

Survival Rate of Esophageal Carcinoma in Iran - A Systematic Review and Meta-analysis

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Abstract

Background: Esophageal cancer is often diagnosed in the last stages where the chance of patient's survival is very low. The aim of this systematic review was presentation of valid estimation of survival in patients with esophageal cancer in different regions of Iran.

Methods: A systematic review was carried out based on the reliable domestic medical databases including: SID, Magiran, Irandoc and Iranmedex as well as reliable foreign databases like PubMed and Scopus using "Cancer", "Esophagus", "survival" "Neoplasms" and "Longevity" as keywords. Then all the reviewed articles and dissertations which met the entry criteria were analyzed. The data were analyzed by using meta-analysis method (random model) and by means of STATA software application version 11.1.

Results: In 18 studies the total numbers of 2932 people were analyzed. The one year survival rate in Iran is estimated at 47 percent (95% CI: 34-61) and the five year survival rate is estimated at 12% (95% CI: 8-16). The two, three and four year survival rates were 31% (95% CI: 18-44), 22% (95% CI: 13-31) and 21% (95% CI: 4-38), respectively.

Conclusion: According to the findings one year survival rate for esophageal cancer in Iran is almost four times higher than its five year survival rate. Moreover the five year survival rate in Iran is less than many other countries.

Keywords: Esophageal Neoplasm; Survival rate; Meta-analysis; Systematic review

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Introduction

Esophageal cancer is the sixth cause of death in the world, which kills about 386000 people each year [1]. Regarding diagnosis and outcome esophageal cancer is one of the most important malignant cancers [2]. Fatality rate of esophageal tumors among victims is high and reported about 90%. The survival rate for these patients is very low and only 12% and 4% for female and male patients, respectively in Caspian region [3]. The highest number of outbreaks was reported in north parts of China (average of 100 to 180 Per 100,000 people). While in the USA this amount is 20 Per 100,000 people [4]. Among 5800 reported cases in Iran, about 3,500 of them die each year [5]. Diari et al. in 1975 in Tehran University reported that the northern region of Iran - including Ardebil, Gilan,

Mazandaran, Golestan and North Khorasan provinces is highest Incidence region in Iran, In this regions Gilan province has the lowest Incidence and North Khorasan has the highest Incidence [6].

Estimation of survival rate in patients with esophageal cancer can help improve the preventive and curative services and assess the effectiveness of new treatments [7]. Victim's quality of life is very important and we should pay more attention to this matter [8].

Many studies have been conducted in the past two decades in relation to survival rate of esophageal cancer in Iran. This systematic review assesses all accessing electronic databases to determine valid estimation of survival rate among patients with esophageal cancer in different regions of Iran.

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Materials and Methods

Sources for the data

The systematic review carried out about survival rate of esophageal cancer that required search all available sources and electronic databases related articles and dissertations as well as the meta-analysis. These databases include the reliable domestic databases such as Iranmedex, Medlib, MagIran and SID as well as the foreign websites such as PubMed/Medline, ISI Web of Knowledge and Scopus. We queried the articles and dissertations using sensitive keywords including “cancer”, “esophagus”, “survival” “Neoplasms” and “longevity” and a combination of them. In order to prevent any bias, the search was carried out by two researchers separately. All articles and dissertations which evaluated the survival time and longevity of the esophageal cancer and published up to 2011 entered into the first step of study without any kind of limitations. After preliminary review, review articles about esophageal cancer without any evaluations on the survival time and papers with insufficient data were omitted from the study. In second step we evaluated 340 articles on esophageal cancer among them 40 ones were repetition, 145 ones irrelevant that omitted from study. Result from full text review 137 article exclude due to insufficient data. Finally 18 articles with proper quality were entered into the process of meta-analysis (Chart 1 at the bottom of the text).

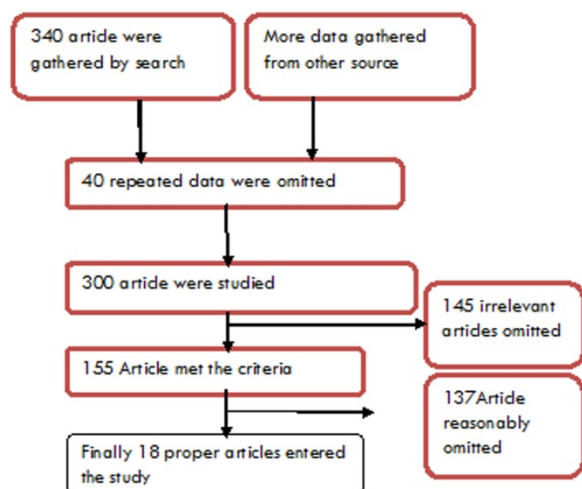


Chart 1. The Flowchart Stages of Entering the Articles into Meta-Analysis.

