

Retrospective histopathological analysis of various neoplasms of different parts of the gastrointestinal tract seen at the Kathmandu University Teaching Hospital (KUTH), Dhulikhel, Nepal

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Abstract

Objective: To find out the spectrum of various histopathologic types of primary neoplasms of different parts of the gastrointestinal tract (oesophagus, stomach, small intestine, colorectum, anal canal) seen at the Kathmandu University Teaching Hospital (KUTH), Dhulikhel as there exists a worldwide wide variation in the distribution of various neoplasms of different parts of the gastrointestinal tract, which appears largely due to exogenous factors rather than due to inherent differences between populations.

Materials and methods: This was a retrospective study. It was carried out at Kathmandu University Teaching Hospital (KUTH), Dhulikhel, Kavre, Nepal. All neoplasms of the gastrointestinal tract seen at the KUTH during the period 1st January 2004 to 31st December 2004 were included in this study and examined by light microscope (LM).

Results: A total number of 18 cases of neoplasms of the gastrointestinal tract were seen. Out of these, 3 (16.7%) were of the oesophagus (all squamous cell carcinoma), 10 (55.5%) were of the stomach (six intestinal type and four diffuse type), 2 (11.1%) were of the small intestine (one was lymphoma of the mucosa associated lymphoid tissue – MALTOMA and other was a malignant gastrointestinal stromal tumour - GIST), 3 (16.7%) were of the colorectum (all adenocarcinoma), and none was of the anal canal.

Conclusion: Relatively large number of cases of the carcinoma of the stomach were found in our this small series of the cases of the gastrointestinal tract in comparison to the Western countries.

Key words: Neoplasms, gastrointestinal tract, gastric carcinoma intestinal type, gastric carcinoma diffuse type, Kathmandu University Teaching Hospital (KUTH).

Gastrointestinal cancers account for a large fraction of human neoplasms. They are almost without exception incurable when gross metastases exist.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.² Oesophageal, gastric, and colorectal cancers have aetiologic relationships with specific environments. Oesophageal cancer is associated with a variety of mutagens, and the risk for gastric and colorectal cancers is strongly related to where one lives.¹

One of the reasons for identifying the environmental risk factors is the hope that this will help in more effective treatment and possibly in the prevention of these deadly diseases. Therefore, this study was done to find out the relative frequency of the various histopathologic types of the gastrointestinal neoplasms seen at

KUTH, Dhulikhel in comparison to the worldwide distribution.

Materials and methods

This was a retrospective study carried out at Kathmandu University Teaching Hospital (KUTH), Dhulikhel, Kavre, Nepal. All cases of various neoplasms of different parts of the gastro-intestinal tract that were submitted to the histopathologic laboratory during the period 1st January 2004 to 31st December 2004 were included in this study and examined by light microscope (LM).

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Results

A total number of 18 cases of neoplasms of different parts of the gastro-intestinal tract were seen during the period 1st January 2004 to 31st December 2004. All of them were malignant.

Out of these, 3 (16.7%) were of the oesophagus (all squamous cell carcinoma), 10 (55.5%) were of the stomach (six intestinal type and four diffuse type), 2 (11.1%) were of the small intestine (one was lymphoma of the mucosa associated lymphoid tissue – MALToma and other was a malignant gastrointestinal stromal tumour - GIST), 3 (16.7%) were of the colorectum (all

adenocarcinoma), and none was of the anal canal (Table 1).

The overall male: female ratio for all the neoplasms was 10 : 8. Out of these, the male : female ratio for the neoplasms of the oesophagus was 1:2, for the neoplasms of the stomach was 6:4, for neoplasms of the small intestine was 2:0 ; and, for the neoplasms of the colorectum was 1:2 (Table 2).

The overall age distribution was : 20 to 30 years 1 case, 31 to 40 years 1 case, 41 to 50 years 3 cases , 51 to 60 years 1 case , 61 to 70 years 7 cases, 71 to 80 years 4 cases (Table 3).

