

Prevalence of Gastrointestinal Tract Cancer Cases among Population of Tripura: A Histological Study.

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Abstract : *Histochemistry is currently the widely used methodology for recognition of gastrointestinal tract (GI tract) cancers like stomach, rectum, colon and oesophagus. Limited studies have addressed the prevalence of GI tract malignancies in Tripura. The objectives of this study were to find out the prevalence of gastrointestinal tract cancers among the population of Tripura, located in North-Eastern part of India. Accordingly, a hospital based study was carried out to evaluate the histopathological aspects of gastrointestinal tract cancer patients attending to Agartala Govt. Medical College during the period of 2010-2017. In this study 161 cases of GI cancers belonging to age between 5 to 85 years were found positive out of total 187 suspected samples. The present study demonstrates and classifies GI tract carcinoma from formalin-fixed paraffin embedded tissue samples. Total 19.63% cases were below 40 years of age. Among all the GI tract cancer incidences 33.54% were stomach carcinoma, 44.72% were rectal carcinoma, 14.91% were colon carcinoma and 6.83% were oesophageal carcinoma. Hence, rectum cancer is found to be more common in this region. More elaborated evaluation of demographical and risk factors are desirable from this region.*

Keywords - *GI tract cancer, Histology, Haematoxylin and eosin stain, Tripura.*

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I. INTRODUCTION

The human gastrointestinal tract (GI tract) is an organ system accountable for digestion and assimilation of various foodstuffs and expelling waste. The human gastrointestinal tract (GI tract) is broadly defined as the stomach and intestine and is divided into the upper and lower gastrointestinal tracts. However, by the broadest description, the GI tract includes all structures between the mouth and the anus. Upper GI tract consists of oesophagus, stomach and lower GI tract consist of colon & rectum. Among many causes, cancers play a vital role in causing many disorders, disabilities and even death of human life worldwide. In India cancer is the 9th common cause for the deaths among children between 5 to 14 years of age ^[1].

Among all organ cancers, gastrointestinal tract (GI tract) cancers present an interesting pattern in distribution over the world ^[2]. GI tract cancer is not only one of the most common cancers but also one of the most common causes of cancer mortality. GI tract cancer is one of the most frequent cancers worldwide, especially in Japan, China, and North-Eastern part of India. There are more than 100 new cancer cases per year in Tripura, with a 5-year survival rate < 10% ^[3]. Environmental agents such as tobacco, alcohol, and highly salted food and *H. pylori* infection have been identified as risk factors in the development of gastric cancer. Overall, the GI tract cancers are responsible for more cancers and more deaths from cancer than any other organ ^[4]. GI tract cancers constitute about 20% of cancer burden in India ^[5].

Histopathological examination is widely available, and specimens are easy to store ^[6]. Haematoxylin and Eosin (H&E) stain has been the most universal and traditional method for examination of formalin-fixed, paraffin-embedded tissue sections of all tissues for more than a century, and its application to cryostat sections of the muscle biopsy is no exception ^[7]. The aim of the present study is to identify the GI tract cancer cases by histochemical staining method which is very much cost effective and useful in worldwide. Considering GI tract cancers, a heterogeneous disease with site-specific treatment options and variable outcomes, the overall result of the present study are extremely variable.

II. MATERIALS & METHOD

2.1 Collection of samples: A total of 187 number GI tract cancers suspected patients from Pathology Department, Agartala Govt. Medical College & G.B Pant Hospital, belonging to age between 5 to 85 years were included. Four types of suspected cancer tissue samples viz., stomach, rectum, colon and oesophagus were

collected from the individuals during the period of January 2010 to September 2017. Demographic data like patient's age, sex, etc. were recorded carefully. The study protocol was accorded ethical clearance from Institutional Ethical Committee accordingly. After collection, the suspected formalin fixed paraffin embedded tissue blocks were further subjected to sectioning and staining procedures in the Immunohistochemistry laboratory of DBT-Project, Pathology Department.

2.1 Tissue sectioning and fixation: At first the tissue blocks were kept on ice for few minutes. In this process a small amount of water will be absorbed by the tissue. So slight swelling occurs & makes the sectioning easier. The tissue blocks were cut in a rotary microtome (section thickness 3-5 μm .) and dried completely. The glass slides were coated by albumin or poly-L-Lysine (0.1%) which can help to attach the tissue with the slide. The tissues were then backed on incubator (at 60°C for 30 minutes).

