

Probability of Survival in Patients with Gastric Cancer

Maryam Rajabi¹, Asghar Karbord^{2*}, Shahram Rastak³, Mohammad Bokharai⁴ and kiamars karbord⁵

¹Assistant professor Anesthesiology & Faculty member of anesthesiology group of Medicine College of Qazvin University of Medical Sciences, Qazvin, Iran.

²MSc epidemiology & faculty members of surgical technologist group of paramedical college, Qazvin University of medical science, Qazvin, Iran

³MSc anesthesiology & faculty members of Anesthesiology group of paramedical college, Qazvin University of medical science, Qazvin, Iran.

⁴MSc ICU educational nursing & faculty members of surgical technologist group of paramedical college, Qazvin University of medical science, Qazvin, Iran

⁵MSc Applied Mathematics. Faculty member of Mathematics school - Hormozgan University, Iran

*Corresponding author:

Asghar Karbord, MSc epidemiology & faculty members of surgical technologist group of paramedical college, Qazvin University of medical science, Qazvin, Iran

Submitted: 25 Feb 2020; Accepted: 03 Mar 2020; Published: 18 Mar 2020

Abstract

Background: Gastric cancer is the most common cancer and currently, the prevalence of gastric cancer is 10 percent among all cancers in the world. There are more than 870 thousand new cases worldwide each year and it causes the death of more than 650 thousand patients. This study was performed to estimate the life table survival in patients with gastric cancer in province Qazvin of Iran at 2010-2020.

Methods: This is cross – sectional study whit analytical type method which has been conducted using the process of longitudinal and survival study. The study population includes all patients diagnosed with gastric cancer in Qazvin province between the years 2010 to 2020. The samples size (600 patient) selected by the random systematic simple sample method than all the patients diagnosed with gastric cancer referred to Qazvin hospitals for treatments including surgery, radiotherapy and chemotherapy that were in the same group from the time aspect, which was recorded from 2010 until 2020. The most important factors affecting survival rate were marked and analyzed with the Kaplan-Meier and cox model.

Results: 68 % of 600 patients, were male with a mean age of (48.23± 8 years), and 32% of patients were female with a mean age of (46±9) and median survival rate were 36 and 40 months, and the survival rate of 1 to 5-year of patients were 16,22,28,34,52 respectively. In cox model, factors including sex, age of diagnosis, lead-time and type of treatment have significant correlation with survival rate ($p \leq 0.05$).

Conclusion: Early diagnosis and treatment of disease in the early stages with suitable surgery increase the survival of patients. However, it does not have special effects on life length of patient but it will increase the quality of life for patients.

Keywords: Gastric Cancer, Survival Rates, Life Table

Introduction

Gastric cancer is the second leading cause of cancer death worldwide and is the most common type of cancer in Iran [1, 2]. Gastric and esophageal cancers are the most frequent causes of cancer-related deaths in Iran with the highest rates reported from northern part of the country [1, 3, 4]. Survivals of gastric and esophageal cancers

has been studied in multiple series with patients stratified by stage of disease, Lauren tumor type, tumor location, and type of therapy. An association between survival and stage of cancer has been shown by all studies. Several authors also reported that 5-year survival have improved over the past several decades 233. Mortality rates of gastric cancer are particularly high in Asia, South America, and parts of Europe. According to a study conducted by Digestive Disease Research Center (DDRC) during 1996 to 2000, upper gastrointestinal

(GI) malignancies constituted nearly half of all malignancies in the province [5-7]. The objective of this study was to estimate the survival rate of patients with gastric or esophageal cancer by histopathology type, grade of tumor, treatment modalities, and location of tumor as well as some of the risk factors of upper GI malignancies such as consumption of alcohol or opium, cigarette smoking, and age at the diagnosis.

Patients and Methods

A prospective review of all the 4000 biopsy proven patients with upper GI cancers (1000esophagus, 1800 stomach and 1200 others cancer GI) who were initially diagnosed at the referral unique clinic for upper malignancies located in the province of Qazvin for 10 years, from 2010 through 2020, was planned. There were 293 males and 127 females with amen age of 64 (range: 20 – 90) years. International classification of disease for oncology (ICD-O-3) was used for coding morphology and topography of tumors. In this study, we looked at the parameters such as overall survival, demographic data, symptoms and signs, risk factors, histopathology, and socioeconomic status. We contacted patients or their families through visiting their residential place and performed a direct interview with them. All of the interviews were done by a physician or a trained nurse. With this method, we collected data from 303 cases. We found date of death of other 55 patient’s by evaluation of official death certificates. Information on 62 patients was missing due to inaccessible home address, address change, or immigration. Data on risk factors and demographic variables were obtained from

questionnaires, which completed at the time of diagnosis at Aras Clinic. Survival analysis was performed using STATA software, release 8. Kaplan-Meier method was used to estimate the survival probability and Cox proportional hazards model was used for multivariate analysis of risk variables [8, 9].

