

Gastric Cancer Prevalence, According To Survival Data in Iran (National Study-2007)

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Abstract

Background: Gastric cancer is a common and lethal disease throughout the world. In Iran with 7300 new cases annually, it is the first cause of cancer related death in both sexes. Regarding the high incidence (10.5/100000 individuals) of gastric cancer and priority of prevalence index in cancer management, in this study we tried to determine 1, 2-3 and 4-5 year point prevalence of the disease according to survival data.

Method: Survival and incidence data were used for determination of cancer prevalence. Incidence data were extracted from cancer registry in Iran and survival data were determined in a descriptive study by following up 3439 gastric cancer patients in Cancer Research Center (CRC). 1, 2-3 and 4-5 year prevalence was estimated from incidence rates in different years and the proportion of patients surviving 0.5, 1.5, 2.5, 3.5 and 4.5 years from the time of diagnosis.

Results: patients with survival of 0.5, 1.5, 2.5, 3.5 and 4.5 years from the time of diagnosis were 46.38%, 26 %, 19.36%, 15.47% and 12.8% respectively. The prevalence of 1, 2-3 and 4-5 year was 3392, 3118 and 1824 respectively. The cumulative 5 year prevalence was 8334 cases.

Conclusion: These estimates of the point prevalence of gastric cancer at 1, 2-3 and 4-5 years are applicable to the evaluation of initial treatment, clinical follow-up, and point of cure. Therefore 1, 2-3 and 4-5 year point prevalence estimates, are necessary in health service planning for gastric cancer management and should be considered by public health managers.

Keywords: *Gastric cancer, Cancer prevalence, Stomach cancer, Iran*

Introduction

Avicenna (980-1037) gave the first account of cancer of stomach and described it as a lethal disease (1, 2). After ten centuries it remained one of the common malignancies worldwide with near 870/000 new cases annually (3, 4). Patients are often diagnosed with advanced disease thus diagnosis of the stomach cancer to a patient signifies impending death, in fact even among the medical profession there is widespread belief that this diagnosis implies hopelessness. This attitude is a great deterrent to progress and is sad one, due to Japanese effort with scientific documentations it is confirmed that cancer of stomach is a curable disease (2).

In Iran, still it is a fatal disease and epidemic with about 7300 new cases every year (5-7). Approximately 60% of gastric cancer in the world occurs in developing Countries (8) and in

developed countries it varies among different races, as in North America it is from 18 till 4.7 for black men and white women in 100,000 individuals. The trend of disease in US is decreased during 1975 to 2006 (9).

Its age standardized incidence rate in Iran has been 18.95, 19.62 and 18.39 during 2003, 2004 and 2005 in 100000 Iranian men and 8.67, 9.17 & 8.32 in 100000 Iranian women, respectively (5, 10, 11). According to these studies, about 7300 cases in Iran (10.5 per 100,000 individuals) are afflicted to gastric Cancer annually (5, 7, 10, 11). In addition, based on Ministry of Health and Medical Education statistics in 2003, the number of death resulted from gastric Cancer was 8100 people (2914 women and 5186 men), therefore gastric Cancer mortality rate is estimated to be about 12 per 100,000 population with 8.5 per 100,000 women and 15 in 100,000 men (12).

This is much higher than in North America with 5.5 and population of 2.8 per 100,000 in men and women respectively (9).

For most cancer sites, cases surviving 5 yr from diagnosis have the same life span as the general population; therefore, most of the workload is done within these first 5 yr. For this reason, estimation the 1, 2-3 and 4-5 yr prevalence is necessary for the evaluation of initial treatment, clinical follow-up and point of cure, respectively, for the majority of cancers (13).

PISANI et al. used surveillance results and age standardized incidence rate in order to compute prevalent cases in various years after diagnosis, and estimated 1, 2-3 and 4-5 yr cancer prevalence in 25 different regions in the world (13).

Cumulative 1-5 yr prevalence rate of gastric cancer in developed countries and developing countries were 52.5 and 14.9 in 100,000 women and 92.4 and 29.8 in 100,000 men, respectively (13).

1, 2-3 & 4-5 yr prevalence rate of gastric cancer in developed countries is 26.1, 38.4 & 28 and 15.1, 21.7 & 15.7 per 100,000 men and women, respectively. This rate is 10.8, 21.7 & 6.9 per 100,000 men and 5.4, 6 & 3.6 per 100,000 women in developing countries respectively (13).

Since the data of 5 yr survival of most malignancies is not available and properly recorded in Iran; in spite of the current incidence rate, prevalence rate is not clear yet. Due to the importance of prevalence index in cancer management, cancer prevalence rate, which indicates new cases plus people who have cancer and are still alive, shows what the needs are, and what facilities should be prepared in the health system to provide these needs. On the other hand, cancer prevalence shows the number of people who need defined services in a specific period in the society.

Therefore, the aim of this study was to calculate 1, 2-3 and 4-5 yr prevalence of gastric cancer according to surveillance data in order to determine early treatment, clinical follow-up, and remission time together with rehabilitation supports.