2.3 Histological staining: The haematoxylin and eosin combination is the most common staining technique used in histology. The diagnosis of malignancies is based largely on the following procedure:

- i) Dewaxing or deparaffinization by xylene (2 changes for 10 min.).
- ii) Rehydration by alcohol (100% \rightarrow 70% \rightarrow 50%, each for 5 min.).
- iii) Washing under normal tap water for 5 min.
- iv) Stain with haematoxylin (for 1-2 min.) and wash under running tap water for 5 min.
- v) Differentiated by 1% acid alcohol (1 ml of concentrated HNO_3 + 99 ml of 70% alcohol).
- vi) Again wash under running tap water until the bluish color form.
- vii) Counter stain with eosin and then washes for 5 min. under tap water.
- viii) Dehydration by alcohol (50% \rightarrow 70% \rightarrow 100%, each for 1 min.).
- ix) Mounting and observe under microscope.

III. RESULTS

The mean age of GI cancers was found to be 54.08 year. After histological staining a total 161 no. of cases were found positive among 187 no. of suspected samples. Among them stomach cancer cases were 54, rectum cancer were 72, colon cancer were 24 and oesophagus cancer were 11 (Table-1 and fig. 1).

Table 1: Gastrointestinal tract cancer incidences in Tripura for the year 2010-2017 among males and females.

Year	Stomach cancer		Rectum cancer		Colon cancer		Oesophagus cancer	
	Male	Female	Male	Female	Male	Female	Male	Female
2010	1	5	4	7	3	1	0	1
2011	9	12	6	3	2	4	1	2
2012	2	0	4	7	1	0	1	0
2013	5	1	2	3	1	2	1	3
2014	3	3	4	3	1	2	1	0
2015	5	1	9	9	1	2	0	0
2016	4	1	6	3	3	0	1	0
2017	2	0	0	2	0	1	0	0
Total	31	23	35	37	12	12	5	6

Among all the cases 33.54% were stomach carcinoma, 44.72% were rectal carcinoma, 14.91% were colon carcinoma and 6.83% were oesophageal carcinoma. Mean age for stomach, rectal, colon and oesophageal carcinoma was 53.37, 58.78, 43.10 and 60 years respectively.

Out of total 54 cases of stomach carcinoma, 31 (57.41%) cases were showing male predominance. Among all the stomach carcinoma, histologically 48.50% were adenocarcinoma, 40.70% were infiltrating adenocarcinoma whereas 10.79% were squamous cell carcinoma. On the other hand out of total 72 rectal carcinoma cases, 37 (51.39%) cases were showing female predominance. Among rectal carcinoma cases, histologically 54.17% were adenocarcinoma, 33.33% were infiltrating adenocarcinoma whereas 12.5% were mucosal cell carcinoma. Out of a total 24 colon carcinoma cases, male and female have shown an equal predominance, where histologically 54.17% were adenocarcinoma. Out of total 11 cases of oesophageal carcinoma, 6 (54.55%) cases were showing female predominance, where histologically 16.21% were squamous cell carcinoma, whereas 83.79% were adenocarcinoma. Representative H&E staining for GI tract cancer cases are shown in figure 2.

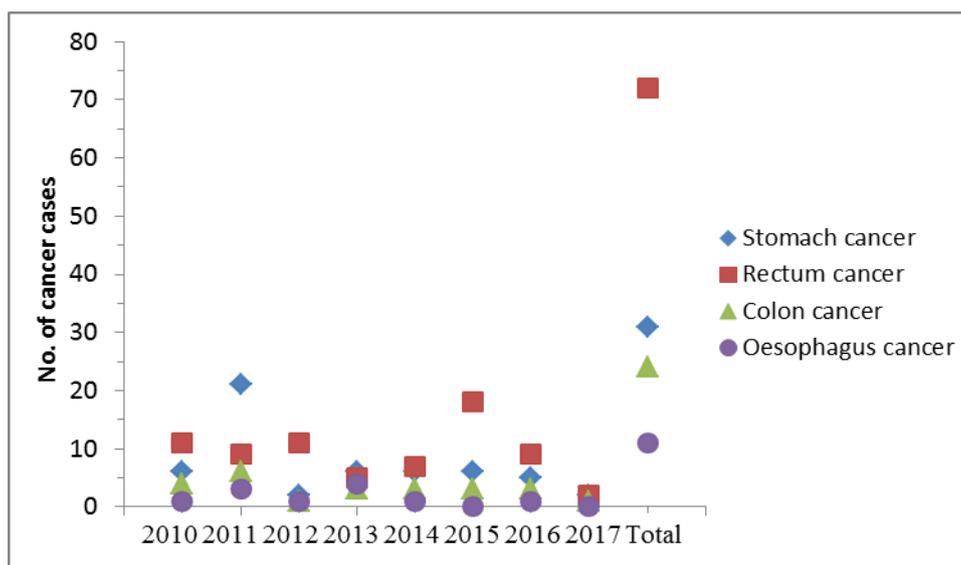


Fig. 1: Gastrointestinal tract cancer incidence in Tripura (year 2010-2017).