Results

Among 358 observed patients at the end of the study, 331 patients were dead and only 27 were still alive. Fifty-five percent of patients were rural inhabitants. Demographic and socioeconomic. Characteristics of patients are shown in (Table 1). Dysphagia was the most common presenting. Complaint observed in 44% of patients; weight loss was another common presenting feature reportedly 15% of patients. According to UN variety analysis (log-rank test), the factors influencing the overall survival rate for both cancers together were undergoing surgery (either alone or in combination with chemo/radiotherapy for both stomach and esophagus: $P < 0.009$), receiving chemotherapy (in combination with surgery: $P = 0.001$; chemo-therapy alone: $P = 0.087$), and tumor grades ($P < 0.001$); undifferentiated type had the lowest Survival (median: 5 months) while those with well-differentiated tumor had the longest survival (median: 9 months). After further ratification by site of tumor, differentiation of tumor and chemotherapy did not reach the statistical significance anymore for esophagus. Age at the diagnosis, tumor site (stomach or esophagus), tumor morphology, alcohol drinking, and opium.

Table 1: to 5 year survival rate estimates for patients with gastric cancer by demographic factors

Village		City		Woman		Man		Demographic factors Survival rate
The standard error	Estimate	The standard error	estimate	The standard error	estimate	The standard error	estimate	
0.73	0.03	0.81	0.04	0.74	0.05	0.52	0.08	1-0 year
0.58	0.04	0.63	0.05	0.61	0.02	0.50	0.04	2-1 years
0.50	0.04	0.55	0.03	0.52	0.04	0.41	0.04	3-2 years
0.47	0.05	0.50	0.07	0.47	0.01	0.30	0.03	4-3 years
0.33	0.06	0.41	0.06	0.40	0.07	0.20	0.06	5-4 years

p- Value=13.13 Wilcoxon = 0.006 p- Value=12.77 Wilcoxon = 0.02

Consumption had no effects on survival rate of patients with upper GI cancer. The 1 and 5-year survival rate for all upper GI cancer patients was 40.5%, and 0.83%, respectively. In terms of overall cumulative survival observed for five years, patients with esophagus cancer had a slightly higher survival rate than patients with stomach cancer ($P = 0.15$). Shows that patients with esophageal cancer had a better survival than those with gastric cancer ($P = 0.15$) Survival of patients with stomach cancer in cardiac was slightly better than those with tumor involving other gastric regions ($P = 0.19$). Only 28% of patients had undergone a curative ere sectional surgery. About 25% of patients did not receive any treatment at all (Table 2). Shows the difference between cumulative survival of patients with operated esophageal cancer and those with no surgery, regardless of other additional treatments ($P < 0.001$). The mean (median) survival rate for patients with esophageal cancer was 12.1 (9) months and for those with gastric cancer was 11.8 (9) months. In those with stomach cancer, patients with the histopathology of “signet ring cell carcinoma” had the lowest survival rate (median: 8 months); other cases lived more than 23 months after the diagnosis. Figure 3 shows that in the entire follow-up, the overall mortality was higher for those with stomach cancer than esophagus. The mortality rate increased steeply from the time of diagnosis for one year, when the rate became steadier for stomach than esophagus cancer, which had decline after the third year. The effect of tumor site, gender, age, and place of residence on the prognosis was not significant in multivariate model adjusted for follow-up time. The mortality ratio of esophageal vs. gastric malignancies was 0.86 (CI95%: 0.6 – 1.1). This ratio for residential place (urban vs. rural) was 1.03 (CI 95%: 0.8 – 1.3). The multivariate analysis of potential prognostic factors in patients with stomach cancer showed that smoking status had a significant prognostic value associated with 81% increase immortality rate ($P = 0.04$). Nevertheless, place of residence, age, and sex had no prognostic values for stomach cancer, after adjustment for other variables included in the model. Based on this database, surgery and chemotherapy seem to be effective treatments for stomach cancer.

