Barium-Meal X-Ray Evaluation of Carcinoma Stomach: A Prospective Study Correlation with Endoscopy and Histopathology

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Gastric carcinoma is a relatively common disease throughout the world. Carcinoma of stomach causes 15,000 deaths annually in USA. Unfortunately exact incidence of this disease in our country is not yet known. To evaluate the value of single contrast Ba-meal study in the diagnosis of carcinoma is the aim of this study. The present study was carried out at Dinajpur medical college hospital during the period from January 2014 to January 2015. A total number of 50 cases attending as OPD or inpatient department undergone Ba-meal x ray and diagnosed as Ca-stomach included in this study. They were selected for endoscopic examination and endoscopic biopsy. Of the 50 selected cases 36 were male and 14 female; age range from 35-90 years, Biopsy report considered as the gold standard for diagnosis of Ca-stomach. Ba-meal study detected carcinoma in 50 cases (100%). Endoscopy detected 42 cases (84%) and finally all the 50 (100%) cases were diagnosed histopathologically as carcinoma stomach. If a longer series are analysed and there finding remain constant, Ba-meal study will become a very useful diagnostic tool for detection of Ca-stomach which will give utmost benefit to the poor patients of our country.

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Key words: Barium, X-ray, Carcinoma, Stomach, endoscopy, histopathology

Introduction

Cancer develops as a result of an accumulation of genetic alternation that disrupt the normal process of cell growth.[1] Cells must undergo numerous genetic changes to generate a solid, metastatic tumour.[2]

The diagnostic value of biphasic radiographic examination of the stomach and duodenum was compared with that of fiber optic endoscopy in a prospective study with dyspepsia patients. The investigation was directed at gastric malignancies and peptic ulcers. Methodologically there is no absolute standard for a study of this kind because histological examination is useful for detection of cancer but inadequate for ulcer. Since fiber optic endoscopy came into use, the traditional role of radiography of the upper gastrointestinal tract has been challenged by endoscopists in the western world in contrast to Japan, both examinations are considered complementary rather than competitive procedures.[3]

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Now only 3% of cancer deaths in men and even fewer in women are due to carcinoma stomach. Despite intense scrutiny over the past quarter century, the reasons for this dramatic decline remain unclear. The 5 year survival rate for all patients with adenocarcinoma of the stomach diagnosed between 1983 and 1987 was 17%. These statistics demonstrates the insidious nature of gastric cancer, which has remained unchanged despite diagnostic advances, such as dual-contrast radiography and endoscopy.

The aetiology and risk factors for gastric cancer have been intensively studied. It is known that gastric cancer occurs more frequently in males than in females and the incidence and mortality increase with age. Higher rates of gastric cancer are associated with lower socioeconomic status, partially explaining the epidemiology of the disease. Although no single aetiologic factor has been proved as a direct cause of gastric carcinogenesis, some associations are strong enough to attempt studies in prevention. The incidence of gastric cancer varies from country to country as well as regionally within countries. Dietary factors have received significant attention as potential factors in the development of gastric cancer. The decline in gastric cancer in the USA has paralleled significant improvement in food, hygiene and sanitation as well as general dietary improvement, including year round availability of fresh fruits and vegetables. Gastric cancer appears to be correlated with a high intake of preserved foods (e.g. food containing high level of salt, nitrates and nitrites), pickled vegetables, and salt – all of which can act as gastric irritants. Nitrates and nitrites can clearly be converted to active carcinogens, the N- nitrosamines. Both ascorbic acid and beta-carotene found in fresh fruits and vegetables act as antioxident; further, ascorbic acid can prevent the conversion of nitrites to nitrosamines.

There is growing evidence that *Helicobacter pylori* infection plays a role in the development of gastric cancer. Striking parallels exist between regional rates of gastric cancer and *H. pylori* infection.[4]

Methods

A total number of 50 cases of carcinoma stomach attending the OPD and in patient dept of the above hospital during the study period were included in this study. They were selected on the basis of clinical, radiological and endoscopic examination. The cases were selected in nature and do not represent the exact incidence of the disease as a whole in this part of the world.

Of the 50 selected cases, 36 were male and 14 female, and their age ranged from 35 to 90 years. Case selection done on the following characteristics:

1) Patients having clinical manifestations of carcinoma stomach.
2) Carcinoma stomach detected by single - contrast barium-meal study.
3) Age 35 years and above.
4) Either sex.

Thorough history was taken regarding complain and functional disability. Relevant clinical examinations were performed.

All 50 selected cases underwent endoscopic examination by fiber optic endoscope. The biopsy materials were collected and sent to the department of pathology for histopathological examination. Histopathological examination were done and reports prepared by pathologists.

Results

Gastric carcinoma more in age group 40-60 years 36 (72%) followed by 8(16%) >60 Years and 6 (12%) <40 years (Table I). Male patients are affected more (72%) than females (28%) (Table II). Of the study subjects 90%

lived in villages at their livelihood are mainly cultivation (table III). Higher incidence of gastric carcinoma was found in subjects belonging blood group B (42%) followed by group A (36%), AB (12%), blood group O is the least, only 10% (Table IV). Smoking was found to be unique risk factor for gastric carcinoma – in this study 72% were smoker – on the other hand only 28% were non-smoker.

Gastric carcinoma was higher in low socioeconomic condition and in illiterate people (Table VI-VII). Ulcerative type adenocarcinoma was more common than squamous cell carcinoma (Table XII).

