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COMMON RISK FACTORS OF CUTANEOUS MALIGNANCY – A HOSPITAL BASED STUDY AT A TERTIARY REFERRAL HOSPITAL

Oncology

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ABSTRACT

Background: The incidence of skin cancer has been increasing dramatically during the past two decades. Over the past three decades, more people have had skin cancer than all other cancers combined. Studies demonstrates association of cutaneous malignancy with different common intoxicants like alcohol, tobacco/smoking and betel nuts etc. But to our knowledge no such studies in the North-East region of India has been carried out.

Methods: This study was conducted at Gauhati Medical College & Hospital, Guwahati, Assam. It is a hospital based cross-sectional descriptive study; a total 150 numbers of newly diagnosed cases of cutaneous malignancy were procured from the Out Patient Department of Dermatology & STD of the institute over a period of 3 years.

Results : (1) Frequent exposure to sunlight/UV light were 81 (54%) SCC , 8 (5.33%) BCC, 8 (5.33%) malignant melanoma and 11 (7.33%) other cutaneous malignancy patients. History of occasional exposure to sunlight/UV light were 30 (20%) SCC, 3(2%) BCC , 4 (2.67%) malignant melanoma and 3 (3.33%) other cutaneous malignancy patients. (2) Frequent exposure to chronic ionizing radiation were 18 (12%) SCC patients, 3 (2%) BCC patients, 4 (2.67%) malignant melanoma and 2 (1.33%) other cutaneous malignancy patients. Moreover, 34 (22.67%) SCC patients, 2(1.33%) BCC patients, 3 (2%) malignant melanoma patients and 5 (3.33%) other cutaneous malignancy patients had history of occasional exposure to chronic ionizing radiation. (3) In the present study 32 (21.33%) SCC, 2 (1.33%) BCC , 2 (1.33%) malignant melanoma and 4 (2.67%) other cutaneous malignancy patients had history of smoking . Moreover, 21 (14%) SCC patients, 3 (2%) BCC patients, 1 (0.67%) malignant melanoma patients and 2 (1.33%) other cutaneous malignancy patients had history of smoking occasionally. (4) In the present study associated diseases were osteoarthritis 42(28%) patients, hypertension in 23(15.33%) , chronic prolapsed intraverebral disc in 15(10%), diabetes in 19 (12.67%) , hypothyroidism in 15(10%), chronic obstructive pulmonary disease in 8(5.33%) , eczema in 7(4.67%) patients, gout in 5(3.33%), chronic liver disease in 4(2.67%) , haemorrhoids in 3 (2%) , haemoglobinopathy in 3(2%), tuberculosis in (0.67%) , varicose veins in 1(0.67%) and other minor diseases in 4 (2.67%) patients.

Conclusion: UV radiation, ionizing radiation and tobacco use can attribute to the causation of cutaneous malignancy.

KEYWORDS

Cutaneous, Malignancy, causation

INTRODUCTION

Tumours of the skin are by far one of the most common of all tumours affecting humans in all age groups from neonate to elderly of both sexes. Of the skin tumours, non melanoma skin cancers {principally, squamous cell carcinoma (SCC) and basal cell carcinoma (BCC)}, are the most common malignant neoplasms in the world. Various studies has shown significant and insignificant relationship of cutaneous malignancy with various risk factors like chronic sunlight/UV light exposure, inoizing radiations and associated diseases.

MATERIALS AND METHODS

This thesis is based on study conducted at Gauhati Medical College & Hospital, Guwahati, Assam. This set of population was studied with a view to understand the common risk factors of cutaneous malignancy. Being a descriptive study, the data were procured from the Out Patient Department of Dermatology & STD, Gauhati Medical College & Hospital, and Guwahati, Assam.

Research design

To fulfil the objectives of the study, the hospital based cross-sectional descriptive study was used for collection and study of data.

Study setting

The present study has been undertaken in the Out Patient Department of Dermatology & STD, Gauhati Medical College & Hospital, and Guwahati, Assam.

