

Spectrum of gastro-intestinal cancers — a ten-year study

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Pattern of gastro-intestinal malignancies differ in different geographical areas and depends upon the genetic, cultural, dietary and socio-economic factors. Therefore studying pattern of gastro-intestinal cancers help to identify high risk groups, recommend preventive measures or advise appropriate screening in high risk population. The present study was undertaken to determine the pattern of gastro-intestinal malignancies at Kolar, situated in south-eastern part of Karnataka. A ten-year retrospective study from January 1997 to December 2006 was done at the department of pathology at Sri Devaraj Urs Medical College, Kolar, Karnataka. All the gastro-intestinal malignancies diagnosed were retrieved from pathology department records and socio-epidemiological data regarding each case was collected from hospital record section. The cases were analysed for site of involvement, age distribution, histological types and yearwise distribution by descriptive analysis. Gastro-intestinal malignancies constituted 22.96% of all the malignancies diagnosed. Males were more frequently affected than females, M:F ratio was 1:0.6. Peak incidence was in 7th decade. Stomach was the commonest site (48.4%) followed by oesophagus (27.7%), rectum (6.5%), colon (5.0%) and primary liver cancer (4.76%). Majority of histological type was adenocarcinoma. Yearwise distribution showed gradual increase in incidence of cancer. In the present study gastro-oesophageal malignancies was the most common gastro-intestinal malignancy in this part of Karnataka which in turn reflects on potential lifestyle and environmental factors.

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Key words : Gastro-intestinal cancer, gastro-oesophageal cancer.

Pattern of gastro-intestinal (GI) cancer varies in different region and depends on socio-economic class, lifestyle and diet. India is a vast country consisting of people of different customs and traditions. Hence pattern of GI cancers varies in different parts of the country. Epidemiological study helps to know the incidence/distribution of cancer and probable aetiological factors responsible for it. The present study was undertaken at the department of pathology at Sri Devaraj Urs Medical College, Kolar which is located in south-eastern Karnataka and shares the borders of Andhra Pradesh and Tamil Nadu which has influenced the food habits and lifestyle of the people. Rice and ragi are the staple food. The food is very spicy and there is widespread use of tobacco and alcohol in both genders especially in the lower socio-economic group. Our hospital caters local population and also border districts, majority of them belong to rural areas.

MATERIAL AND METHOD

A ten-year retrospective study from January 1997 to December 2006 was undertaken. All the histopathology

and fine needle aspiration cytology (FNAC) cases related to GI system reported as malignant were included in this study. Multiple specimens of a patient especially where endoscopy biopsy/FNAC was followed by histopathology of resected specimens was considered as one case. Only those endoscopy biopsy/FNAC cases which were not followed by histopathological study of resected specimens were counted separately. The relevant history and clinical findings of each case were retrieved from records. Cases lacking relevant clinical information were excluded. The diagnosis of each case were critically revised, confirmed and cumulative data was then categorised and coded according to ICD 10 WHO ISCD 1994¹. The cases were analysed according to age, sex, site, yearwise and histopathological type using SPSS software. These findings were compared with other similar studies.

OBSERVATIONS

Among a total of 19,615 cases of histopathology (n=15307) and FNAC (n=4308) reported, 2744 (13.98%) were malignant. GI cancers were 630 cases (22.96%) of total cancers. Of 630 cases, 379 cases (60.15%) were males and 251 cases (39.84%) were females with male:female ratio 1:0.66. The commonest site was stomach (Table 1). The peak age was in 7th decade followed by 6th decade in both genders (Table 2). Yearwise analysis showed a steady rise in incidence of the cancer in both genders (Table 3).

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The commonest site in the present study was the stomach (n=305) accounting for 48.4% of total GI cancers with male:female ratio being 1:0.5 (males-202 cases and females- 103 cases). Stomach cancer was the second most common cancer of all the cancers in the present study in males after oral cancers and fourth common in females after cancers of oral cavity, cervix and breast.

The peak age was 7th decade in males and sixth decade in females. Majority of cases histopathologically were adenocarcinoma with 2 cases of non-Hodgkin's lymphoma, 3 cases of carcinoid with metastasis, 2 cases of leiomyosarcoma and one case of gastro-intestinal stromal tumour.

