

Gastric Cancer in people below and above 40; is it different?

Hossein Froutan Pishbijari, MD.¹, Morvarid Assefi Rad, MD.², Iraj Baghi, MD.³

Department of Endoscopy, Imam Khomeini General Hospital, Tehran University of Medical Sciences, Tehran, Iran.

Abstract

Background: Gastric cancer is the second most common cancer and also the second cancer related death all over the world. In recent years recorded data for tumor has shown a rise in the incidence of gastric cancer in young individuals. The present study was designed to compare some of the epidemiologic characteristics of individuals suffering from gastric cancer aged below and above forty years.

Methods: This cross-sectional study was performed on 389 patients suffering from gastric cancer referred to a referral private clinic in Tehran during the years 1991 and 2001. The patients were divided into two groups, those older than 40 years and the younger ones. The demographic information, the tumor type and location as well as the prevalence of the H. pylori infection was compared in the two groups. The collected data were entered in SPSS version 13 and analyzed using chi-square and fisher exact test.

Results: Fifty patients (12.9%) were reported to be lower than 40 years. The mean age of the patients in this group was 32.1 ± 6.8 years while the number was calculated to be 63.23 ± 9.7 years in the other group. The male to female ratio in the group younger and older than 40 years was 1.9: 1 and 2.6:1, respectively. Adenocarcinoma and lymphoma compromised 70% and 12% of the individuals younger than 40 years whereas they were reported in 89.3% and 3.2% of the patients in the other group. While cancer in the middle third of stomach was the most frequent type in both groups, the prevalence of upper third gastric cancer was considerably higher in those younger than 40 years old (19.9% vs. 5%). H. pylori infection was seen in 23.2% of the younger group, while more than 56% of the older group suffered from H. pylori infection. There was a statistically significant difference between the two groups ($P < 0.017$).

Conclusion: gastric cancer is not rare among the individuals younger than 40 years old. The disease is reported to be seen in the absence of H. pylori infection in the majority of these cases. There is a considerable difference between the prevalence of malignant lymphoma in this group of patients compared with the older patients.

Keywords: gastric Cancer; H-Pylori infection; lymphoma; adenocarcinoma

Introduction

Gastric cancer with a frequency that varies greatly among different geographic regions is

the second most common cancer worldwide [1, 2]. The highest rates (40/100000) are reported in Japan, China and certain parts of America; whereas the whites in North America as well as in India, the Philippines, most African coun-

1. **Corresponding author**, Professor of Gastroenterology, Department of Gastroenterology, Imam Khomeini Hospital, Tehran University of Medical Sciences, Tehran, Iran. Email: Froutan@ams.ac.ir, Fax: +982166581650 Tel: +9821 6935456
2. Resident of Internal Medicine, Imam Khomeini Hospital, Tehran University of Medical Sciences, Imam Khomeini Hospital, Tehran, Iran.
3. Assistant Professor of General Surgery, Poursina Hospital, Guilan University of Medical Sciences, Rasht, Iran.

tries, some countries in western Europe and Australia have the lowest prevalence of the disease [3].

Gastric cancer incidence has markedly decreased in some countries such as united states but it remains high in others such as Japan and Iran [4]. It is the first leading cause of cancer-related deaths in men, and the second one among women in Iran. The highest incidence of gastric cancer in Iran was reported from Ardebil; northwestern province of Iran, with an incidence rate of 49.1 and 25.4/1000000/year for men and women respectively [5].

The epidemiologic and the demographic characteristics of gastric cancer has changed in the recent years. Information extracted from tumor registry database has shown considerable rise in the incidence of gastric cancer among young individuals during the recent years [6]. Moreover, several studies have noted an increase in the number of adenocarcinoma cases arising from gastric cardia especially in areas with a low incidence of gastric cancer [7,8].

The present study was designed to compare some of the epidemiologic and demographic characteristics of gastric cancer patients who were younger or older than 40 years old.

Methods

The cross-sectional study was conducted on all the gastric cancer patients referred to a private referral clinic in Tehran during the years 1991 and 2001. The diagnosis of gastric cancer was confirmed based on the reports of pathologic biopsies. Data on the patients' age, sex, different types of malignant gastric tumors, tumor location and the existence of H. pylori in-

fection were extracted from the patients' records. Endoscopies were performed by an experienced endoscopist. The patients were grouped into above 40 and below 40 age groups. According to the pathologic findings, tumor types were defined in the following four categories: adenocarcinoma, lymphoma, gastrointestinal stromal tumor (GIST) and Others. Metastatic, non-differentiating carcinoma and squamous cell carcinoma (SCC) tumors were considered as 'Others'. H.pylori infection was defined either according to UBT and serology tests or based on the histological study of standard endoscopic biopsies. Pathologic findings were reported by different pathologists. The obtained data were analyzed using SPSS Version 13. Chi-square and Fisher Exact tests were used to analyse the variables.