Study period

The study period was three years commencing from November, 2010 to October, 2013.

Study population

The study population comprise of 150 numbers of newly diagnosed cases of cutaneous malignancy attending the Department of Dermatology & STD of Gauhati Medical College & Hospital, Guwahati, Assam during the period of November, 2010 to October, 2013. Before undergoing the study clearance from institutional ethical committee was obtained. Analysis of data was done in the year 2014.-15

The sample

Sample size of 150 number of newly diagnosed cutaneous malignancy patients were taken into the study during the period of November, 2010 to October, 2013.

Selection of cases

The 150 cutaneous malignancy cases were selected into the study among the patients of all age groups attending the Department of Dermatology & STD of Gauhati Medical College & Hospital, Guwahati, Assam during the period of November, 2010 to October, 2013. Initially, patients were selected purely on clinical ground and then diagnosis was confirmed by biopsy.

1. Inclusion criteria

Newly diagnosed cases of cutaneous malignancy of all age group coming from November, 2010 to October, 2013.

2. Exclusion criteria

Old diagnosed cases of cutaneous malignancy that are under treatment.
Protocol

The proforma was prepared based on universal standard protocols for evaluation of cutaneous malignancy which contains separate history, examination and investigation parts. Then diagnosis was made based on biopsy report of the lesions.

Methods

Details of the patient

Details of the patients were recorded in the manner in order of age, sex, religion, caste, occupation, address, hospital number and registration number for identification and documentation. When patients were first examined a detailed history was taken and thorough clinical examination was done. Then they underwent a battery of investigations to confirm diagnosis. For socioeconomic status of the patients Kupuswamy modified criteria was used. All the patient's history, clinical examination, investigation findings, and diagnosis data were recorded in a pre-designed and pre-tested proforma. As immunohistochemistry facility was not available in the study centre diagnosis was made on the basis of histopathology only. Staging of the cutaneous malignancy was not done. Cancers of oral mucosa, lip, anal canal, conjunctiva and vulva are also included into the study. Cases belonging to cutaneous malignant melanoma are called melanomas skin cancers and others like squamous cell carcinoma (SCC) and basal cell carcinoma (BCC) are called non-melanoma skin cancers.

RESULTS AND OBSERVATIONS

1. Distribution of history of chronic sunlight/UV light exposure N=150

Most of the patients of our study group were outdoor manual workers with definite history of sun exposure for prolonged period.

History of Sunlight /UV light	Cutaneous malignancy							
	SCC		BCC		MM		Others	
exposure	No.s	%	No.s	%	No.s	%	No.s	%
Frequent	81	54	8	5.33	8	5.33	11	7.33
Occasional	30	20	3	2	4	2.67	5	3.33
Total = 150	111		11		12		16	

Table-1: Distribution of history of chronic sunlight/UV light exposure.

Frequent exposure: 2-3 hours daily exposure, Occasional exposure: 1-2 hours exposure in a week.

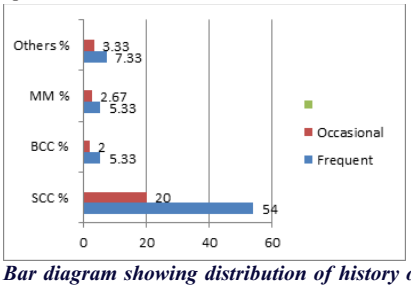

Figure-1: Bar diagram showing distribution of history of chronic sunlight/UV light exposure

The table-1 shows that in the present study, 81 (54%) SCC patients, 8 (5.33%) BCC patients, 8 (5.33%) MM patients and 11 (7.33%) other cutaneous malignancy patients had history of frequent exposure to sunlight/UV light. Moreover, 30 (20%) SCC patients, 3(2%) BCC patients, 4 (2.67%) MM patients and 3 (3.33%) other cutaneous malignancy patients had history of occasional exposure to sunlight/UV light.