Ba-meal study was found highly significant tool for diagnosis of carcinoma stomach compared to endoscopy (Table XIV)

Table I: Age group of the patients (n=50)

Age group (years)	No of patients	Percentage
<40	6	12
40-60	36	72
>60	8	16

Table II: Sex incidence of carcinoma stomach (n=50)

Sex	No of patients	Percentage
Male	36	72
Female	14	28

Table III: Occupation of the patients (n=50)

Occupation	No of patients	Percentage
Cultivator	20	40
Service holder	15	30
Housewife	10	20
Businessman and others	5	10

Table IV: Blood group of the cases (n=50)

Blood Group	No of Patients	Percentage
B	21	42
A	18	36
AB	6	12
O	5	10

Table V: Incidence of smoking (n=50)

Smoking habit	No of patients	Percentage
Smoker	36	72
Nonsmoker	14	28

Table VI: Socioeconomic condition (n=50)

Socioeconomic condition	No of patients	Percentage
Low	20	40
Below average	15	30
Average	12	24
Good	3	6

Table VII: Educational status (n=50)

Educational status	No of patients	Percentage
Illiterate	21	42
Primary level	14	28
Secondary	7	14
Higher secondary	6	12
Graduate level	2	4

Table VIII: Presenting symptoms (n=50)

Presenting symptoms	No of patient	Percentage
Epigastric pain not responding to treatment	40	80
Loss of appetite leading to loss of weight	45	90
Pallor, fatigue and tiredness	35	70
Vomiting and gastric disorder	32	64
A lump in the abdomen	21	42
Haematemesis and melaena	7	14
Dysphagia	4	8

Table IX: Routine investigations (n=50)

Investigation	No of patients	Percentage
Haemoglobin <50%	35	70
Elevated ESR>30mm	40	80
Leucocytosis	7	14
Positive occult blood test	14	28
Abnormalities in urine analysis	4	8

Table X: Site of filling defect (n=50)

Site	No of patients	Percentage
Antral region	42	84
Body and fundus	5	10
Cardia	3	6

Table XI: Macroscopic nature of growth (n=50)

Nature of growth	No of patients	Percentage
Ulcerative type	21	42
Fungating cauliflower like	9	18
Annular stenosing type	8	16
Polypoid type	4	8
Undiagnosed	8	16

Table XII: Type of histopathological growth (n=50)

Type	No of patients	Percentage
Squamous cell carcinoma	4	8
Adenocarcinoma	46	92

Table XIII: Lymph node involvement (n=50)

Lymph node involvement	No of patients	Percentage
Gastric	50	100
Coeliac and para-aortic	12	24
Mesenteric	3	6
Supraclavicular	2	4

Table XIV: Finding of different examination (n=50)

Examination	Positive no (%)	Negative no (%)
Barium	50(100%)	0
Endoscopy	42(82%)	8(16%)
Histopathology	50(100%)	0

p<0.001 (highly significant)

Discussion

This prospective study was carried out to determine the diagnostic value of single - contrast barium-meal study compared with endoscopic finding and correlation with histopathological study for the diagnosis of carcinoma stomach.

All the patients underwent barium -meal study, endoscopic examination and histopathological examination as independent procedures. The final diagnosis was made on the basis of histopathological reports. In the present study, 36 cases (72%) occurred between 40 to 60 years, 6 cases (12%) below 40 years and 8 cases (16%) beyond 60 years of age. Under the age of 30 years, gastric carcinoma is rare.[5]

Males suffer three times more than females from carcinoma of stomach.[6] In the present series, 36 cases (72%) were male and 14 cases (28%) were female, and male to female ratio was 2.6:1. In our study, sex distribution is almost similar to the above study. Stocks and Davis (1964) noted that deaths from cancer stomach were twice as high in certain rural areas of Wales as compared to the national average and proposed a relationship between the amount of organic material found in the soil sample from a particular region and the gastric cancer mortality rate of that region.[7] It is not possible to find out the exact incidence of this disease in respect to regional variations in our country with this limited case study. As 90 percent of people of our country live in

rural areas, the incidence of this disease will be definitely high among rural people in respect to urban people. No exact report of correlation of gastric cancer to any occupation till now has been reported. In this series, 20 cases (40%) were cultivators, 15 cases (30%) service holder, 10 cases (20%) housewives, businessman and others 5 cases (10%).

Epidemiological distribution of gastric cancer throughout the world is influenced by dietary factors. In general, gastric cancer appears to be positively correlated with ingestion of starch, pickled vegetables, salted fish and meat and negatively correlated with whole milk, fresh vegetables and vitamin C.[8] A number of authors commented that the highest incidence of gastric carcinoma in Japan is due to hot rice, wine, raw fish and pickled vegetable diet of the Japanese. The principle food of our people is rice. In the present series, all patients are rice eaters. The association of cancer of the upper alimentary tract with tobacco smoking is well established. Staszewski (1960)[9] showed the association between smoking and cancer of the stomach. He showed that 70 percent series, 36 cases (72%) of stomach cancer were smokers. Arid (1957) found a higher incidence of gastric carcinoma in people with blood group "A". In this series, highest incidence of gastric carcinoma was found in blood group "B", i.e.21 cases (42%) and the next blood group was "A", 18 cases (36%). In our study also highest incidence of gastric carcinoma was found in low socioeconomic group, i.e.20 cases (40%).

Conclusion

This study established the fact that barium-meal examination of stomach and duodenum is the best way for the diagnosis of carcinoma stomach. We think that it should be the initial screening procedure in the diagnosis of carcinoma stomach. X-ray machines with fluoroscopy facilities are available in most of the district hospitals of Bangladesh. The test should be performed by a radiologist himself under screening to get the maximum benefit out of the available modalities in Bangladesh.

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