Results

Of the total 469 studied patients records, 389 files contained the required data. Fifty patients (12.9%) were below and 339 (87.1%) were above 40 years of age. The mean age of each group was calculated to be 32.1 ± 6.8 and 63.23 ± 9.7 years, respectively. The youngest patient was 13 and the oldest one was 92 years old.

Two hundred and seventy eight males (71.5%) and 111 (28.5%) females were enrolled in the study; the male/female ratio was 1.9:1. In the age group of below 40 age group, there were 33 male (66%) and 17 female (34%) patients. The above 40 age group consisted of 245 males (72.3%) and 94 females (27.7%). There was no significant difference between the two age groups (P=0.0402).

Among the studied patients, 331 cases

Type of tumor Age Group	Adenocarcinoma		Other tumors		Total	
	Percent	Number	Percent	Number	Percent	Number
<40	70	35	30	15	100	50
>40	89.3	301	10.7	38	100	339
Total	86.8	336	13.2	53	100	389

Table 1. Adenocarcinoma and other tumors frequency in patients according to age groups.

Type of tumor Age Group	Lymphoma		Other tumors		Total	
	Percent	Number	Percent	Number	Percent	Number
<40	12	6	88	44	100	50
>40	3.2	11	96.8	328	100	339
Total	4.4	17	95.6	372	100	389

Table 2. Lymphoma and other tumors frequency in patients according to age groups.

Tumor Location Age Group	Upper third		Middle and Lower third		Total	
	Percent	Number	Percent	Number	Percent	Number
<40	5	2	95	38	100	40
>40	19.9	60	80.1	241	100	301
Total	18.2	62	81.8	279	100	341

Table 3. Frequency of tumor location in patients according to age groups.

(86.4%) had adenocarcinoma; lymphoma and GIST were observed in 4.4% and 0.5% of the cases, respectively. Other tumors such as non-differentiating carcinoma, SCC and metastatic carcinoma involved 8.7% of the cases. Adenocarcinoma was reported in 70% (35 cases) and 89.3% (301 cases) of below and above 40 age groups, respectively. There was a statistically significant difference in the prevalence of adenocarcinoma between the two age groups ($P < 0.0001$) (Table 1). Chi-square test revealed a meaningful statistical difference among adenocarcinoma tumor type in the age groups ($P < 0.0001$).

The difference between the prevalence of lymphoma in the two age groups was significant ($P = 0.005$) (Table 2). And also significant difference was found between tumor types and the age group ($P = 0.005$).

The location of gastric tumors was specified in 341 patients. Among the patients of below and above 40 groups, 87.5% and 76% of the tu-

mors were located in the middle third of the stomach. A significant statistical difference was found between tumor locations and age groups ($P = 0.017$) (Table 3).

The *H. pylori* infection was determined in 331 patients; in other words, 46.25% of the patients with gastric cancer had *H. pylori* infection, as well. There was a significant difference between the prevalence of *H. pylori* infection and the age group ($P < 0.0001$) (Table 4). Nonetheless, a significant statistical difference was found between *H. pylori* infection accompanied by gastric cancer and the age group of the patients ($P < 0.0001$).

Discussion

Gastric cancer is the second common cancer in the world. While the highest prevalence of the disease is reported in the 7th decade of life, its occurrence before the age of 40 is rare [1]. The epidemiologic and the demographic characteristics of gastric cancer has changed in the

H. pylori status Age Group	Positive		Negative		Total	
	Percent	Number	Percent	Number	Percent	Number
<40	23.2	23	76.8	76	100	99
>40	56	130	44	102	100	232
Total	46.2	153	53.8	178	100	331

Table 4. Frequency of *H. pylori* infection in patients according to age groups.

recent years. In a study conducted in northern New Jersey (1982-2002), the prevalence of the disease in individuals younger than 40 years had risen from 2% in 1989-1995 to almost 12.5% in 1996-2002 [6].

In the present study, the highest prevalence of the cancer was found in the 61-70 age groups. However, while the patients older than 40 years old included more than 85% of the studied population, the number of afflicted patients who were younger than 40 years was also remarkable. In a study conducted in Jordan, 8.5% of the patients with gastric cancer were below 40 years old [9]. It could be concluded that gastric cancer is not quite rare among individuals younger than 40 years.

The prevalence of gastric cancer is different in men and women. The male/female ratio of the disease was reported to be 3:1 in some studies, while others has showed a rate as low as 1.3:1 [6,10,11]. In the present study the total male/female ratio was 2.5:1, however, other studies [10,11] reported this ratio as 1.9:1 and 2.6:1 in below and above 40 age groups, respectively. Despite the fact that the cancer was more prevalent among the below 40 females, the difference in the prevalence of the disease was not significant. However, in the study carried out in northern New Jersey, 82% of the patients younger than 40 years old were females.