The second common site was oesophagus (n=175) accounting for 27.7% of total GI cancers with male:female ratio being 1:0.8. Oesophageal cancer was the third common site of total cancers in males and fifth in females in

Table 1 — Sitewise Distribution of GI Cancer Cases in Both Sexes (ICD – 10 – WHO, ISCD, 1994)						
ICD Code	Site of malignancy	No of cases		M:F ratio	No of cases (%)	
		Male (%)	Female (%)			
C15	Oesophagus	94(24.80%)	81(32.27%)	1:0.8	175(27.7%)	
C16	Stomach	202(53.29%)	103(41.03%)	1:0.5	305(48.4%)	
C17	Small intestine	7(1.84%)	7(2.78%)	1:1	14(2.2%)	
C18	Colon	22(5.80%)	10(3.98%)	1: 0.4	32(5.0%)	
C19/20	Rectum	20(5.27%)	21(8.36%)	1:1.05	41(6.5%)	
C21	Anal canal	-	1(0.39%)	-	1(0.1%)	
C22 :	Liver	22 (5.80%)	8(3.18%)	1:0.36	30(4.76%)	
	Metastatic liver deposit	8(2.11%)	11(4.38%)	(1:1.37)	19 (3.01%)	
C23	Gall bladder	-	5(1.99%)	-	5(0.7%)	
C25	Pancreas	1(0.26%)	1(0.39%)	1:1	2(0.3%)	
C26	Other/undefined digestive organs	3(0.79%)	3(1.19%)	1:1	6(0.9%)	
Total		379 (100%)	251(100%)	1:0.66	630(100%)	

present study. The peak age in males was in 6th decade and in females 7th decade. Histopathologically majority of the cases were squamous cell carcinoma except 8 cases which were adenocarcinomas.

Rectal cancer was the fourth common site constituting 6.5% (n=41) of total GI cancers with male:female ratio being 1:1.05. The peak age in both genders was 7th

decade. Histopathologically majority of cases were adenocarcinoma except one case of squamous cell carcinoma and one case of non-Hodgkin's lymphoma.

Colon cancer was the 4th common site constituting 5.0% (n=32) of all GI cancers with male:female ratio being 1:0.4 The peak age in males was sixth decade and seventh decade in females. Majority of cases histopathologically were adenocarcinoma with one case of non-Hodgkin's lymphoma.

Table 2 — Sexwise Distribution of Cases of Gastro-intestinal Cancer in Various Age Groups																						
Site	0-9		10-19		20-29		30-39		40-49		50-59		60-69		70-79		80-89		90-99		Total	
	years		years		years		years		years		years		years		years		years		years			
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Esophagus					1		3	3	6	24	36	20	26	28	18	4	4	2			94	81
Stomach					7	7	10	7	37	18	51	29	66	27	24	8	7	7			202	103
Small intestine					1				1	1	2	1	1	4	1	1	1				7	7
Colon					4		3		4	2	6	2	4	6	1						22	10
Rectum				1	2	1		4	2	2	1	3	10	6	2	4	1		2		20	21
Anal canal												1										1
Liver			1		2(1)	(1)	2(2)	1	1(1)	1(2)	4(2)	2(2)	7(2)	1(6)	3	2	3				22(8)	8(11)
Gall bladder									1		2		2								-	5
Pancreas											1	1	1								1	1
Others					1		1				1	2	1								3	3
Total			1	1	19	9	20	16	52	51	103	63	119	81	49	19	16	9	2		379	251
All figures in parentheses indicate number of cases of metastatic deposits in liver; M-Male; F-Female																						

Table 3 — Sexwise and Yearwise Distribution of Cases of Gastro-intestinal Cancer																					
Site	1997		1998		1999		2000		2001		2002		2003		2004		2005		2006		Total
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F			
Oesophagus	12	5	5	1	3	7	8	13	8	6	5	1	9	8	14	11	15	18	14	12	175
Stomach	5	4	13	4	9	7	17	4	23	13	8	3	13	10	32	21	41	19	41	18	305
Small intestine										1	1	1			1	1	4	3	1	1	14
Colon	1		2	1	3		2	1	1		1	2		3	1	3	8		3		32
Rectum		1	1	2	2	1	2	3		2		1	2	2	5	2	6	6	1	2	41
Anal canal																		1			1
Liver		1	1		5	3	3		3	1	2	3	2	1	4	3	5	3	6	3	49
Gall bladder										1				1		2					5
Pancreas								1							1						2
Others	2						1	1										2			6
Total	20	11	22	8	22	18	33	23	35	25	17	11	26	25	58	43	79	52	66	36	630
All figures in brackets in liver indicate number of cases of metastatic deposits in liver; M-Male, F-Female																					

Primary liver cancer was the 5th commonest constituting 4.76% (n=30) total GI cancer with male:female ratio being 1:0.36 and peak age in males was in 7th decade and females in 6th/8th decade. Nineteen cases were secondaries in the liver, majority were seen in females.

