoma was the most common tumor consisting of 80% of cases from the small intestine. The cases of adenocarcinoma were graded according to their histological differentiation and most of them 58.3% (7 cases) were diagnosed as well differentiated.

Tumors of Colorectum

Rectum was the commonest site constituting 51.51 % (17 cases) of colorectal malignancies. Out of 33 cases from colon and rectum, majority cases were of Adenocarcinoma (75.75%) 25 cases. Out of 28 cases of colo-rectal carcinoma, 19 cases were Adenocarcinoma NOS constituting 57.57% of colorectal carcinomas. (Table 6). Majority (64%) of the cases of Adenocarcinoma were moderately differentiated.



Table/Figure: 5 (A) Photomicrograph of Well-differentiated Adenocarcinoma (10x, H&E Stain). **(B)** Photomicrograph of Moderately Differentiated Adenocarcinoma (40x, H&E Stain). **(C)** Photomicrograph of Poorly differentiated Adenocarcinoma (10x, H&E Stain).

Table/Figure: 6 Histopathological variants of Adenocarcinoma

Variant	Number	Percentage (%)
Adenocarcinoma NOS	19	57.57
Mucinous Adenocarcinoma	5	15.15
Signet Ring Adenocarcinoma	1	3.03
Undifferentiated Carcinoma	3	9.09

Anal canal

Our study showed 5 cases of tumors in the anal canal, 3 cases in male and 2 cases in female patients. 2 cases of well-differentiated adenocarcinoma and 3 cases of squamous cell carcinoma were seen.

DISCUSSION

Tumors of the gastrointestinal tract are one of the common tumors encountered and they demonstrate an array of histological patterns, varied clinical presentations, and an immense variability in their prognosis. Considering the numerous variables involved, it would be justified in undertaking an in-depth study into tumors of gastrointestinal tract.

Tumors of Gastrointestinal tract were seen over a wide range of ages. The highest distribution was found in the 5th decade. However, the peak distribution was the 6th and 7th decade in the study done by Nital et al⁹ and Mohammad et al² respectively.

A male predominance was observed in our study with a male to female ratio of 1.33:1. This ratio is less when compared to studies of Nital et al⁹, Biren et al¹⁰, Neelima et al¹¹ while the ratio is more when compared to

Sunita et al¹² where the ratio is 1.21:1.

In the present study, the commonest site for tumors was the Esophagus constituting 46.3%, followed by tumors of the Colo-Rectum which constituted 27.73% of the cases. Studies of Nital et al⁹, Biren et al¹⁰, and Neelima et al¹¹ showed colorectum and anal canal as the most involved site while study of Mohammad et al² and Sunita et al¹² showed the stomach as the commonest site of involvement.

Table/Figure: 7 Comparison of Anatomical distribution

Study	Esophagus	Stomach	Small Intestine	Colo-Rectum and Anal canal
Present study	55(46.2)	11(9.2)	15(12.6)	38(31.9)
Mohammad et al ²	3(16.7)	10(55.5)	2(11.1)	3(16.7)
Nital et al ⁹	7(10.93)	9(14.06)	12(18.75)	35(53.12)
Biren et al ¹⁰	26(28.57)	18(19.78)	9(9.89)	36(39.56)
Neelima et al ¹¹	55(6.3)	97(11.2)	138(15.9)	461(53.2)
Sunita et al ¹²	268(7.1)	863(23.2)	707(18.9)	350(9.4)

Tumors Of The Esophagus

Tumors of the Esophagus are quite common and show great variation in the incidence between countries and also in different regions in the same country.

In the present study, 55 cases of esophageal tumors were studied, which formed 46.3% of all tumors studied, which are higher than those found by Nital et al⁹ (10.93%), Biren et al¹⁰ (28.57%), Neelima et al¹¹ (21%), Sunita et al¹² (7.1%).

The predominant site in our study was mid esophagus (47.27%), which was consistent with Geetanjali et al¹³ (45%), S Pande et al¹⁴ (42.9%), vidya et al¹⁵ (47.8%).

The most common type of tumor was squamous cell carcinoma (90.9%) followed by adenocarcinoma (9.1%). Similar results were seen in studies by Geetanjali et al¹³ (20.5%), S Pande et al¹⁴ (23.3%), vidya et al¹⁵ (70.8%).

Tumors Of The Stomach

In the present study, 11 cases of stomach tumors were studied, which formed 9.3% of all tumors studied, which is lower than those found by Leena Devi et al¹⁶ (49.34%), Mohammad et al² (66.67%), and Prabhakar et al¹⁷ (31%).

Table/Figure: 8 Comparative anatomical distribution of gastric tumors.

Site	Present study		Praveen et al ¹⁸		S Hirachand ¹⁹	
	No of cases	%	No of cases	%	No of cases	%
Cardia	0	0	11	26.19	4	14.81
Fundus	0	0	1	2.3	0	0
Body	6	54.5	6	14.28	3	11.1
Pylorus	5	45.45	24	57.14	20	74.08

Among the gastric tumors studied, 9 cases were of adenocarcinoma and 2 cases of stromal tumor were seen. This finding is in conformity with studies by Leena Devi et al¹⁶, and Mohammed et al², where adenocarcinoma was the most common tumor. On histological examination, the majority of adenocarcinomas in the present study were of signet ring cell type.