Table 2: 1 to 5 year survival rate estimates for patients with gastric cancer by the way of treatment

Chemotherapy		Radiotherapy		Surgery		Way of treatment Survival rate
The standard error	Estimate	The standard error	estimate	The standard error	estimate	
0.73	0.03	0.81	0.04	0.74	0.05	1-0 year
0.58	0.04	0.63	0.05	0.61	0.02	2-1 years
0.50	0.04	0.55	0.03	0.52	0.04	3-2 years
0.47	0.05	0.50	0.07	0.47	0.01	4-3 years
0.33	0.06	0.41	0.06	0.40	0.07	5-4 years

p- Value=13.26

Wilcoxon = 0.000

Radiotherapy associated with higher mortality, although none of these findings reached statistical. Significant. Mortality in educated patients was half of that in illiterates ($P = 0.10$). Those with diffuse type of adenocarcinoma of stomach had 37% higher mortality than those with the intestinal type of adenocarcinoma (CI 95% for mortality ratio: 0.30 – 6.33). In patients with esophageal cancer, taking all other factors (e.g., age, gender, other treatments, Etc). Into account, surgery was significantly associated with lower mortality while radiotherapy Seemed to be associated with higher mortality ($P = 0.46$). Drinking alcohol was highly associated with the increased mortality of esophageal cancers (hazard ratio = 7.5; CI 95%: 0.82 – 69.1).

Discussion

Cases in province Qazvin or Iran, but could demonstrate the fact that the majority of patients with upper GI cancers at a referral clinic have a short survival after diagnosis. In conclusion, the overall survival rates for upper GI malignancies in this gastroenterology clinic in Qazvin Province are relatively low. Since stage of cancer is a very important factor influencing survival of patients with upper GI Cancer, these short survival rates can be due to the fact that patients with upper GI cancer in Qazvin are, in general, referring to physicians at late stages of the disease. Surgery might be an effective treatment for all patients with upper GI cancer in Qazvin; especially for those with cancer of esophagus [10]. Smoking and fast food are associated with decreased survival of patients with stomach cancer. Squamous cell carcinoma of the esophagus (85%) was the predominant histology seen in our study, with adenocarcinoma (14%) being less common. These data are consistent with data from most of other Asian countries [11-13]. These figures are different from those found in the developed countries where adenocarcinoma is becoming a more common type of histology in esophageal cancers

[13-18]. In our study, the survival of patients with esophagus cancer was slightly more than patients with stomach cancer ($P = 0.26$); these figures are different from those found in the countries such as England and South Korea [11, 19]. Women with esophagus cancer had a slightly longer survival than men in Qazvin Province; these data are consistent with data form European countries [16, 20]. Signet ring cell histopathology type of tumors in this study had significantly lower survival than other types of histopathology inpatients with stomach cancer. Nonetheless, in another study, there was no difference between types of histopathology [14].

The average survival time in our patients is similar to other developing countries such as Pakistan. The median time of survival in our study was 9 months while in Pakistan it was 7 months.8These data, however, are different from those reported from England, Korea, and China [11, 12, 19]. The overall survival rate for our series (both men and women) was 40.5% after one year, 16.9%after two, 6.5% after three, 2.5% after four, and less than 1% after five years. These data are different from those reported from developed countries or China [13, 14, 16]. For example, in China the1 to 5-year survival rates in the patients with stomach cancer were reported to be 54.2%, 41.8%, 37.9%, 34.0%, and 30.5%, respectively [20]. In the multivariate Cox proportional hazards model for stomach cancer, the only statistically significant explanatory variable was smoking status, which shows ever-smoking is associated with lower survival (adjusted for other factors in the model, Table 3). In our multivariate Cox proportional Hazards model for esophageal cancer, the only statistically significant explanatory variable was Surgery, which showed that patients who had undergone surgery had 51% lower mortality than Those who had received other treatment modalities (i.e., chemotherapy and radiotherapy).

Table 3: Life table calculation of the patients

The risk for each period	The proportion of those who were alive from the first to the end of the program	The proportion of those who have not died during the period	The proportion of those who died during the period	During the study were at high risk	During the study period were excluded	Have died during the study period	At the start of study period were alive	Time interval of starting the treatment (according to month)
0.07	0.58	0.57	0.52	566	99	308	600	10
0.08	0.39	0.46	0.58	292	27	162	280	20
0.05	0.33	0.91	0.53	87	23	25	104	30
0.04	0.22	0.86	0.21	45	29	16	58	40
0.06	0.21	0.94	0.28	17	21	9	27	50

Although there are reports that surgery improves the survival, even in stage IV upper GI cancers, 15% judgment on the effect of any treatment on survival, based on these data, is not correct, because those patients who take a treatment like surgery are different from others in respect to their health condition like cardiovascular status; it is more likely that only those patients with healthier condition can undergo surgery. Therefore, a better survival of operated patients might be attributed to their health status that made them being selected for surgery. The same argument may be applicable to those who underwent radiotherapy, which had a higher mortality; the patients might have been chosen for this treatment for they had non-operable metastasized tumors. This issue should be further studied by randomized controlled trials. Although staging of tumor had not been recorded in our database, these results may reflect that higher proportion of patients with advanced tumor stage were visiting this referral tertiary clinic. Another reason for obtaining such a short survival rate might be due to the fact that we have 15% loss in the follow-up; if we suppose all of them were alive, the survival rates could be substantially higher. Therefore, results of this study may not be representative of all upper GI cancer.