From the observed data, it appears that there are significant differences in the prevalence of cutaneous malignancy following UV radiation. So, UV radiation can attribute to the causation of cutaneous malignancy.

2. Distribution of history of chronic ionizing radiation (Diagnostic & Therapeutic) N=150

History of ionizing radiations (Diagnostic & Therapeutic)	Skin cancers							
	SCC		BCC		MM		Others	
	No.s	%	No.s	%	No.s	%	No.s	%
Frequent	18	12	3	2	4	2.67	2	1.33
Occasional	34	22.67	2	1.33	3	2	5	3.33
Total = 150	111		11		12		16	

Table-2: Distribution of history of chronic ionizing radiation (Diagnostic & Therapeutic)

Frequency of exposure: 1-2 shots once in a month, Occasional exposure: 1-2 shots every six months

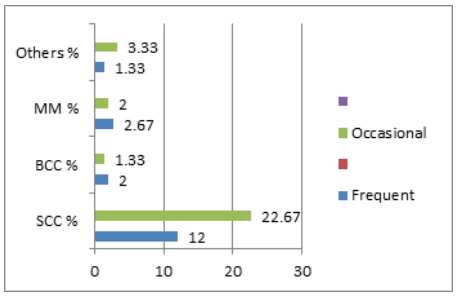

Figure-22: Bar diagram showing distribution of history of chronic ionizing radiation (Diagnostic & Therapeutic)

The table-2 shows that 18 (12%) SCC patients, 3 (2%) BCC patients, 4 (2.67%) MM patients and 2 (1.33%) other cutaneous malignancy patients had history of frequent exposure to chronic ionizing radiation (Diagnostic & Therapeutic). Moreover, 34 (22.67%) SCC patients, 2(1.33%) BCC patients, 3 (2%) MM patients and 5 (3.33%) other cutaneous malignancy patients had history of occasional exposure to chronic ionizing radiation (Diagnostic & Therapeutic).

From the observed data, it appears that there is a significant difference in the prevalence of cutaneous malignancy following ionizing radiation which is more prominent in basal cell carcinoma and malignant melanoma group. So, ionizing radiation can attribute to the causation of cutaneous malignancy, more frequently basal cell carcinoma.

3. Distribution of cutaneous malignancy patients with different smoking habits. N = 150

Smoking	Skin cancers							
	SCC		BCC		MM		Others	
	No.s	%	No.s	%	No.s	%	No.s	%
Frequent	32	21.33	2	1.33	2	1.33	4	2.67
Occasional	21	14	3	2	1	0.67	2	1.33
Total = 150	111		11		12		16	

Table-3: Distribution of cutaneous malignancy patients with different smoking habits

(Frequent: 5-6 numbers of Beedi/cigarette per day, Occasional: 1-2 numbers of Beedi/cigarette in two weeks)

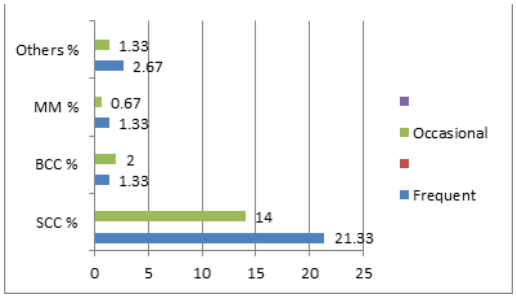

Figure -3: Bar diagram showing distribution of cutaneous malignancy patients with different smoking habits

The table-3 shows that 32 (21.33%) SCC patients, 2 (1.33%) BCC patients, 2 (1.33%) MM patients and 4 (2.67%) other cutaneous malignancy patients had history of having frequent smoking. Moreover, 21 (14%) SCC patients, 3 (2%) BCC patients, 1 (0.67%) MM patients and 2 (1.33%) other cutaneous malignancy patients had history of smoking occasionally.