Table 1: Part-wise distribution of histopathologic types of neoplasms of the gastrointestinal tract (GIT)

Parts of GIT	No. of cases (%)	Histopathologic type
Oesophagus	03 (16.7%)	All squamous cell carcinoma
Stomach	10 (55.5%)	6 intestinal type, 4 diffuse type
Small intestine	02 (11.1%)	1 MALToma, 1 malignant GIST
Colorectum	03 (16.7%)	All adenocarcinoma
Total	18	

MALToma= Mucosa-associated lymphoid tissue lymphoma
GIST= Gastrointestinal stromal tumour

Table 2: Sex-wise distribution of neoplasms of the gastrointestinal tract (GIT)

Parts of GIT	Male	Histopathologic type	Female	Histopathologic type	Total
Oesophagus	1	SCC	2	Both SCC	3
Stomach	6	4 It, and 2 Dt	4	2 It, and 2 Dt	10
Small intestine	2	1 MALToma, 1 M. GIST	0		2
Colorectum	1	AC	2	Both AC	3
Total	10		8		18

SCC= Squamous cell carcinoma It= Intestinal type Dt= Diffuse type
MALToma=Mucosa-associated lymphoid tissue lymphoma M. GIST= Malignant Gastrointestinal stromal tumour
AC= Adenocarcinoma

Table 3: Age-wise distribution of neoplasms of the gastrointestinal tract (GIT)

Parts of GIT	20-30	31-40	41-50	51-60	61-70	71-80	Total
Oesophagus All SCC	1	0	0	1	0	1	3
Stomach	0	0	2 Both Dt	0	6 2 Dt, 4 It	2 Both Dt	10
Small intestine	0	0	0	0	1 M. GIST	1 MALToma	2
Colorectum All AC	0	1	1	1	0	0	3
Total	1	1	3	2	7	4	18

SCC= squamous cell carcinoma It= Intestinal type
Dt= Diffuse type M. GIST= Malignant Gastrointestinal stromal tumour
MALToma=Mucosa-associated lymphoid tissue lymphoma
AC= Adenocarcinoma

Discussion

Neoplasms of the various parts of the gastrointestinal tract have a marked variation of distribution. These variations are according to the race; gender; age; the part of the gastrointestinal tract affected, [for instance, in the North American whites, of all the cancers of the body, the 1996 estimated cancer rates of the stomach and colorectum were 2% and 9% respectively³]; the histological type of the neoplasms; geographical region of the world [for instance, the average annual age-adjusted rates per 100,000 people for cancers of the oesophagus, stomach and large bowel showed rate of 4.0, 8.0 and 46.5 respectively in North American whites; whereas in contrast, the rate was 8.4, 73.6 and 26.4 respectively in Osaka, Japan²].

These variations in various gastrointestinal neoplasms affecting different parts of the gastrointestinal tract in comparison to the cases in our present series in the are discussed below.

Neoplasms of the Oesophagus

Benign neoplasms of the oesophagus are rare⁴ and consist of leiomyoma, fibroma, lipoma, haemangioma, neurofibroma, lymphangioma.⁵ Malignant stromal neoplasms of the oesophagus are even more rare and are of the smooth muscle or fibroblast origin. In our series there were no benign or malignant neoplasms of stromal origin of the oesophagus seen.

Malignant epithelial neoplasms of the oesophagus consisting of the carcinomas are the ninth most common cancer in the world⁴. In the United States they comprise approximately 6% of all the cancers of the gastrointestinal Tract.⁵ Of these, squamous cell carcinoma and adenocarcinoma are the most common types⁴.

There are striking and puzzling differences in the incidence of oesophageal carcinoma worldwide. Worldwide squamous cell carcinomas constitute 90% of oesophageal cancers, but in the United States there has been an exponential increase in the incidence of adenocarcinomas associated with Barrett oesophagus; and, currently in the US its incidence has surpassed squamous cell carcinoma⁶.