References

- Sadjadi A, Nourai M, Mohagheghi MA, Mousavi-Jarrahs A, Malekzadeh R, et al. (2005) Cancer occurrence in Iran in 2002, an international perspective. *Asian Pac J Cancer Prev* 6: 359-363.
- Akoh JA, Macintyre IM (1992) Improving survival in gastric cancer: review of 5-year survival rates in English language publications from 1970. *Br J Surg* 79: 293-299.
- Saidi F, Malekzadeh R, Sotoudeh M, Derakhshan MH, Farahvash MJ, et al. (2002) Endoscopic esophageal cancer survey in the western part of the Caspian littoral. *Dis Esophagus* 15: 214-218.
- Ferlay J, Parkin DM, Bray F, Pisani P, Cooke A (2004) *GloboCan 2002. Cancer incidence, mortality and prevalence. Lyon IARC 2004*: 5.
- Sadjadi A, Malekzadeh R, Derakhshan MH, Sepehr A, Nourai M, et al. (2003) Cancer occurrence in Qazvin: results of a population based cancer registry from Iran. *Int J Cancer* 107: 113-118.
- Derakhshan MH, Yazdanbod A, Sadjadi A (2004) High incidence of adenocarcinoma arising from the right side of the gastric cardia in NW Iran. *Gut* 53: 1262-1266.
- Yazdanbod A, Arshi S, Derakhshan MH, Sadjadi A, Malekzadeh R (2001) Gastric cancer: the most common type of upper gastrointestinal cancer in Qazvin, Iran: an endoscopy clinic experience. *Arch Iranian Med* 4: 76-79.
- Jemal A, Thomas A, Murray T, Thun M (2002) Cancer statistics 2002. *CA Cancer J Clin* 52: 23-47.
- Bull K, Spiegelhalter DJ (1997) Tutorial in biostatistics survival analysis observational studies. *Stat Med* 16: 1041-1047.
- Alidina A, Gaffae A, Hussain F, Islam M, Vaziri I. Survival data and prognostic factors seen in Pakistani patients with esophageal cancer. *Ann Oncol* 15: 118-122.
- Yun YH, Bae JM (2002) Survival of all cancer patients in Korea though 2-year follow-up. *J Korean Med Sci* 17: 448-452.
- Tian J, Wang XD (2004) Survival of patients with stomach cancer in Change city of China. *World J Gastroenterol* 10: 1543-1546.
- Barchielli A, Amorosi A, Balzi D, Crocetti E, Nesi G (2001) Long-term prognosis of gastric cancer in a European country: a population-based study in Florence (Italy). 10-year survival of cases diagnosed in 1985 – 1987. *Eur J Cancer* 37: 1674-1680.
- Theuer CP, Nastanski F (1999) Signet ring cell histology is associated with unique clinical features but does not affect gastric cancer survival. *Am Surg* 65: 915-921.
- Takeno S, Noguchi T, Kikuchi R, Sato T, Uchida Y, et al. (2001) Analysis of the survival period in resectable stage IV gastric cancer. *Ann Surg Oncol* 8: 215-221.
- Cetiagoya GF, Bergh CK, Klinger-Roitman J (1998) A prospective study of gastric cancer, real 5-year survival rates and mortality rates in a country with high incidence. *Dig Surg* 15: 317-322.
- dos Santos SI (1999) *Cancer Epidemiology; Principles and Methods. Lyon France: IARC.*
- Jimeno-Aranda A, Sainz SR, Aragones GM. "Gastric cancer in the province of Zaragoza (Spain): a survival study." *Neoplasma* 43: 199-203.
- Wu X, Chen VW, Ruiz B, Andrews P, Su LJ, et al. (2005) Incidence of esophageal and gastric carcinomas among American Asians/Pacific Islanders, whites, and blacks. *Cancer* 106: 683-692.
- Swisher SG, Deford L, Merriman KW, Walsh GL, Smythe R, et al. (2000) Effect of operative volume on morbidity, mortality, and hospital use after esophagostomy for cancer. *J Thorac Cardiovasc Surg* 119: 1126-1132.

Copyright: ©2020 Asghar Karbord. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.