

# Analysis of surgically treated gastric cancers: a tertiary hospital experience in Turkey

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## ABSTRACT

**OBJECTIVE:** Gastric cancer (GC) is the fifth most common cancer worldwide, and in Turkey, GC is placed among the 10 most frequently seen cancers. However, analyzing the epidemiology of cancers and improving screening programs for cancers are not still the top priorities for healthcare professionals. This study aims to show distribution of GC based on stages in a tertiary hospital of Istanbul, Turkey.

**METHODS:** All surgically treated GC cases in the General Surgery Department, between January 2009 and January 2014 were retrospectively reviewed. Data including the operation year, the demographic, clinical and histopathological parameters were recorded and statistically analyzed.

**RESULTS:** The study group consisted of 111 patients. Seventy-four (66.66%) patients were men, and 37 (33.33%) patients were women with a mean age of 63.49±11.83 years. Stage 3 and 4 were the most frequently observed stages with 62 and 18 cases, respectively. Stage 3 was the most common stage found during the study period ( $p<0.05$ ). During 5 years of the study period, GC was less frequently located on the cardia ( $n=31$ ) when compared with other locations ( $n=75$ ) for GC ( $p<0.05$ ).

**CONCLUSION:** Turkey's population has generally advanced stage GC disease. New strategies are needed for achievement of early diagnosis and better outcomes.

*Keywords: Gastric cancer; surgery; Turkey.*

Gastric cancer (GC) is the fifth most common cancer worldwide. Nearly 0.95 million new cases of gastric cancer were detected in the year 2012 worldwide [1].

Gastric cancer was still the fourth most common cancer in the world until 2008, but according to Globocan 2012, it has been the fifth one after lung,

breast, colorectal and prostate cancers accounting for 6.8% of all cancers globally [1, 2]. Gastric carcinomas have two subgroups according to tumor sites which differ in epidemiologic and pathologic profile, clinical presentation and prognosis such as proximal (cardia) and distal (noncardia) carcinomas [3, 4]. Most of the gastric adenocarcinomas oc-



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cur in developing countries. Japan and Korea have the highest rates of gastric carcinoma in the world. *H. pylori* infection, consumption of salty foods and N-nitroso compounds, low intake of fresh fruits and vegetables, smoking, obesity are some common risk factors for gastric cancers.

There was a regular reduction in the global non-cardia gastric cancer incidence with different rates among countries. The declining rate was more than 80% in the USA, while it decreases much less frequently in countries such as Japan, Korea and China [5]. This global reduction may be associated with increased refrigeration, decreased reliance on salted and preserved foods, reduction in chronic *H. pylori* infection, increased application of screening tests in high-risk countries and reduction in smoking. Despite these factors, gastric cardia cancer incidence rates in the USA and Europe have increased. Gastroesophageal reflux disease due to increase in obesity and better distinction from esophageal adenocarcinoma in the light of standardized international classification of the site of cancer are contributing factors for the increase in gastric cardia cancer [6].

Higher incidence of GC is shown in the elderly and with male gender similar to colorectal cancers. GC patients were mostly diagnosed at advanced stages because the signs of disease are often reported too late [7]. Surgical treatment of GC in early stages offer the chance of cure, but in advanced

stages, surgery often provides only palliation. Thus, disease stage is a crucial factor in the achievement of successful treatment.

In Turkey, GC is placed among the 10 most common cancers with an increasing incidence [8]. However, analyzing the epidemiology of cancers and improving screening programs for cancers are not still the top priorities among healthcare professionals.

This study aims to show the distribution of stages of GC in a tertiary hospital of Istanbul, Turkey.

## MATERIALS AND METHODS

All cases of GC who were treated surgically in the General Surgery Department between January 2009 and January 2014 were retrospectively reviewed. Approval for this study was obtained from the Ethics Committee of our institution, and signed informed consent forms were obtained from the patients.

Data were analyzed as for age, gender, tumor TNM stage and tumor location. The cases who were assessed as adenocarcinoma in histopathological evaluations were staged according to the 2012 TNM classification. Stages were grouped from 1 to 4. According to TNM stages “early stage” and “advanced stage” groups were created. The early stage group consisted of stages 1 and 2, whereas the advanced stage group consisted of stages 3 and 4. The cases were grouped as “others” which were reported

**TABLE 1.** Characteristics GC patients

	Patients
Number	111
Age (mean±SD)(years)	63.49±11.83
Gender	
Male/Female (ratio)	74/37
Tumor TNM stage	
Stage 1, n (%)	10 (9)
Stage 2, n (%)	16 (14.4)
Stage 3, n (%)	<b>62 (55.85)</b>
Stage 4, n (%)	18 (16.21)
Others	5 (4.5)

as lymphoma and gastrointestinal stromal tumor histopathologically. Tumor locations were grouped as “cardia group”, “non-cardia group” and “remnant stomach” group.

All cases were separated and analyzed according to years in which cancer was diagnosed. The differences between cases of each year by age, gender, TNM stage, early or advanced stage groups and location were evaluated. We also analyzed these data according to their proportional distributions and annual changes.