In our study majority of cases were poorly differentiated Adenocarcinoma (55.55%). Other studies like Praveen et al¹⁸ (72.2%), S Hirachand¹⁹ (44.4%) showed a preponderance of moderately differentiated adenocarcinoma.

Two cases of mesenchymal tumors found in stomach were diagnosed as GIST and were confirmed on IHC showing CD117 positivity. On microscopic examination, the tumor was composed of spindle cells arranged in interlacing fascicles.

Tumors Of Small Intestine

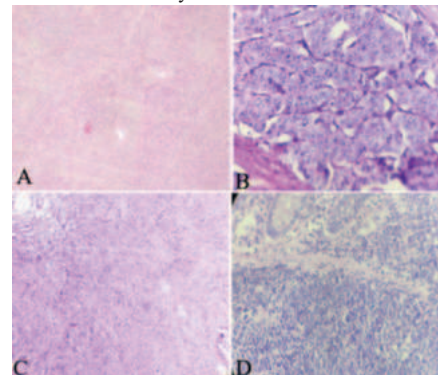
Small intestinal tumors are relatively rare and constitute only 3-6% of all gastrointestinal tumors in spite of constituting 75% of the length and 90% of the mucosal surface of the alimentary tract. Our study showed 15 cases of tumor of small intestine which is 12.7% of total cases.

Other studies showed following percentage of small intestinal tumors:

Nital et al⁹ (18.7%), Biren et al¹⁰ (9.89%), Neelima et al¹¹ (15.9%), Sunita et al¹² (23.2%), Mohammad et al² (11.1%).

Majority of tumors were Adenocarcinoma (80%), followed by 1 case of B cell Non-Hodgkins Lymphoma, Neuroendocrine tumor, Schwannoma each and it was consistent with studies of Nital et al⁹ and Biren et al¹⁰.

A study by Shahid Jamal et al²⁰ showed Adenocarcinomas were the common tumors and the commonest site of involvement was duodenum similar to our study.



Table/Figure: 9 (A) Photomicrograph of GIST (10x, H&E Stain). It is composed of spindle cells to epithelioid cells with abundant eosinophilic cytoplasm. Spindle cells are arranged in fascicles, **(B)** Photomicrograph of Neuroendocrine tumor (10x, H&E Stain). The cells are arranged in trabecular and organoid architecture and show salt pepper chromatin, **(C)** Photomicrograph of Schwannoma (10x, H&E Stain). Bland spindle shaped cells with elongated nuclei are seen, **(D)** Photomicrograph of B cell Non-Hodgkin Lymphoma (40x, H&E Stain).

Tumors Of Colo-rectum And Anal Canal

Tumors of the colon and rectum are the commonest tumors in the gastrointestinal tract in the Western World.

In the present study, 38 cases were from the colorectal and anal canal region constituting 31.9 % of all cases which was in conformity with studies by Nital et al⁹ (53.2%), Biren et al¹⁰ (38.46%), Sunita et al¹² (43.7%).

The anatomical site commonly involved was rectum, constituting 51.51% of all colorectal cancers which was in conformity with study by Nandish et al.²¹

Table/Figure: 10 Comparative anatomical distribution of colorectal cancer

Site	Present study	Mohammad et al ²	Abdulkareem F.B. et al ⁴	Nandish. et al ²¹
Caecum	2(6.06)	2(66.6)	34(8.09)	2(4.65)
Ascending colon	2(6.06)	0	24(5.71)	9(20.93)
Transverse colon	1(3.03)	0	19(4.5)	2(4.65)
Descending colon	4(12.1)	0	15(3.57)	4(9.30)
Sigmoid colon	7(21.2)	0	0	8(18.60)
Rectum	17(51.5)	1(33.3)	0	18(41.86)

Out of 33 cases of colon rectum, 25 cases were of adenocarcinoma (75.75%), 5 cases of adenomatous polyp (15.15%), and 3 cases of undifferentiated carcinoma (9.09%) which was consistent with study by Abdulkareem et al⁴ where majority of colorectal tumors were adenocarcinoma.

Table/Figure: 11 Comparative histological type of colorectal cancer

Type	Present Study	Nandish et al ²¹	Abdulkareem et al ⁴
Adenocarcinoma	19(67.85)	37(86.04)	366(87.14)
Mucinous Adenocarcinoma	5(17.85)	2(4.65)	34(8.09)
Signet ring Adenocarcinoma	1(3.57)	1(2.32)	5(1.19)

The differentiation of adenocarcinomas showed majority moderately differentiated adenocarcinoma (64 %), which was consistent with study by Nandish et al²¹. While in study by Abdulkareem et al⁴ well-

differentiated adenocarcinomas were common.

Tumors Of Anal Canal

Our study showed 5 cases of tumors in the anal canal, 3 cases in male and 2 cases in female patients. 2 cases of well-differentiated adenocarcinoma and 3 cases of squamous cell carcinoma were seen.

CONCLUSION

GI tumours were more common in the fifth decade. Males outnumbered females with a male to female ratio of 1.33:1. Predominantly affected site was the esophagus. Cases of adenocarcinoma and squamous cell carcinoma were equally common. Tumors of the gastrointestinal tract show a wide variation in the histological type making the histopathological examination a must in the diagnosis of these tumors. Early diagnosis and treatment is beneficial for better management and is imperative in providing better quality of life to the patient.

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Conflict of Interest

None.

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