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Non hematological malignancies in Punjab: an institution based cancer registry data

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Abstract

Punjab, once the leader of green revolution in India, is now suffering from adverse consequences of contaminated water from rapid industrialization and excessive use of chemical fertilizers for high yield of crops. As more and more states practice the agricultural practices followed in Punjab the fear amongst the medical faculty is that the cancer scenario in Punjab will be replicated in other states as well. Therefore apart from Government initiatives, institution base cancer registries are also an indispensible tool in analyzing the spectrum of cancer in population. We hereby present the spectrum of non-hematological malignancies analyzed through over institution based cancer registry.

Keywords: Cancer, Punjab, Spectrum, Non-hematological

Introduction

Cancer is not a single disease but a large family of diseases, which involve abnormal cell growth with the potential to invade or spread. The National cancer institute defines cancer as "a term for disease in which cells divide without control". WHO (2006) states that 70 percent of cancer deaths occur in low and medium income countries. It also emphasizes that mortality from cancer is expected to increase from 7.7 million (2005) to 11.6 million (2030). The magnitude of cancer problem in the Indian Sub-continent (sheer numbers) is increasing because of poor to moderate living standards and inadequate medical facilities. According to 1991 Indian census data, about 609000 cancer cases have been observed. This number had drastically increased to 806,000 by the end of the last century; with 96.4 and 88.2% age standardized rates for males and females; out of 100,000 cases analyzed.

Punjab has been the leader of green revolution in India for about 5 decades now and seems to be the first state suffering from adverse consequences of the same as well. It is home to the highest rate of cancer in India due to contaminated water from rapid industrialization and excessive use of chemical fertilizers for high yield of crops. As more and more states practice the agricultural practices followed in Punjab the fear amongst the medical faculty is that the cancer scenario in Punjab will be replicated in other states as well. Therefore it is essential to study the trends of cancer, role of demographic profile, pesticides, environmental factors etc.

In order to generate reliable data on the magnitude and pattern of cancer regarding morbidity and mortality pattern and changing time trends of cancer in a population, the presence of cancer registries in various regions of the country is not only desirable but a necessity. Cancer registration is an active method to collect and classify information of all malignant cases in order to produce statistics on cancer and provide a framework for assessing and controlling the impact of cancer in the community.

Since most of the patients of the Malwa belt in Punjab dubbed "the cancer belt" of the state throng into the Dayanand Medical College and Hospital, Ludhiana. It was thought pertinent to analyze the institution based cancer registry that might help in throwing light on the gravity of the cancer situation prevailing in the above-mentioned region. A majority of the studies done in the past highlight hematological malignancies as the leading cause of cancer, we decided to analyze the non-hematological cancers only, with the aim to have elaborative analysis of the non- hematological cancer patterns.

Materials and Method

This retrospective analysis was done over a period of 5 years. All non- hematological malignant cases, received in the Department of Pathology at Dayanand Medical College and Hospital were included. The record of surgical pathology biopsies in the archives maintained at the Pathology Department of Dayanand Medical College, Ludhiana was studied. The baseline characteristics including age, sex, religion, area of living, site of involvement were recorded from institution data base as per pre designed proforma. The histomorphological type and grade of tumor was noted from the pathology reports of the patients. The slides and blocks were reviewed wherever necessary.

The department has been receiving surgical biopsy specimens in 10 percent buffered formalin and tissue being processed using automatic histokinette and further slides made from the paraffin blocks. Immunohistochemical stains are also being done

wherever considered necessary to reach a definite diagnosis.

Results

A total of 53,495 tissue biopsies were received for histopathological evaluation in the Department of Pathology, DMC&H in five years, of which a total of 2582 were histopathological proven to be non-hematological malignancies. Majority of the patients were between 31-80 years of age (89.62%). The age bracket of 51-60 years reported maximum number of non- hematological cancer cases i.e. 722(27.96%) and the lowest number of cancer cases were reported in the age bracket of 0- 20 years i.e. 50(1.93%). Males outnumbered females (M:F=1.07:1). Gastrointestinal tract (esophagus, stomach, small intestine, colon anal canal) was the most common site affected constituting 27.4% of all non-hematological malignancies. Colorectal cancers ranked first amongst all cancers of GIT in males, accounting for 176(13.18% of all male cancers) cases and in females accounting for 86 cases (6.90% of all female cancers) making it the second commonest after esophageal cancers in females. Adenocarcinoma and squamous cell carcinoma were the common histological subtypes in colorectum and esophagus respectively. The second common site involved by cancer was Breast 12.2 % with female predilection. In males only 17 cases were encountered making it 1.27% of all male cancers. Invasive duct carcinoma was the most prevalent histological subtype with 292 cases (92% of all breast cancers). Female reproductive tract (FRT) system and Kidney ureter and Bladder (KUB) region constituted 11.2% and 8.2% malignancies with ovaries (117 cases, 32.32%) being the common site in FRT and urinary bladder (101 cases, 43.5%) n KUB region Serous cystadenocarcinoma was the common histological subtype in ovarian malignancies and urothelial carcinoma in bladder malignancies. Head and neck region (8.7%) and Male genitourinary tract (MGT)(8.4%) also constituted large chunk of malignancies with squamous cell carcinoma of oral cavity and oropharynx (24.7%)being the common histological subtype in head and neck region and prostate adenocarcinoma (83.3%) being the common histological type in MGT. Splenic malignancies were rarest with 0.07% cases.