Materials and Methods

The present paper was conducted as a descriptive study through the follow up of 3439 gastric cancer patients. There were 19578 gastric cancer patients registered in "Iran Cancer Registration Center" during 2001-2005 (6); among them the telephone numbers were available for 8733 families (44.6%). To obtain information about patients, a trained nurse called and interviewed with all families, but the available data is collected from 3439 cases as the study population (40%) whom were cooperative to respond our questions about the patient health or death status.

All of the demographic features for the study group were matched with the main registered cases during year 2001-2005. Information was analyzed by SPSS using "life time table" and 0.5, 1.5, 2.5, 3.5 and 4.5 yr surveillance rates were computed and used in the final prevalence formula.

Age specific incidence rate in age groups for 2003, 2004 and 2005 (5 yr interval) was used from national report of cancer registration in the mentioned years: 0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 75-74, 75-79, 80-84 and >85 yr. According to 60, 70 and 81 percent coverage of pathology centers during 2003, 2004 and 2005 respectively, adjusted incidence rate was estimated.

Then for computing of prevalent cases of age "K", we used the following formula in which Dr Pisani et al used incidence rates and year-specific survival probabilities (13):

$$P_k(n) = \sum IC_{k-i} * S_{k-i}(i - 0.5)$$

Where:

IC_x = annual number of new cases at age x

$S_x(t)$ = the proportion of cases diagnosed at age x and alive at time t after diagnosis n= the number of years as case or number of years before cured.

k= shows the age that prevalence formula computes for.

Results

From 19578 patients, 3439 were followed up but 250 cases of them had a date of death before the time of diagnosis. Thus to avoid any possible bias in results these cases were dropped and study population became 3189 cases. Average age of gastric cancer patients was 64.76 ± 12.77 yr (ranging from 12 to 108 yr old). Among them, 26.1% were women and 71.3% were more than 60 yr old. Observed survival rate at 0.5, 1.5, 2.5, 3.5 & 4.5 yr were computed to be 46.38, 26, 19.36, 15.47 and 12.8 percent, respectively. Observed 5 yr survival rate in affected gastric cancer patients was 12.3%.

In Table 1, observed survival data has been shown according to gender. 1, 2-3 & 4-5 yr prevalence was 4.71, 4.33 & 2.53 respectively per 100000 individuals. 1, 2-3 & 4-5 yr prevalence rate was estimated to be 6.35, 5.78 & 3.22 per 100000 men and 3.04, 2.85 & 1.83 in 100000 women, respectively. Cumulative 1-5 yr prevalence per 100,000 men and women was 15.36 & 7.72 respectively. Cumulative 1-5 yr prevalence in whole population was 11.57 per 100000.

Table 2 gives number of cases surviving 1, 2-3 and 4-5 yr(s). The statistics can be summed to give the prevalence of all cases diagnosed within 5 yr.

Table 3 shows the number of patients whom alive after 5 yr (cumulative 5 yr prevalence). In addition, the percent of gastric cancer patients in different age groups has been shown.

Table 1: Observed survival of gastric cancer in IRAN according to sex

| Observed survival | Male (%) | Female (%) |
|-------------------|----------|------------|
| 0.5 year | 45.19 | 49.72 |
| 1.5 year | 24.63 | 29.82 |
| 2.5 year | 17.96 | 23.26 |
| 3.5 year | 13.63 | 20.48 |
| 4.5 year | 11.45 | 15.67 |

Table 2: Prevalence of gastric cancer in Iran (2007)

| Prevalence | Male | Female | Total |
|-----------------|------|--------|-------|
| 1 yr | 2306 | 1086 | 3392 |
| 2-3 years | 2100 | 1018 | 3118 |
| 4-5 years | 1171 | 653 | 1824 |
| Cumulative 5 yr | 5577 | 2757 | 8334 |

Table 3: Cumulative 5 years prevalence of gastric cancer in Iran according age and sex group (2007)

| Age groups (yr)\ | Female | Male | Total (%) |
|------------------|--------|------|-------------|
| 0~4 | 0 | 0 | 0 |
| 5~9 | 0 | 0 | 0 |
| 10~14 | 0 | 0 | 0 |
| 15~19 | 1 | 2 | 2(0.03) |
| 20~24 | 11 | 10 | 21(0.25) |
| 25~29 | 35 | 19 | 54(0.65) |
| 30~34 | 62 | 43 | 105(1.25) |
| 35~39 | 76 | 95 | 170(2.04) |
| 40~44 | 109 | 147 | 256(3.07) |
| 45~49 | 153 | 205 | 357(4.29) |
| 50~54 | 218 | 414 | 632(7.58) |
| 55~59 | 265 | 456 | 721(8.65) |
| 60~64 | 304 | 565 | 869(10.43) |
| 65~69 | 376 | 721 | 1097(13.16) |
| 70~74 | 410 | 1071 | 1480(17.76) |
| 75~79 | 445 | 1059 | 1504(18.05) |
| 80~84 | 269 | 707 | 976(11.71) |
| 85+ | 25 | 65 | 90(1.08) |
| Total | 2757 | 5577 | 8334(100) |

Discussion

Prevalence describes the number of persons alive at a particular point in time with the special disease such as gastric cancer. There is some controversy in definition of prevalence; some authors take it to mean, "ever having been diagnosed with cancer", even the subject is cured for many years ago, the others believe it should be defined as "alive with cancer"; and the subjects still receiving some form of treatment or follow up management. This controversy makes little sense for gastric carcinoma because of very low cure rate particularly in a developing country such as Iran. Therefore, it is a relevant measure in the context of health service planning which reflects the number of individuals in the community requiring a defined care procedure at the same time.