Also, adenocarcinoma is the most common type in most Western countries where too it is increasing in incidence: it has increased since the mid-1970s by 5 to 10% per annum. This change is greater than that of any other neoplasm in this time. The reason for this change is not

understood, but may be due to a changed incidence of Barrett's oesophagus⁴. Adenocarcinoma of the oesophagus appears to evolve through dysplastic change in the Barrett oesophagus mucosa. Barrett oesophagus refers to replacement of the distal oesophageal squamous epithelium by a metaplastic columnar epithelium in response to prolonged injury, which is an attempt of the organism, as viewed from the teleologic standpoint to replace the injured area with a type of epithelium that is better equipped to cope with the existing local conditions.⁷ There has been a similar increase in the incidence of adenocarcinoma of the cardia of the stomach. The epidemiological change suggests that cancer of the cardia and adenocarcinoma of the oesophagus are, in fact, the same disease⁴.

In our series there were no cases of adenocarcinoma of the oesophagus or of the Barrett's oesophagus. Squamous cell carcinoma is endemic in the Transkei region of South Africa and in the Asian "cancer belt" that extends across the middle of Asia, from the shores of the Caspian Sea (in Northern Iran) to China. The highest incidence in the world is in Linxian in Henna province in China, with more than 100 new cases per 100,000 of population per annum and 20% of all cancer deaths are caused by oesophageal cancer (mainly squamous cell type), with females being more affected than males . Whereas, in sharp contrast to this, in the US , there are only about 6 new cases per 100,000 population per year, accounting for 1% to 2% of all cancer deaths. These epidemiologic contrasts must contain causative clues that remain to be deciphered⁶.

However, probable contributing dietary factors consist of a combination of fungal contamination of food with production of a carcinogenic mycotoxin, together with nutritional deficiencies in the population. In Linxian, supplementation of the diet with beta-carotene, vitamin E and selenium has been shown to reduce the incidence of this cancer⁴.

In our series the cases of oesophageal neoplasms were similar to the worldwide distribution and not as seen in the Western countries, consisting of a total of three cases of the neoplasms of the oesophagus, all of which were squamous cell carcinoma.

Sex distribution wise: one was in a male and two were in females. This is similar to the “endemic region” of the world where females are more affected than the males. In the US, male-to-female ratio is 3:1⁶.

Neoplasms of the Stomach

Gastric adenocarcinoma is the second most common neoplasm in the world.⁸; and, it is a major cause of cancer mortality worldwide. However, there are marked variations in its worldwide incidence. In the UK, it is approximately 15 per 100,000 per year, in the USA 10 per 100,000 per year and in Eastern Europe 40 per 100,000 per year, in Japan, 70 per 100,000 per year, and there are small geographical areas in China where the incidence is double that in Japan.

These underlying epidemiological data make it clear that this is an environmental disease⁹. Studies of Japanese migrants to the USA have revealed a much lower incidence in second-generation migrants, confirming the importance of environmental factors. Furthermore, the high risk of stomach cancer was also observed in second generation Japanese in Hawaii who continued to consume a Japanese-style diet but was low in those adopting a Western-style diet.¹⁰ This phenomenon confirms specifically the contribution of diet in the causation of gastric carcinoma.

In 1965, Lauren classified gastric carcinoma into two subtypes: those exhibiting an intestinal morphology with the formation of bulky tumours composed of glandular structures and those with diffuse, infiltrative growth of poorly differentiated discohesive malignant cells. The intestinal and diffuse sub-types appear to have a different pathogenic basis. The intestinal type predominates in high-risk areas, and develops from precursor lesions. By contrast, the diffuse type has no precursor lesions. Although the intestinal type was far more common, the drop in the incidence of gastric cancer has occurred only in this type⁸.

Risk factors of diffuse carcinoma are not well-defined. Risk factors for intestinal type carcinoma include diet including use of preservatives, high-salt foods, high-starch foods, smoked or pickled foods, consumption of nitrites and nitrates, lack of refrigeration, lack of fresh fruit and vegetables. Other risk factors include smoking, heavy alcohol intake, *Helicobacter pylori* infection with chronic

gastritis, autoimmune gastritis, partial gastrectomy with gastroduodenal reflux.