Site	Number of Cases (n)	Percentage (%)
Gastro-intestinal tract	710	27.4
Breast	317	12.2
Female reproductive system	308	11.9
Kidney/ ureters and Urinary Bladder	232	8.9
Head and Neck	226	8.7
Male reproductive system	216	8.4
Hepato- pancreatobiliary	150	5.8
Central nervous system	105	4.1
Soft tissue and Bone	74	2.9
Lymphnode metastasis	67	2.6
Skin	63	2.4
Lung	57	2.2
Thyroid	39	1.5
Eye	10	0.4
Adrenal and Pituitary	06	0.1
Spleen	02	0.07
Total	2582	100

Discussion

India is a vast country and therefore the spectrum of malignancies display regional variations attributed to differences in environment, nutrition, social and religious customs, culture and habits. Registries from Mumbai, Bangalore, Chennai, Thiruvananthapuram and Dibrugarh, showed the number of cancer cases registered were 51,146; 24,229; 25,009; 26,172 and 2532 respectively, in the period of 3 years from January 2001 to December 2003. According to Mehrotra et al, maximum number of patients was registered in Mumbai, comprising 28,471 (55.7%) males and 22,675 (44.3%) females with a sex ratio of 1.27:1.[(1)] To generate reliable data on the magnitude and pattern of cancer, a population based and/ or hospital-based registry is a must.

The crude incidence of cancer is defined as the number of new cancer patients per year per 100,000 persons of the sex under consideration. This evaluation is only possible to evaluate in a population-based registry. In 2012, Government of Punjab conducted a population-based registry, which placed Punjab on the top of cancer prevalence list with 90 cancer patients per 1 lakh population as compared to national average of 80 cancer patients per 1-lakh patients. However, due to some missing data regarding diagnosis, age and sex of patient, anatomical site of tumor ICMR initiated its own study and started preparing cancer atlas of Punjab in 2012.

In the present study, the incidence of non-hematological malignancies as per total number of histopathological biopsies is 4.83%. A ten year retrospective study conducted by Sabharwal et al in Ludhiana from 1982-1993, showed an incidence of cancer equal to 8.36%.[(2)] Though, even higher figures of 11.5%, 13.66% and 13.92% have been reported from Bengal, Jammu and Amritsar respectively by Banerjee et al,[(3)] Kapoor et al,[(4)] Prabhakar et al [(5)] their studies included hematological malignancies also.

Of the 2,582 cancer cases, males outnumbered females with 1335 cases (51.74%) compared to1247 cases (48.29%) in females with MF ratio of 1.07:1.This is akin to data regarding sex ratio from Dibrugarh (1.77:1) by Ferlay et al.[(6)] Lack of awareness, low literacy rate and relative negligence towards health of females in this part of the country could be responsible for a high MF ratio. A nationwide study conducted by

ICMR showed the number of male, female and the total cancer patients in 2004 were 390809, 428545 and 819354 respectively.[7]

Cancer was found to be uncommon in the first two decades of life with only 1.70% of the cases were below 20 years of age. Majority of cancers in both the sexes were seen in the age group of 41-60 years (53.66%) as reported by most of the studies conducted in India by Sabharwal et al (49.66%),[2] Kapoor et al (50.4%)[4] thus affirming the fact that aging is the single biggest risk factor for developing cancer.

The two most common sites of cancer in females in the present study are breast and ovaries with breast cancer being the commonest (24.19%) followed by ovarian cancers (8.87%). The incidence is comparable to the past study by Sabharwal et al[2] from Ludhiana, 1995 (21.05%). However, Mehrotra et al showed regional variation in breast cancer with low incidence in some regions like Allahabad, U.P.[1] Breast cancer has emerged as the leading site of cancer amidst women in India and according to National cancer registry program (NCRP) all urban registries in India showed an increasing trend of breast cancer among females. Recent reports of Population based cancer registry from India have shown that breast cancer incidence is higher than cancer cervix in most urban registries.[8] Invasive duct carcinoma, NOS was the commonest histological type accounting for 502 cases (88.2%) of all breast cancers (n= 560). The incidence of breast cancers in males though low i.e. 1.26% of all male cancers has shown a slight increase in incidence as compared to previous study done by Sabharwal et al.[2]