Data Extraction

Data extraction form was used to record the all required data in the study. This form included sample size, study region, gender, 1 year to 5 year survival rate, histology type, as well as affected area of esophagus.

Statistics

In every article the one to five year survival rate was considered as the probability of a two-term distribution and its variance was calculated using two-term distribution. Incongruity of the studies was determined using the Q-test and I2 measure. Due to the incongruity of the studies we used the random effect model for combining the results of them. The analysis in the sub-groups was carried out regarding the under-study region (North, Center, East and Tehran). The data were analyzed using STATA software application version 11.1. The significance level of the tests was considered 5%.

Results

Overall, 18 articles included according to inclusion criteria in the meta-analysis. Looking for sample sizes, 2932 patients enrolled study. 11 articles (61%) were performed in the northern parts of Iran, 3 ones (16.6%) were carried out in central parts; one (5.5%) was conducted in the eastern parts and 3 ones (16.6%) were accomplished in Tehran province. Studies were published between 1 January 1989 and 31 August 2010 (Table 1).

According to results from Meta-analysis, the one-five year survival rate for esophageal cancer in this study were 47% (CI 95%: 34-61), 31% (CI 95%: 18-44), 22% (CI 95%: 13-31), 21% (CI 95%: 4-38) and 12% (CI 95%: 8-16), respectively (Table 2).

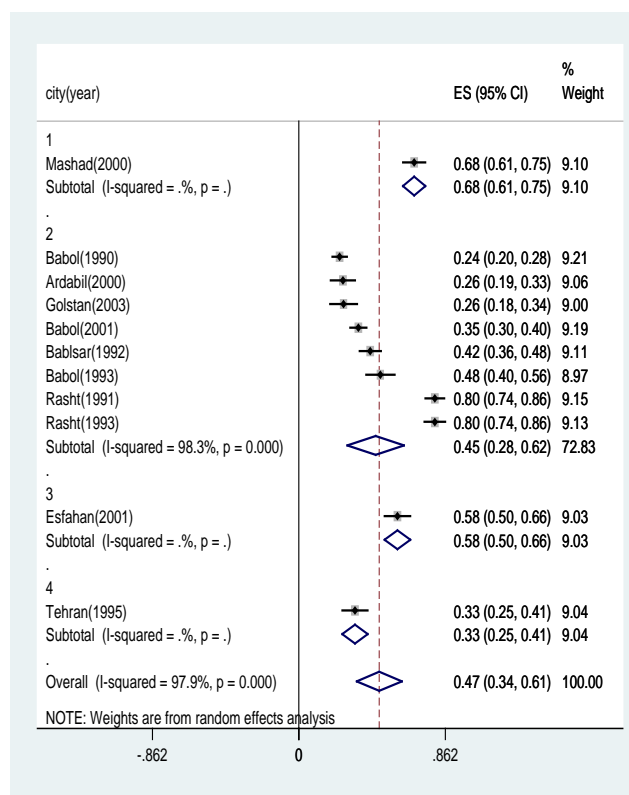
Geographical variation results on survival rate in our study indicated the one year survival rate in northern region, with eight articles enrolled in meta-analysis was 45% (CI 95%: 28-62), in the northwest region, with one study was 68% (CI 95%: 61-75), in the central region, with one study was 55% (CI 95%: 50-68) and in Tehran was 33% (CI 95%: 25-41). The pooled rate one year survival rate according to result of Meta-analysis was 47% (CI 95%: 34-61) (graph 1). Graph 2 shows the overall rate of five year survival according to Meta-analysis was 12% (CI 95%: 8-16).

Table 1. The Characteristics of the Studies Entered into the Meta-Analysis

Study region	Year	Sample size	Survival rate				
			1 year	2 year	3 year	4 year	5 year
mashad	2000	190	0.68	0.49	0.36	-	-
Rasht	2008	71	-	-	-	-	-
Rasht	1991	192	0.8	0.61	0.52	0.38	-
Fars	2001	161	-	-	-	-	-
Ardebil	2000	141	0.26	0.11	0.05	0.02	-
Babolsar	1992	230	0.42	0.21	0.11	-	0.08
Isfahan	2001	161	0.58	0.33	0.18	0.15	0.01
Tehran	1989	245	-	0.08	-	-	0.15
Babol	1900	359	0.24	0.16	-	-	-
Golestan	2003	115	0.26	-	-	-	-
Tahran	2007	100	-	-	-	-	-
Sari	1992	79	-	-	0.11	-	-
Golestan	2005	39	-	-	-	-	-
Babol	1993	133	0.48	-	-	-	-
Tehran	1995	150	0.33	-	0.1	-	0.04
Rasht	1993	162	0.8	0.5	0.4	0.3	0.2
Babol	2001	364	0.35	0.15	-	-	0.09
Isfahan	2010	40	-	-	-	-	-

