CANCER IN SOUTH KARNATAKA AND ITS PARADOXICAL RELATION TO DIABETES MELLITUS

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ABSTRACT

The present work identifies a high incidence of oral cancer in south Karnataka. The primary reason for this could be due to extensive addiction to tobacco alone or tobacco and alcohol in most of these patients. The next in intensity was cancer of the breast and cervix among the cancer patients surveyed in south Karnataka. Majority of these patients had no specific addiction and the exact reason for this high incidence remains unclear. Only a small percentage of patients exhibited other types of organ related cancer. It has been reported that the incidence percentage of diabetes mellitus and cancer in India, parallel each other. However, we observed a low incidence of diabetes mellitus patients also having cancer in south Karnataka. Though the exact reason for this remains unclear an attempt has been made here to explain this phenomenon, hypothetically using information in literature, which suggests a suppression of cellular regenerative activity by sugar and sugar phosphates. Cellular regenerative activity is well known to be a prerequisite for cancer.

KEY WORDS

Cancer, diabetes mellitus, tobacco, cellular proliferation, blood sugar.

INTRODUCTION

Neoplastic conditions like cancers are dreaded diseases characterised by uncontrolled cellular proliferation of specific organs (1) with metastasis in some cases. The exact reason for the occurrence of cancer is still unclear though a number of aspects like extensive use of tobacco, alcohol addiction and exposure to radiations have been implicated to be causative factors for this disease (2). Moreover, for many of the cancers affecting humans there exists limited treatment protocol thus leading to prolonged suffering and death (3,4). The aim of the present work was to segregate the various cancer patients in south Karnataka obtained from the hospital registry on the basis of type of cancer, age, addictions and those having diabetes. Further it has already been reported (5) that glucose inhibits DNA synthesis in cultured hepatocytes, a prerequisite for cellular proliferation (6). Hence diabetics (7,8) should exhibit a certain extent of immunity against cellular proliferative disease like cancer. This hypothetical aspect of a possible counter relationship between cancer and diabetes mellitus is discussed which needs future experimental evaluation.

MATERIALS

The Kasturba Medical Hospital located at Attavar in

Mangalore was started in 1999 and is involved in the diagnosis and treatment of cancer patients. All details about cancer patients registered by the oncology department of the hospital, since its inception was documented on a proforma. The data was analysed and categorised as detailed in the tables.

RESULTS AND DISCUSSION

In this study high incidence of oral cancer to the extent of 25.5% was observed out of a total of 400 tumour patients evaluated (Table I). Use of tobacco has been reported (9) to be the primary cause of oral cancer in India. The high occurrence of this, type of tumour may be due to the addiction of most of these patients to tobacco, with (28.4%) or without alcohol (64.7%). Only 6.9% of patients had no history of any addictions (Table 2). Moreover, on an all India basis the incidence of oral cancer in males was 48% and females 20% with all these patients addicted to tobacco (10). However, these figures indicating oral cancer in India on an average for both sexes was higher than that reported in our work for south Karnataka and extensive use of tobacco by the population of this region seems to be the primary causative factor. Tobacco chewing is a socially accepted practice among both men and women (11) in India and is the primary reason for oral cancer seen in both sexes. Most of the oral cancer patients in this study were above 41 years of age (Table 3). Tobacco use usually starts at teenage and few years elapse before the manifestation of oral cancer, which explains the probable reason why most of these patients are in the forties or above age group.

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Table I Type of Tumour distribution and segregation of diabetics and non-diabetics.

Sl. No.	Tumours	No. of Cases (n)	% of Cases	Diabetic Cases	Non-Diabetic Cases
1	Oral	102	25.5	2.0	100
2	Breast	73	18.2	1.0	72
3	Cervix	73	18.2	3.0	70
4	Non-Hodgkins Lymphoma	25	6.2	-	25
5	Oesophagus	24	6.0	-	24
6	Ovary	19	4.7	2.0	17
7	Lung	11	2.7	-	11
8	Leukemia	10	2.5	-	10
9	Brain	09	2.3	-	09
10	Parotid	08	2.0	1.0	07
11	G.I.T.	08	2.0	-	08
12	Uterine	07	1.7	1.0	06
13	Multiple Myeloma	06	1.5	-	06
14	Liver	05	1.3	-	05
15	Thyroid	05	1.3	-	05
16	Kidney	04	1.0	-	04
17	Lymphoma	03	0.8	-	03
18	Prostate	03	0.8	-	03
19	Bladder	02	0.5	-	02
20	Vagina	02	0.5	-	02
21	Testis	01	0.3	-	01
Total		400	100	10	390

After oral cancer the other type of tumours which showed a high incidence in south Karnataka were those involving the breast and cervix which separately constituted 18% of the total number of patients screened for tumours (Table I). These percentage values reported here are within the range of values for their occurrence in the general Indian population (12,13). Most of the patients in our study who exhibited breast and cervix cancer were in the 31 to 60 year age group (Table 3). Further, majority of these patients were not addicted to tobacco or alcohol (Table 2). These facts add support to the suggestion that some unknown biological parameter may be the initiating factor for these tumours in these patients as reported (12,13).