From the observed data, it appears that there is a significant difference in the prevalence of cutaneous malignancy following smoking which is more prominent in squamous cell carcinoma, mostly over oral mucosa. So, smoking can attribute to the causation of cutaneous malignancy, more frequently squamous cell carcinoma.

4. Distribution of associated diseases of the patients N = 150

Associated diseases	Total	
	No.s	%
Osteoarthritis	42	28
Hypertension	23	15.33
Diabetes	19	12.67
Hypothyroidism	15	10
Chronic prolapsed intraverebral disc	15	10
Chronic obstructive pulmonary disease	8	5.33
Eczema	7	4.67
Gout	5	3.33
Chronic liver disease	4	2.67
Haemorrhoids	3	2
Haemoglobinopathy	3	2
Tuberculosis	1	0.67
Varicose veins	1	0.67
Others	4	2.67
Total	150	100

Table-4: Distribution of associated diseases of the patients

The table-4 shows that osteoarthritis was present in 42(28%) patients, hypertension in 23(15.33%) patients, chronic prolapsed intraverebral disc in 15(10%) patients, diabetes in 19 (12.67%) patients, hypothyroidism in15(10%) patients, chronic obstructive pulmonary disease in 8(5.33%) patients, eczema in 7(4.67%) patients, gout in 5(3.33%) patients, chronic liver disease in 4(2.67%) patients, haemorrhoids in 3 (2%) patients, haemoglobinopathy in 3(2%) patients, tuberculosis in (0.67%) patients, varicose veins in 1(0.67%) and other minor diseases in 4 (2.67%) patients.

From the observed data, it can be concluded that association of cutaneous malignancy with osteoarthritis, hypertension, diabetes, and hypothyroidism is highly significant and with other minor diseases is less significant.

DISCUSSION

1. Distribution of history of chronic sunlight/UV light exposure

In the present study, 81 (54%) SCC patients, 8 (5.33%) BCC patients, 8 (5.33%) MM patients and 11 (7.33%) other cutaneous malignancy patients had history of frequent exposure to sunlight/UV light. Moreover, 30 (20%) SCC patients, 3(2%) BCC patients, 4 (2.67%) MM patients and 3 (3.33%) other cutaneous malignancy patients had history of occasional exposure to sunlight/UV light.

From the observed data, it appears that there are significant differences in the prevalence of cutaneous malignancy following UV radiation. So, UV radiation can attribute to the causation of cutaneous malignancy. In 1982, Landis SH, Murray T[1] reported that evidence is accumulating that childhood and intermittent recreational exposure are also important in accounting for basal cell carcinoma. Squamous cell carcinoma appears to be related more to constant chronic occupational sunlight exposure than to intermittent exposure. Exposure to artificial UVR mainly from sum lamps and sun beds have shown modest increased in relative risks for MM, in the order of 1.1 to 1.2. In 1982, it was reported in *Albright S*D[2] that UVR is the most important and common cause of BCC.In 1984, Elwood et al.[2] reported that the most significant etiological factor for both melanoma & non melanoma skin cancer is chronic exposure to ultraviolet light.

Similarly, in 1986, Roenigk RK, Ratz JL, Balin PL, Wheeland RG. et al.[3] reported that the most significant etiological factor for both melanoma & non melanoma skin cancer is chronic exposure to ultraviolet light. In 1991, Kricker A, Armstrong BK, English DR, Heenan DJ et al.[4] reported that sun exposure is the main cause of skin cancers, and that exposure in childhood is particularly important for BCC. In 1992, Rowe DE, Carroll RJ, Day CL Jr. et al.[5] reported that PUVA is particularly phototoxic and mutation in both P53 and the oncogenes Ha-R are present in a large proportion of PUVA associated SCC.

In 1992, Brodland DG, Zitelli JA, et al.[6] reported that like basal cell carcinoma, sunlight is the most common causative factor in whites. In 1992, Preston DS, Stern RS et al.[7] reported that since exposure to ultraviolet rays of the sun is a causative factor, basal cell carcinoma is most commonly seen in geographic areas where there is significant sun exposure and in people, whose skins are most susceptible to actinic damage from exposure to sunlight, i.e., fair-skinned individuals with blue eyes and blond hair, hence mainly affects Caucasians.