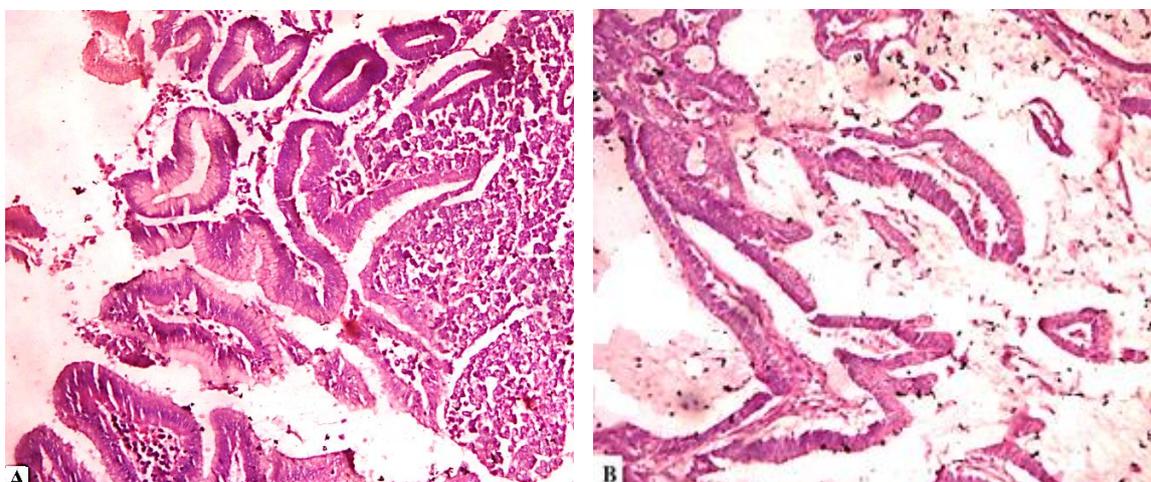


Fig. 2: Photomicrograph of gastrointestinal tract cancer cases (H&E stained, 10X).
A= Stomach carcinoma, B= Colon carcinoma.

IV. DISCUSSION

In spite of good advancements for diagnosis and treatment, cancer is still a big threat to our society^[8]. This is the second most common disease after cardiovascular disorders for maximum deaths in the world^[9]. The diagnosis of most malignancies is based largely on H&E procedure. The haematoxylin and eosin combination is the most common staining technique used in histology. Haematoxylin is a salt, which segregates in water to form ions (positive and negative). The positive ion that is alkaline in nature mingles with the negatively charged areas of the cellular macromolecules. The phosphate group of nucleic acids change its colour from blue to purple and then black.

Another salt, eosin also disengages in water to form ions. The negative ion is acidic, that coalesce to the positively charged section of the cellular macromolecules, mostly with the cytoplasmic proteins, changing its color through a range of hues, which range from pink to red to orange. Through the staining of haematoxylin and eosin, consequently, the nuclei of the cells of almost every tissues blemish bluish while the cytoplasmic segment of the cells of nearly all tissues tarnish into pink.

Gastrointestinal malignancies are considered as a group of disease entities. According to ICMR study, our neighboring state Assam is having the highest incidence of oesophageal carcinoma in India^[10]. Tobacco smoking and alcohol consumption are considered as major contributing factors for oesophageal carcinoma. Lower incidence of oesophageal carcinoma than other GI carcinoma types in our study differs with the high

prevalence in this region. Rectum cancer is more common in this region. Incidence of stomach carcinoma in Tripura is low compared to rectal carcinoma but higher than colon and oesophageal carcinomas.

Our neighboring state Mizoram is having highest incidence rate of gastric carcinoma in India ^[10]. In a study from Chennai, the incidence of stomach carcinoma was higher in male than female & cancer most commonly occurred in the fifth decade ^[11]. Stomach carcinoma can occur in any part of the stomach. Approximately 37% of gastric carcinoma in the United State originate in the upper third of the stomach where as 20% originate in the middle third, and 30% present in lower third. More elaborated study on the evaluation of demographic and risk factors of GI tract cancers are needed; which can help in improving the preventive strategies.

V. CONCLUSION

This study reveals the four types of GI tract carcinoma from formalin-fixed paraffin embedded tissue sample from Tripura. This study helps to diagnose GI tract cancer cases simply by conventional pathological staining method which will be very much helpful in cancer diagnosis at low expense. Major percentage of the cases was found above 40 years of age. Among all the four types of GI tract cancer cases rectal carcinoma were found more common in this region. Higher incidence of GI tract cancers especially rectal cancers in this region necessitates more elaborated evaluation of demographical and risk factors. Knowledge of the diverse risk factors will help in identification of high-risk individuals and can also improve the preventive strategies.

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