There was low incidence of other types of organ related tumours in the cancer patients evaluated from south Karnataka. However, an interesting observation made in this work is that only a few (2.5%) of the patients with diabetes mellitus also had cancer (Table 1). It has been reported (14,15) that the total incidence of cancer and diabetes assessed independently paralleled each other in the Indian population which was not observed in our investigation. It has already been indicated earlier that glucose suppresses DNA synthesis (5). Further, glucose has been shown to suppress liver

regeneration of partially hepatectomised animals (16). Hyperglycemia is also reported (17) to decrease mitogenic activity consequently leading to vascular disease in diabetics. Moreover, recent work (18-20) has indicated that liver regeneration consequent to its destruction by toxicants, is suppressed in diabetics leading to a hindrance in tissue repair mechanism resulting in increased susceptibility and mortality to hepatotoxicants. This work was extended further to show that dietary restriction in animals act as a protective mechanism against toxicants due to hepatic repair and hepatocellular regeneration being unaffected in these animals (21,22). Further, it is already well known that wound healing is inhibited in diabetics. All these facts may account for the lower incidence of cancer in diabetics which as of now is just a hypothetical explanation which needs further experimental validation. However, one probability which could account for cancer in diabetics is that cancer might have preceded the latter in these patients which could not be confirmed. Low-grade diabetes mellitus strictly under control could also facilitate regenerative activity and cancer. Anyway whatever the reason there is scope for further research evaluation on the possible relationship between diabetes mellitus and cancer.

Table 2 - Distribution % of tumour cases as per patients addictive habits

Sl. No.	Tumours (n=400)	Tobacco	Tobacco and alcohol users	No addictions
1	Oral	64.7	28.4	6.9
2	Breast	26	-	74.0
3	Cervix	38.4	-	61.6
4	Non-Hodgkins Lymphoma	32	8	60
5	Oesophagus	41.7	45.8	12.5
6	Ovary	21.1	-	78.9
7	Lung	27.3	63.6	9.1
8	Leukemia	10	-	90
9	Brain	22.2	11	66.7
10	Parotid	37.5	50	12.5
11	G.I.T.	-	50	50
12	Uterine	14.3	-	85.7
13	Multiple Myeloma	16.7	50	33.3
14	Liver	-	60	40
15	Thyroid	-	20	80
16	Kidney	25	25	50
17	Lymphoma	66.7	-	33.3
18	Prostate	33.3	66.7	-
19	Bladder	50	50	-
20	Vagina	100	-	-
21	Testis	-	-	100

No patients were found with alcohol addiction

Table 3 Age related % distribution of tumour in patients

Sl. No.	Tumours (n=400)	Upto 20 yrs	21 to 30 yrs	31 to 40 yrs	41 to 50 yrs	51 to 60 yrs	61 to 70 yrs	71 yrs to above
1	Oral	1	1	5.9	26.5	27.5	27.5	10.6
2	Breast	-	4.1	39.7	17.8	24.7	11	2.7
3	Cervix	-	2.7	20.6	26	32.9	13.7	4.1
4	Non-Hodgkins Lymphoma	28	28	4	28	8	-	4
5	Oesophagus	-	-	8.3	29.2	29.2	8.3	25
6	Ovary	-	-	10.5	52.6	31.6	5.3	-
7	Lung	-	-	9.1	18.2	45.4	18.2	9.1
8	Leukemia	60	10	20	10	-	-	-
9	Brain	33.3	-	44.5	22.2	-	-	-
10	Parotid	-	25	-	25	37.5	12.5	-
11	G.I.T.	-	-	12.5	25	25	37.5	-
12	Uterine	-	-	14.3	42.8	28.6	-	14.3
13	Multiple Myeloma	-	-	50	-	16.7	-	33.3
14	Liver	-	-	40	-	-	60	-
15	Thyroid	-	40	-	20	20	20	-
16	Kidney	50	-	-	-	-	50	-
17	Lymphoma	-	-	33.3	-	66.7	-	-
18	Prostate	-	-	-	-	-	100	-
19	Bladder	-	-	-	50	-	50	-
20	Vagina	-	-	-	-	50	50	-
21	Testis	-	100	-	-	-	-	-

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