Small intestine cancer was sixth common site contributing 2.2% (n=14) of all GI cancers with equal distribution in both genders. Histopathologically the common cancer was adenocarcinoma with one case of GI stromal tumours and 3 cases of carcinoid with metastasis.

Gall bladder cancer accounted for 0.7% (n=5) of all GI cancers with all 5 cases in females. Two cases each were in 6th and 7th decades and one case in fifth decade. Histopathologically all 5 were adenocarcinomas. Pancreatic cancers were only 2 cases (0.3% of all GI cancers) one each in male and female. In male it was in 7th decade and in female it was in 6th decade. Histopathologically both were adenocarcinomas. The other sites in the present study were 4 cases in omentum of which 3 were secondary adenocarcinoma deposits and one case of secondary deposits of carcinoid. Also one case of haemangiopericytoma of mesentery and one case of neuroblastoma of anterior abdominal wall was noted in present study.

DISCUSSION

GI cancers are one of the leading cancers in India and the incidence varies from 5.8% in Amritsar, 14.36% in Kerala to 65.25% in Kashmir². Changes in age distribution of a population, public education, availability of screening programmes/medical facilities take a role in the distribution of cancer. The incidence reported are 22.44%, 38% and 10.8% of total cancers in France, Iran and Pakistan respectively³⁻⁵. In the present study the incidence was 22.96% of total cases.

GI cancers are common in elderly population and the peak age reported is 6th and 7th decades with 80% of cases above 40 years⁶. However a study⁵ at Pakistan reported lower age of development of GI cancers compared to western study. In the present study the peak age was 7th decade in both genders; also 89.52 of cases were more than 40 years.

Regarding sex distribution, in most of the studies male preponderance is seen. Male:female ratio reported is 1:0.6 in France, 2.3:1 in Pakistan and 1.67:1 in western Saudi Arabia^{3,5,6}. In the present study male:female ratio was 1:0.66 having male preponderance.

The site distribution of various GI cancers mainly depends on environmental and dietary factors. It differs in different geographical areas as carcinoma of oesophagus being most frequent in Iran and South Pakistan, carcinoma stomach in Eastern Asian countries and North Pakistan and colorectal carcinoma in North Pakistan and the developed world⁵. In the present study the commonest site is stomach followed by oesophagus in both genders.

Gastric cancer is the third most common malignancy worldwide constituting 50% of all GI cancers⁷. It is common in low social class groups and 60% of cases are seen in developing countries^{5,8}. Highest incidence is seen in East Asia, East Europe and some parts of South Africa and lowest incidence in North America and Europe⁵. It is also common in parts of south India like Hyderabad, Nellore, Thiruvallur, Erode, Kasaragod, Palakkad, Kancheepuram, etc, and parts of South Karnataka like Udupi, Shimoga, Dakshina Kannada, Bangalore, Mysore and Chikmagalur¹. The risk of cancer changes within two generations on migration to new locale. Males are frequently affected in both high and low incidence areas⁵. Decreasing trend in the incidence of stomach cancer in Mumbai reported indicating lifestyle changes impacting on stomach cancer incidence⁹. The incidences in various studies are 29.33%, 24%, 17% and 18% of total GI cancers in France, Pakistan, Saudis and Non-Saudis in Saudi Arabia respectively^{3,5,6}; 40% cases are seen between 50-70 years of age with a few cases in less than 20 years of age⁵. Male preponderance is seen in many studies^{3,5-7}. The risk factors are smoking, alcohol, *Helicobacter pylori*, pickled/salted food, nitrites/nitrates used as preservatives and decreased use of onions, green fruits/vegetables^{3,4,6,7}. Increased carbohydrate diet like rice consumption, drinking of hot/salted tea and a high intake of red chilies are other environmental factors¹⁰. However low incidence of stomach cancers in Punjab is correlated with consumption of large amount of milk, milk products and wheat flour⁴. In the present study the incidence is 48.4% of total GI cancers indicating high incidence. There is male preponderance as in other studies the peak age was in 7th decade in males and 6th decade in females. Majority of the patients in this study also belong to low social class of rural background, rice is staple food, intake of more spicy food, alcohol and smoking common in both gender with low intake of fresh fruits and vegetables. Probably high carbohydrate diet is associated with decreased protective micronutrients as vitamin C, vitamin E and tocopherol, thus increasing risk of stomach cancer. Onions, fresh fruits and vegetables has high anti-oxidants and decrease risk of stomach cancer^{10,11}.