We can estimate cancer prevalence through counting registered people in "Cancer Registration Systems" directly. This system not only should register results and data for a long time, but also needs patients' treatment/remission conditions on follow-ups, which are almost impractical in highly

populated countries like Iran. Population surveys have been a practical alternative, although this approach leads to the underestimation of true values (13).

Thus, using aforementioned formula for measuring cancer prevalence seems reasonable. Two main factors in prevalence rate are survival and incidence rate. In this article, gastric cancer 0.5, 1.5, 2.5, 3.5 & 4.5 yr surveillance rate have been calculated as 46.38%, 26%, 19.36%, 15.47% and 12.8% respectively. 1, 2-3 and 4-5 gastric cancer prevalence with cumulative 5 yr prevalence in all population were 3392, 3118, 1824 and 8334 cases respectively.

Five years survival rate of gastric cancer has been reported to be 12.3%, which is lower than the world. Five year survival rate for men and women were %11.5 and %16.4 respectively, which are about half of the world estimation.

Five-year survival rate of gastric cancer has been 24.3% in 17 SEER (Surveillance Epidemi-

ology and End Results) regions according to 1996- 2003 information (14).

Poor survival of gastric cancer in Iran is perhaps due to late diagnosis of cancer; therefore, affected individuals have been diagnosed in advanced stages.

According to the mentioned study, 1 yr prevalence rate of gastric cancer was 6.35 in 100,000 men, which are lower than developed, and developing countries (26.1 & 10.8 per 100,000). Regarding women, we also observe a similar difference.

One-year prevalence rate of gastric cancer in women is 15.1, 5.4 & 3.04 per 100000 in developed countries, developing countries and Iran respectively.

Pisani et al. in prevalence measuring study for 25 world regions contributed mentioned more incidence of cancer and more survival in developed countries (13) (Table 4). According to their study, the difference is greater in costly cancers with complex treatments.

The difference in the 2-3 and 4-5 yr and the cumulative 5-yr prevalence rate are similar.

Table 4: Gastric cancer prevalence rate in Iran compared with developed and developing countries

| Prevalence | Developed countries | | Developing countries | | Iran | |
|--------------------|---------------------|--------|----------------------|--------|-------|--------|
| | Male | Female | male | female | male | female |
| 1 year | 26.1 | 15.1 | 10.8 | 5.4 | 6.35 | 3.04 |
| 2-3 years | 38.4 | 21.7 | 21.7 | 6 | 5.78 | 2.85 |
| 4-5 years | 28 | 15.7 | 6.9 | 3.6 | 3.22 | 1.83 |
| Cumulative 5 years | 92.4 | 52.5 | 29.8 | 14.9 | 15.36 | 7.72 |

In a study in INDIA, 5717 cancer patients (esophagus, stomach, pancreas, lung cancers) registered in the Mumbai Population-Based Cancer Registry who were followed between 1987-1991. Five years survival rate of gastric cancer was 10.1%, which is nearly close to present study (15).

A study conducted in Ardabil, North West of Iran during 2000 and 2004, showed that in 420 biopsy proven patients with upper GI cancers (141 esophagus, and 279 stomachs), 5 yr survival rate for all upper GI cancer patients was 0.83% (16). In terms of overall cumulative survival observed for 5 yr, patients with esophagus cancer had a slightly higher survival rate than patients with stomach cancer ($P= 0.15$) (16). There-

fore, 5 yr survival rate of gastric cancer in present study is remarkably higher than Ardabil study.

Totally, about 0.006% of men and 0.003 percent of women with gastric cancer (1 yr prevalence) are treated. In addition, about 0.006% of men and 0.003% of women (2-3 yr prevalence) are under clinical follow-up and 0.003% of men and 0.002% of women (4-5 yr prevalence) are in remission. These findings are very helpful for health planners to prepare needed services.

The advantage of this study was the great number of follow-up population. According to calculations, a sample size of 384 cases was needed to calculate survival rate with 95% confidence, whereas in this study 3439 cases were evaluated (9 times more) which minimizes the role of confounding factors.

Totally, in Iran there are 8334 patients with gastric cancer. Among them, 5577 cases are men and 2757 cases are women. About 3392 cases (2306 men & 1086 women) need early treatment (1 yr prevalence) for cancer. In addition, 3118 cases (2100 men & 1018 women) are under clinical follow up (2-3 yr prevalence) and 1824 cases (1171 men and 653 women) are in remission (4-5 yr prevalence).

Ethical Considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc) have been completely observed by the authors.

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