Ovarian neoplasms have gained importance, as they are increasingly responsible for the mortality in females. In the present study, ovarian cancers account for 8.87% of all female cancers as compared to 3.77% by Sabharwal et al.[2] The trend analysis by period has shown an increasing trend in the incidence rate of ovarian cancer in most of the registries, with a mean annual percentage increase ranging from 0.7% to 2.4 %. Another study done by ICMR[8] in Delhi in 2009 showed 7.15% of ovarian cancer cases in 2001, 7.14% in 2006 and 7.14% in 2011, concluding that the incidence remained stable over the years. Surface epithelial tumors formed a major chunk of malignant cases reported with Serous Adenocarcinoma (67%) being the commonest histological subtype followed by germ cell tumors(11%) and sex cord stromal tumors (3%) which are similar to other studies conducted by Pradhan A et al[11] Chow SN,[12] Nakashima N et al.[13]

Sabharwal et al[2] in his study reported 19.39% cases of cervical cancer, making it second most common cancer after breast. In our present study, cancer of cervix constituted 7.77% of all the cancers in females and thus, has slipped to fourth position overall. All the urban population based cancer registries (PBCR) at Bangalore, Bhopal, Chennai, Delhi and Mumbai have shown a statistically significant decrease in the AARs of this site of cancer as reported by NCRP, 2008.[14]

The leading cancer sites in males in our study were prostate, colon and esophagus. This is in contrast to a study done in the other parts of the country by Mehrotra et al[1] who placed cancer of oral cavity and lung cancer on the top of the list. Non- smoking and non- tobacco chewing culture in Punjab due to religious taboo in Sikhism could be a reason for this difference. Trends recorded are similar to study conducted by PPCB (Punjab pollution control board)[11] in 2005 in the same region where lung and oral cancers were missing from the top five types of cancer.

Carcinoma Prostate was the commonest malignancy overall of male urogenital tract, constituting 13.48% of all male cancers as compared to 9.65% in the last study done in 1995 by Sabbharwal et al.[2] The increasing trends as shown in our study are comparable to study by Yeole B.B.[15] and others like Chennai registry (4.95%), followed by Bhopal registry (3.45%), Delhi registry (2.40%), Bangalore registry (2.02%) and Mumbai registry (0.89%) who noticed maximum increase in age adjusted incidence rate over an entire period of observation. In contrast to the prostate cancer incidence and mortality trends in western countries, rates are increasing in Asian and Eastern European countries, where PSA testing is not commonly used.

In accordance to colorectal cancer being the major cause of morbidity and mortality worldwide, it ranked foremost amid all cancers of GIT in males, accounting for 176(13.18% of all male cancers) cases and 86 cases (6.90% of all female cancers) with Adenocarcinoma, NOS being the most common histological type. Colorectal cancers were found to be second commonest after esophageal cancers in females. The number of cases have compounded in both sexes as compared to previous study by Sabharwal et al, which is in concordance with the other recent studies. Cancer of esophagus accounted for 8.68% of all the cancers in males and 8.90% of all the cancers in females with Squamous Cell Carcinoma being the predominant histologic type. Jose T (2004),[12] Mehrotra et al reported that in both the sexes, the most common site among all gastrointestinal malignancies was the esophagus.[1]

Cancer of the liver accounted for 1.42% of all cancers in males and 0.96% in females. Majority of liver cancers were metastatic tumors. Cancer of gall bladder accounted for 2.62% cancers in males and 3.53% in females in the present study. These figures showed a slight increase in number of cases as compared with the study done by Sabharwal et al[2] and in another study by Murthy N. S et al, in 2011 at Mumbai, Delhi, and in various other registries.[17] The female propensity can be explained due to its association with gallstones, a risk factor for gallbladder cancer.

Lung cancer percentages are low in the present study (3.47% in males and 0.88% in females) with male to female ratio of 4.1: 1. These results are comparable to other studies by Reddy et al, Kashyap et al who found a male to female ratio of 4:1[18] and 6.1:1[19] respectively. Genetic factors are known to play a role in the development of lung adenocarcinoma, and familial genetic clustering of lung cancer has been found. Squamous cell carcinoma in males and adenocarcinoma in females were the common histological subtypes. Socio-cultural considerations may have modified this pattern and there may be ethnic/ racial differences in disease pattern.

Conclusion

While cancer rates in general are decreasing in the Western world, they are increasing in economically transitioning countries including India, because of adoption of unhealthy lifestyles such as smoking, physical inactivity and consumption of calorie-rich food. A hospital based cancer registry is an integral part of hospital's cancer programme or health care delivery system. Knowing the pattern of cancer will provide leads in undertaking etiological research and developing evidence based strategies to aid cancer control programme for prevention, early detection, diagnosis, treatment and palliation.

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