The variables were statistically analyzed in consideration of their numbers and proportional values since the number of some variables were very few. Statistical calculations were performed with use of the IBM SPSS 22 (IBM SPSS, USA). Normally-distributed continuous variables were expressed as mean±standard deviation (SD). Categorical variables were expressed as frequencies and percentages. Chi-square, Fisher’s exact test and Yates Continuity Correction test were used for the comparisons of continuous parametric variables. Student’s t test was used for the comparisons of parametric variables with normal distribution. The statistical results were presented with a 95% confidence interval. The differences were considered statistically significant when p value was <0.05.

## RESULTS

Hundred and eleven patients with gastric cancer were operated during the study period. Seventy-four (66.66%) patients were male and 37 (33.33%) were female. The mean age of the study population was  $63.49 \pm 11.83$  years. Annual distribution of the patients according to their gender and ages are shown in Figures 1 and 2.

Annual number of patients during the study period varied (n=12, 22, 30, 24 and 23 for the years 2009, 2010, 2011, 2012, and 2013, respectively) Disease stage analyses of patients who were assessed as adenocarcinoma in histopathological examinations revealed that stages 3 and 4 were the most determined stages with 62, and 18 cases, respectively (Table 1). Examination of the annual distribution of stages did not show significant differences while

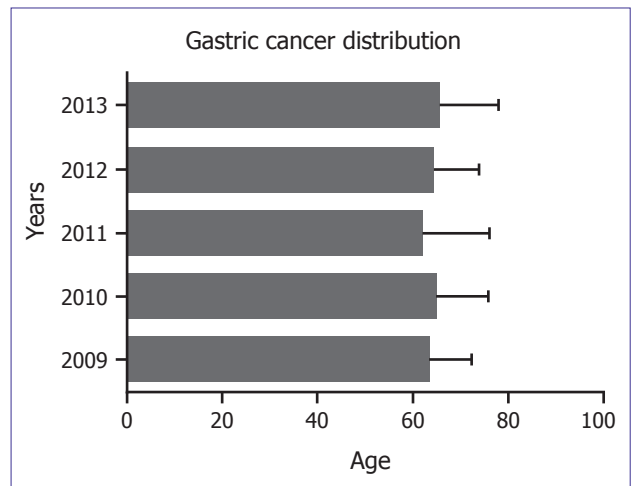


FIGURE 1. Annual age distribution for GC.

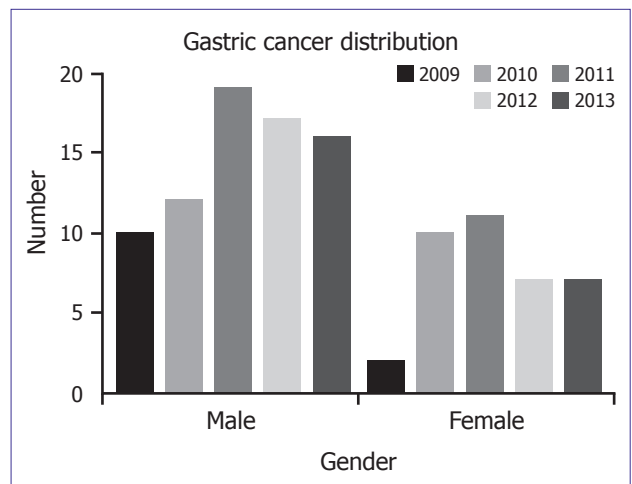


FIGURE 2. Annual gender distribution for GC.

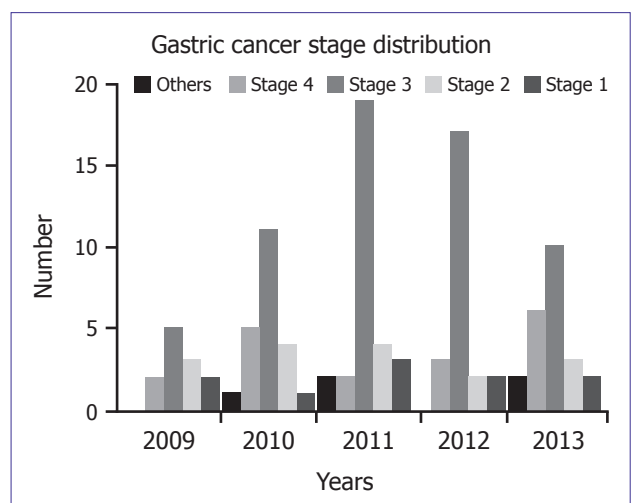


FIGURE 3. Annual stage distribution for GC.

analyzing proportional values yielded statistically significant results ( $p < 0.001$ ) (Table 2, Figure 3).

Stage 3 was the most commonly seen stage during study period. Early and also advanced stages were also examined annually, and no significant difference was found ( $p = 0.6057$ ). Still proportional values were statistically significant ( $p = 0.0012$ ) (Table 3). Advanced stages were mostly detected annually during study period.