According to Catalano study[12] about 90% of gastric tumors are malignant and adenocarcinoma comprises 95% of the malignant cases. In our study, 86.4% of the patients had adenocarcinoma and 4.4% had lymphoma. In patients younger than 40 years, adenocarcinoma and lymphoma were correspondingly found in 70% and 12% of the cases; in the above 40 age group, and the prevalence was 88.8% and 3.2%, respectively. These difference indicates that although adenocarcinoma is the most common gastric tumor in patients aged younger than 40, comparing this group with the above 40, lymphoma is more prevalent in the former group.

The location of gastric tumors has also

changed in western countries during the recent decades. However, reports from China, Japan, Pakistan and Jordan explained the high prevalence of gastric tumors in antrum or distal regions of the stomach also considered as high risk sites (50-60% of the cases) [9,11].

Reports from Iran also have shown that cardia is the most common site of involvement for gastric cancer in the country [4,5,10]. In the present study, 77.4% of the gastric tumors were located in the middle third of the stomach regardless of the age group. However, tumors of the proximal area was significantly more prevalent among patients older than 40 compared to those younger than 40.

Several epidemiologic reports have implied that *H. pylori* infection plays an important role in the incidence of gastric cancer, and causes chronic inflammation in gastric mucosa; and subsequently the resulted byproducts including super-oxidases may damage the DNA and the tissue by producing nitrous amines. Therefore, inflammatory cytokines and the released growth factors provide the grounds for the emergence of gastric cancer [14].

In the study conducted in northern New Jersey, 64% of the patients (7/11 patients) with gastric cancer who were below 40 years of age had no *H. pylori* infection [6]. In the present study, only 23.2% of the below 40 patients had *H. pylori* infection and the infection was found in 56% of those aged more than 40 years; and the meaningful difference indicated that *H. pylori* infection was significantly less accompanied by gastric cancer in patients younger than 40 years.

Conclusion

The demographic and epidemiological study of the patients younger than 40 years suffering from gastric cancer revealed the disease is not rare among young Iranian individuals. It also showed simultaneous *H. pylori* infection is not reported in majority of these cases and the relative frequency of malignant gastric tumors may

be different in this group when compared with those above 40.

References

1. Bryan JD, David LB, et al. Gastric Adenocarcinoma Review and Considerations for Future Direction. *Annals of Surgery* 2005, 241 (1). 27- 35.
2. J Chen, Christoph R, et al. Recent Advances in Molecular Diagnosis and Therapy of Gastric Cancer. *Dig Dis* 2004; 22: 380- 385.
3. Nubia M, Francieschi S. Epidemiology of Gastric Cancer and Perspectives for Prevention. *Salud Publica Mex* 1997; 39 (4)
4. Abdi- Rad A, Ghaderi- sohi S, et al. Trend in Incidence of Gastric Adenocarcinoma by Tumor Location from 1969- 2004: a study in one Referral Center in Iran. *Diagnostic Pathology* 2006, 1: 5
5. Derakhshan MH, Yazdanbod A, et al. High Incidence of Adenocarcinoma arising from the right side of the Gastric Cardia in NW Iran. *Gut* 2004; 53: 1262- 1266.
6. Kalia SA, Cohen AJ. Changing Epidemiology of Gastric Cancer. *Proc Am Soc clin oncol* 2003; 22
7. Devesa SS, Blot WJ, et l: Changing Patterns in the Incidence of Esophageal and Gastric Carcinoma in the US. *Cancer* 1998, 83: 2049- 53
8. McKinney PA, Sharp L, Macfarlen GJ, Muir CS. Esophageal and Gastric Cancer in Scotland 1960-1990. *Br J Cancer* 1995,71: 411-5.
9. Bani- Hani KE, Yaghan RJ, et al. Gastric Malignancies In Northern Jordan with special emphasis an descriptive epidemiology. *World J Gastroenterol* 2004 August; 10 (15): 2174-2175
10. Sadighi S, Raafat H. Gastric Carcinoma: 5 years experience of a single institute. *Asian Pac J Cancer Prev*. 2005; 6 (2): 195-6
11. Iqbalkhan, M. Gastric Carcinoma: 5 years survival after surgery. *J Pak Med Assoc*. Apr 2005; 55 (4): 158-60.
12. Catalano V. Gastric Cancer. *Crit Rew Oncol Hematol* 2005; 54: 209-241.
13. Taghavi N, Nasrollahzadeh D. Epidemiology of Upper Gastrointestinal Cancers in Iran: A subsite analysis of 761 cases. *World J. Gastroenterol* 2007 October 23; 13 (40): 5367- 5370.
14. Masanori J to, Shingi T. Causal role of Helicobacter Pylori Infection and Eradication Therapy in Gastric Carcinogenesis. *World J Gastroentro* 2006; 12 (1): 10-16.