Discussion

In recent decades some success has been obtained in the management and cure of esophageal carcinoma. Nevertheless, esophageal carcinoma is still a malignant tumor with the poor prognosis [9]. Esophageal tumors are considered an endemic disease in Iran particularly in the brinks of the Caspian Sea [10]. In our study the five year survival rate is equal to 12%. In a study carried out in 2008 by Agrawal et al, the survival rate in patients during the first five years after diagnosis is reported 13% [11] that conforms to results of our study. In a study by Bashash et al. 2011, which tries to compare the survival rate for stomach and esophageal cancers in Ardebil in Iran and British Colombia in Canada, the one year survival rate was estimated 17% in Ardebil and 33% in British Colombia [12]. This significant difference shows a geographic variation in survival rate of esophageal cancer in different parts of the world perhaps due to differences in health and wellness of people in different areas. Also in this study the mortality of esophageal cancer was more than the fatality of stomach cancer [12]. In Netherlands the five year survival rate for men and women was 12.8 % and 9.8 %, respectively [13]. This study conforms to results of our study which shows the five year survival rate was 12%. In Japan 2012, by Tamura et al the five year survival rate of esophageal cancer was estimated 42.9% and in



Graph 1. One Year Survival Estimation in the Studied Articles Separated by Region (Each Line Shows 95% Confidence Interval. The Diamond Shape is the Total Survival and Confidence Interval).

Table 2. results obtained for one to five year survival using Meta-analysis

Survival rate (By year)	No. of Articles	No. of patients	Survival rate (CI %)
One	11	2197	0.47(34-61)
Tow	8	1685	0.31(18-44)
Three	9	1685	0.22(13-31)
Four	4	656	0.21(.4-38)
Five	7	1559	0.12(.8-16)

similar article in USA 2012 [14] Blackmon et al. was reported 30% [15]. Thus our result is considerably lower than developed countries such as Japan and the USA.

Some limitations can be addressed in current study. First, most of the final enrolled studies owned from inner databases. Second some articles did not give the survival rate by year and just report the five-year survival rate.

Of the 18 final articles, 11 were performed in the northern reigns of the country including Golestan, Mazandaran, as well as Gilan and Ardebil provinces. The reason for this can be attributed to highest rate of esophageal cancer in northern regions in Iran. In other regions number of the studies related to survival in patient with esophageal cancer is scarce. So the survival rate in other regions of Iran

is not clear due to the lack of sufficient data and due to the scarcity of studies, the reported estimations don't have sufficient accuracy.

Conclusion

According to results of this study the one year survival rate (47%) of esophageal cancer in Iran is almost five times more than the five year survival rate (12%). Hence, the early diagnosis of the disease is very important in order to prolong the survival of the patients.

Acknowledgment

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Conflict of Interest

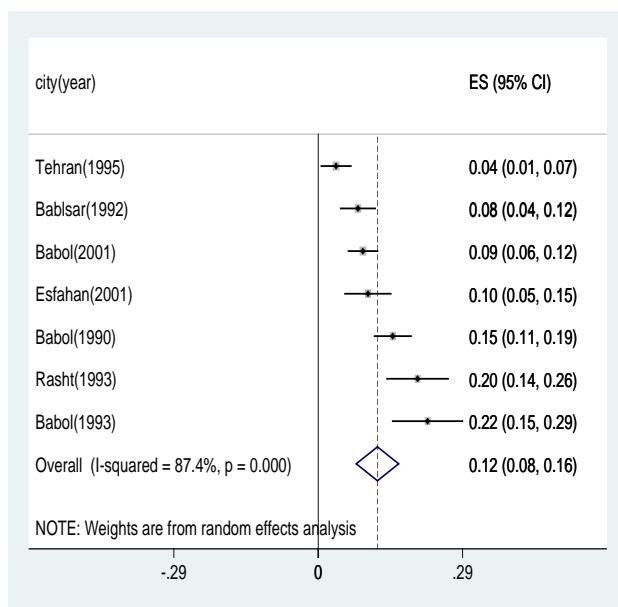
The authors have no conflict of interest in this study.

Authors' Contribution

Amir Yarhousseini and Loghman Sharifzadeh collected the data designed this article, Kourosh Sayehmiri participated in design of study and data analysis. Fatemeh Sayehmiri analyzed the data, and prepared graphs Ali Delpisheh and Yousef Veisani participate in preparing of the manuscript. All authors read and approved the final manuscript.

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Graph2: Five Year Survival Estimation in the Studied Articles Separated by Region (Each Line Shows 95% Confidence Interval. The Diamond Shape is the Total Survival and Confidence Interval)

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