Oesophageal cancer is the 6th frequent site among all the cancers worldwide and 80% cases seen in developing countries⁵. The geographical distribution differs more than what is observed for any other cancers⁵. It is commonly seen in low social class population⁸. The incidence in various studies are 5.18%, 22.6%, 16.5% and 13.0% of all GI cancer in Finland, Pakistan, Saudis and non-Saudis in Saudi Arabia respectively^{5,6,8}. In majority of studies there is male preponderance^{3,4,6,8}. The peak incidence is in sixth decade⁵. The risk factors are smoking and alcohol which are independent risk factors and is dose and duration dependent^{2,3,8}. However, it is less associated with adenocarcinoma^{2,3}. The other risk factors are overweight, obesity, gastro-oesophageal reflex, nass, opium and also familial³.

However increase intake of fresh fruits and vegetables reduces the risk⁸. In the present study oesophageal cancer is the second common GI cancer with male preponderance. Peak age is in 6th decade in males and 7th decade in females. Majority of the patients in this study belong to low socio-economic class of rural background; 95% of the cases are squamous cell carcinoma.

Colorectal cancers are more common in high social class population with western diet, obesity, decreased physical activity, sedentary work, alcohol, red meat and animal fat^{3,4,8}. However increase intake of fresh fruits, vegetables, dietary fibre, milk, diet calcium, hormonal replacement therapy in females decreases the risk^{3,4}. Genetic factor plays an important role especially hereditary syndromes⁶. The incidence in various studies are 37.1%, 45.23%, 28.5% and 36.0% of total GI Cancers in Finland, Pakistan, Saudis and non-Saudis in Saudi Arabia respectively^{5,6,8}. Peak age reported is between 50-60 years of age⁵. In a study at Pakistan, majority of the cases were less than 60 years compared to west⁵. Majority of the studies shows male preponderance³⁻⁶. In the present study the incidence is 11.5% of total GI cancers with male preponderance in colonic cancer and female preponderance in rectal cancer. The peak age was 6th decade in males and 7th decade in females for colonic cancer and 7th decade in both genders in rectal cancer.

The incidence of hepatocellular carcinoma in various studies are 5.16%, 26.0% and 20.6% of total GI cancers in Finland, Saudis and non-Saudis in Saudi Arabia respectively^{6,8}. Majority of the studies show male preponderance^{4,6}. Alcohol, tobacco, aflatoxin in food, hepatitis B virus and hepatitis C virus infectious (75-80% cases) are risk factors^{3,5}. In this study primary liver cancer contributes 4.9% of total GI cancers with male preponderance. Maximum cases were seen in 6th decade in both genders.

Cancer of small intestine is common in high social class population⁸. The incidence in various studies are 1.30%, 1.3%, 3.70%, 0.5% and 1.0% of total GI cancers in Finland, France, Pakistan, Saudis and non-Saudis in Saudi Arabia respectively^{3,5,6,8}. Male preponderance is seen in many studies⁴⁻⁶. The risk factors are alcohol, smoking, fried foods, sugars, carbonated drinks, salted/smoked foods, bread, porota, rice, red meat and decreased intake of fresh fruits and vegetables^{3,8}. Histologically adenocarcinoma is the common cancer⁵. In this study cases of small intestine contributes 2.12% of all GI cancers with female preponderance and maximum cases were seen in 7th decade.

The incidence of anal cancers reported are 4.03%, 1.0% and 27.0% of total GI cancers in Pakistan, Saudis and non-Saudis in Saudi Arabia respectively with male preponderance^{5,6}. Histologically squamous cell carcinoma and melanoma are common⁵. Pancreatic cancers are commonly seen in low social class population and associated with smoking⁸. The incidences are 16.23%, 4.5% and 40% of total GI

cancers in Finland, Saudis and Non-Saudis in Saudi Arabia respectively with male preponderance^{4,6,8}. Gall bladder cancers are commonly seen in low social class population⁸. The incidence reported are 5.60% and 4.07% of total GI cancers in Finland and Saudis/non-Saudis in Saudi Arabia respectively with female preponderance^{4,6,8}. In this study all the 5 cases were seen in females.

The leading GI cancers in the present study were cancers of stomach and oesophagus and then colorectal cancer which showed male preponderance except rectal cancer having female preponderance. This epidemiological study gives an idea of probable risk factors as migrant studies have showed strong evidence of role of environmental factors and lifestyle in cancer risk¹². A further study has to be undertaken to exactly analyse the risk factors. However, this hospital-based study points towards incidence pattern, probable risk factors, helps to improve the quality of life and take up preventable measures/screening programmes in early detection of cancers.

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