Some of the pathogenesis of these risk factors consist of chronic inflammation with generation of reactive oxygen species; carcinogenic N-nitroso-compounds formed from nitrates by the action of nitrite-reducing bacteria which colonise the achlohydric stomach.

H. pylori infection step-wise causes chronic gastritis, atrophy, intestinal metaplasia, and dysplasia of the gastric mucosa leading finally to carcinoma. In our small series there were disproportionately large number of carcinomas of the stomach comprising 10 cases out of a total of 18 malignant neoplasms of the gastrointestinal tract. Out of these, eight were located in the antrum and two were located in the cardia. Six were of the intestinal type, out of which four were in males and two in females; with the mean age of 68 years (age range being 65 to 72 years). Out of the four diffuse type, two were in males and two in females, with a mean age of 54 years (age range being 41 to 65 years). Larger studies are necessary to know more definitely the incidence of carcinomas of the stomach, including their histologic types; and also to determine the environmental factors possibly contributing to such incidence.

In general, in Nepal, one contributing factor could be the high rate of smoking. According to estimation of World Health Organization (WHO) 38.4% of the total population of Nepal above 15 year of age with 48.4% males and 28.7% females smoke¹¹.

Neoplasms of the Small Intestine

Small intestine consists of 75% of the length of the gastrointestinal tract. However, of all the gastrointestinal tract neoplasms only 3 to 6% occur in the small intestine.¹² Exact cause of this is not known. However, possible explanations include the fluidity and relative sterility of small bowel contents and the rapid transit time, reducing the time of exposure to potential carcinogens. It is also possible that the high population of lymphoid tissue and secretion of IgA in the small intestine protects against malignancy¹³. In our series there were a total of two cases of neoplasms of the small intestine. Both were malignant. One was a lymphoma of the mucosa associated lymphoid tissue (MALToma in a 76-year-old male and the other was a malignant gastrointestinal stromal tumour (GIST) in a 62-year-old male.

Neoplasms of the Colorectum

Colorectal segment of the gastrointestinal tract is most affected by neoplasms, out of which 98% are adenocarcinomas. In our series, we had a total of three cases of colorectal cancers (CRCs). All of these were adenocarcinoma. Out of these two were located in the caecum - one in a 40-year-old female and other in a 49-year-old male. The third was located in the rectum in a 79-year-old female. In the US, CRC is the fourth most common cancer, after breast, lung and prostate and the second most common cause of cancer mortality after lungs. Incidence rates vary at least 10-fold worldwide . Highest rate are in North America and Northern Europe and the lowest in Asia and Africa. When people migrate from low incidence areas to high incidence areas the rates of CRC increases rapidly among them.² So, it would appear that the Japanese migrants to the US traded stomach cancer for CRC by adopting a more Western-style diet !

These diet factors that increase the risk of colon cancer include high intake of red meat, animal fat, over consumption of food; and, low intake of vegetables, fruit and dietary fibres . High fibre intake may reduce the risk for CRC by diluting faecal carcinogens and by reducing colonic transit time, thus limiting the exposure of the colonic mucosa to potential carcinogens.² Also, it is postulated that milk may protect against bowel cancer.¹⁴ Soliman et al found 35.6% of colorectal patients in Egypt were <40 year, with >50% of the tumours located in the rectum. They think it could be due to exposure to

organochlorine pesticide in a genetically predisposed population and are continuing their investigation to delineate these risk factors and to understand the carcinogenic process in colon cancer.¹⁵

Neoplasms of the anal canal

Anal canal cancer is fairly uncommon. In our this small series no cases of neoplasms of the anal canal were seen.

Conclusion

In our this small series of various neoplasms of different parts of the gastrointestinal tract relatively large number of cases of the carcinoma of the stomach were found in comparison to the Western countries. Although the number of neoplasms in our this series was relatively low, yet we were able to get a sense of the spectrum of various histopathologic types of primary neoplasms arising from different parts of the

gastrointestinal tract. Nonetheless, larger studies are needed to confirm our this finding.

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