GC was detected most frequently on locations other than cardia during 5 years of the study period (cardia,  $n = 31$ , and non-cardia,  $n = 75$ ) ( $p = 0.3073$ ,  $p < 0.001$ ) (Table 4).

## DISCUSSION

Cancer is one of the major public health problems in Turkey. It has been estimated that within the next 20–30 years cancer will take the highest death

**TABLE 2.** Annual TNM stage distribution for GC

	2009		2010		2011		2012		2013		p
	n	%	n	%	n	%	n	%	n	%	
Stage 1	2	16.67	1	4.76	3	10.71	2	8.33	2	9.52	<b>&lt;0.0001</b>
Stage 2	3	25	4	19.05	4	14.29	2	8.33	3	14.29	
Stage 3	<b>5</b>	<b>41.67</b>	<b>11</b>	<b>52.38</b>	<b>19</b>	<b>67.86</b>	<b>17</b>	<b>70.83</b>	<b>10</b>	<b>47.62</b>	
Stage 4	2	16.67	5	23.81	2	7.14	3	12.5	6	28.57	
Total	12		21		28		24		21		

**TABLE 3.** Annual early and advanced stage distribution of GC

	2009		2010		2011		2012		2013		Totals	p
	n	%	n	%	n	%	n	%	n	%		
Stage 1–2	5	41.67	5	23.81	7	25	4	16.67	5	23.81	26	<b>0.0012</b>
Stage 3–4	<b>7</b>	<b>58.33</b>	<b>16</b>	<b>76.19</b>	<b>21</b>	<b>75</b>	<b>20</b>	<b>83.33</b>	<b>16</b>	<b>76.19</b>	<b>80</b>	

**TABLE 4.** Annual tumor location distribution for GC

	2009		2010		2011		2012		2013		Total	p
	n	%	n	%	n	%	n	%	n	%		
Cardia	2	16.67	4	18.18	9	30	9	37.5	7	30.44	31	<b>&lt;0.0001</b>
Non-cardia	<b>10</b>	<b>83.33</b>	<b>18</b>	<b>81.82</b>	<b>20</b>	<b>66.67</b>	<b>12</b>	<b>50</b>	<b>15</b>	<b>65.22</b>	<b>75</b>	
Remnant	0	0	0	0	1	3.33	3	12.5	1	4.34	5	
Total	12		22		30		24		23		111	

toll [9, 10]. Epidemiological evaluations of GC, and all other cancer types are important in determining the treatment, early diagnosis and the development of screening programs. In Far East, screening programs were developed for GC, which is common in that region, and early diagnosis and improved survival from GC are achieved. In most of the studies performed, GC patients were most frequently in advanced age and of male gender.

As the geriatric population increases in the world, GC continues to be an important public health issue currently, and will be so in the future. Despite this, the impact of some regional differences about age of the patients have been evaluated as for the presence of age-dependent demographic characteristics. In our study, most of the patients were older ages with a mean age of  $63.49 \pm 11.83$  years. Male gender dominance was determined, and this data is consistent with the literature [11].

Disease stage is one of the most important prognostic factors for GC patients. Patients diagnosed in early stages have more improved outcomes than those in their advanced stages. Different screening programmes using endoscopic procedures, tumor marker analysis, etc. have been applied in different countries for the diagnosis of cancer, and prediction of its stage [12, 13]. In the literature, diverse distributions of disease stages have been reported from various regions based on environmental and regional differences. As mentioned above early disease stages of GC has been determined in the Far East. Despite limited information in the literature, data on distribution of disease stage of GC in Turkey shows that most of the patients have advanced stage diseases [14]. We found that stage 3 is the most common stage and analysis of annual change didn't show any difference in its incidence. Almost 80% of GC patients have advanced stages.

The dietary habits in Turkey have broadly changed during recent years. Intake of fruits and vegetables decreased, while that of animal protein, meat, sugar refined cereals increased. Becoming an industrial society with a predisposition to a western style nutrition and modification of the lifestyle may be the underlying cause of of this alteration.

In Turkey, there are no examples of community-based screening programmes covering specific target groups, except for some sporadic pilot studies. Parallel to joint deficiencies in screening protocol and detection of cancers at an early stage, it is widely accepted that cancer cases are diagnosed at an advanced stage in Turkey, causing early and preventable deaths. Current study suggests that healthcare management professionals must develop new strategies about screening programmes especially in GC.

Recently, the prevalence of adenocarcinoma of the esophagus and cardia increased along with a decrease in distal gastric cancers in developed countries. The data from developing countries about this alteration is very scarce. Some studies showed different results concerning anatomical location of gastric adenocarcinoma for the west and east parts of Turkey. In our study, non-cardia location was predominantly determined and its predominance didn't change annually [7, 8].

This study has several potential limitations. First, the number of patients is not enough to make definitive recommendations. Multicenter analysis may be more valuable. Another limitation is retrospective design of the study. Randomized-controlled prospective studies would be more beneficial about clarification of this issue.

In conclusion, Turkey's population has advanced stage GC generally. New strategies are needed for earlier detection of GC, and achievement of better outcomes.

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