In 1994, Armstrong & Kricker [8] reported that solar UVR is thought to account for about 93 percent of cutaneous malignant melanoma. In 1994, Miller DL et al.[9] reported that a skin tumours are seen more frequently at sites of frequent sun exposure. In 1994, Ziegler A, Jonason AS et al.[10] reported that the component of sunlight believed to be most important in cutaneous 'carcinogenesis is UVB (290-320 nm), which is both initiator and promoter of carcinogenesis. In 1994, Lawrence N, Cottel VVI, et al.[11] informed that melanoma is most common in persons with predominantly indoor occupations whose exposure to the sun is limited to weekends and vacations. In 1994, Lawrence N, Cottel VVI, et al.[11] reported that chronic sun exposure in people who tan well does not appear to be associated with increased risk and may even be protective. While basal-cell and squamous-cell carcinomas occur most commonly in maximally solar-exposed areas of the body (e.g., face, back of hands, forearms, and in persons with almost daily and substantial lifetime exposure to UV radiation, such as farmers and sailors) in contrast, melanoma occurs most commonly in areas of the body exposed to the sun intermittently, such as the back in men and the lower legs in women, with relative sparing of more frequently exposed sites such as the face, hands, and forearms.

In 1995, Gallagher et al.[12] reported that constant exposure to UV light increases SCC & BCC development. Moreover, Sun exposure is the main cause of skin cancers, and that exposure in childhood is particularly important for BCC. In 1996**,** Gailani MR, Leffell DJ, Zieg et al.[13] reported that for BCC, the most significant etiological factors appear to be exposure to ultraviolet radiation and genetic predisposition. In 1996, Green A, Battistutta D,[14] reported that the increasing incidence of BCC in young individuals has been emphasized; however, the mean age is still high, probably because of the cumulative action of ultraviolet light throughout life and of reduction of the ozone layer. In 1999, Munyao TM, Othieno-Abinya NA. et al.[15] reported that sun exposure increases the risk of both melanoma & non- melanoma skin cancer.

In 2000, De Pinho LTA[16] reported that chronic sun exposure appears to be important in the development of BCC. A latency period of 20 years is typical between the time of UV damage and the clinical onset of BCC. In 2001, **Ramachandran S, Fryer AA, Smith AG, Lear JT, Bowers B Jones PW et al.[17] reported that** UV light treatment used for psoriasis (and other recalcitrant dermatoses) also predispose to the development of SCC. In 2003**,** Gaspari A.A. Sauder D.N. et al.[18] reported that UV light exposure has strong relationship with BCCs.

In 2005, Hussein MR, et al.[19] reported that there is a linear correlation between intensity of exposure to sunlight and melanoma in white skinned people. White skinned people who live close to the equator have increased tendency of developing malignant melanoma. This is particularly evident in Australia, where the highest per capita incidence of melanoma is found. In general, melanoma is far more common in whites than in black populations. Buijan M, Bulat V, Situm M, Mihic LL et al.(2008)[20] reported that in most cases, BCC develops on chronically sun-exposed skin in elderly people, most commonly in the head and neck region. In 2009, S. C. Harrison and W. F. Bergfeld et al.[21] reported that athletes develop the more common, generally treatable skin cancers and potentially life threatening malignant melanoma. In 2011, Cogliano VJ, Baan R et al.[24] reported that there is sufficient evidence to show that overexposure to ultraviolet (UV) radiation is the main preventable cause of skin cancers-both malignant melanoma and non- melanoma skin cancers (NMSC). In 2014, Wu S, Han J, Laden F et al.[25] reported that sustaining 5 or more sunburns in youth increases lifetime melanoma risk by 80 percent. Thus, our study findings are comparable with these international studies.

2. Distribution of history of chronic ionizing radiation (Diagnostic & Therapeutic)

In the present study, 18 (12%) SCC patients, 3 (2%) BCC patients, 4 (2.67%) MM patients and 2 (1.33%) other cutaneous malignancy patients had history of frequent exposure to chronic ionizing radiation (Diagnostic & Therapeutic). Moreover, 34 (22.67%) SCC patients, 2(1.33%) BCC patients, 3 (2%) MM patients and 5 (3.33%) other cutaneous malignancy patients had history of occasional exposure to chronic ionizing radiation (Diagnostic & Therapeutic).

From the observed data, it appears that there is a significant difference in the prevalence of cutaneous malignancy following ionizing radiation which is more prominent in basal cell carcinoma and malignant melanoma group. So, ionizing radiation can attribute to the causation of cutaneous malignancy more frequently basal cell carcinoma. In 1992, Brodland DG, Zitelli JA, et al.[26] reported that in SCC the aetiology can be UV light, chemical and thermal burns, scars, chronic ulcers, chronic granulomas (tuberculosis of the skin, syphilis), draining sinuses, contact with tars and hydrocarbons, and exposure to ionizing radiation. In 1995, Fleming ID, Amonette R, Monaghan T, Fleming MD et al. [27] reported that therapeutic ionizing radiation can induce SCC both experimentally and clinically. Most patients with radiation-induced tumours have a remote history of ray therapy for acne vulgaris although patients who develop SCC in radiation ports for Hodgkin disease or thyroid cancer are not uncommon.

In 2000, De Pinho RA[16] reported that X-ray exposure is also associated with BCC formation. Thus, although findings of the present study are statistically insignificant, these are comparable with these international studies.

3. Distribution of cutaneous malignancy patients with different smoking habits.

In the present study, it has observed that 32 (21.33%) SCC patients, 2 (1.33%) BCC patients, 2 (1.33%) MM patients and 4 (2.67%) other cutaneous malignancy patients had history of having frequent smoking. Moreover, 21 (14%) SCC patients, 3 (2%) BCC patients, 1 (0.67%) MM patients and 2 (1.33%) other cutaneous malignancy patients had history of smoking occasionally.

From the observed data, it appears that there is a significant difference in the prevalence of cutaneous malignancy following smoking which is more prominent in squamous cell carcinoma, mostly over oral mucosa. So, smoking can attribute to the causation of cutaneous malignancy more frequently squamous cell carcinoma.

In 2004, Preiman A, Bird G, Metelitsa AI, et al.[28] reported that smokers are at 3.3 times increased risk for developing squamous cell carcinoma (SCC) of the skin compared to non-smokers. Risk of cutaneous SCC increases with the number of packs smoked daily and the duration of the smoking habit. [29]

Thus, although findings of the present study are statistically insignificant, it is comparable with this international study.

CONCLUSIONS

(1) UV radiation can attribute to the causation of cutaneous malignancy.
(2) Different types of tobacco are equally responsible for the prevalence of cutaneous malignancy.
(3) Ionizing radiation can attribute to the causation of cutaneous malignancy more frequently basal cell carcinoma.

RECOMMENDATIONS

1) The clinical manifestations of cutaneous malignancy range from total absence of any symptoms in subjects with premalignant conditions to formation of swelling, ulcer, bleeding, pigmentation, certain skin changes, pain and itching etc. Differentiating cutaneous malignancy from other causes with similar features and from other cutaneous conditions is important for prognosis and treatment. Evaluation of patients suspected of cutaneous malignancy in a timely fashion is also critical, as a delay in diagnosis can have a negative impact on the disease course.

Health education of the society should form an important aspect of the health care so that they could learn certain do's and don'ts related to different diseases like cutaneous malignancy specially in persons having past and family history of cutaneous malignancy and other diseases and inculcate these in their behavioral patterns through constant practice so as to prevent the occurrence of diseases or reduce the effects of illness. The common symptoms of cutaneous malignancy which are similar to common diseases should be included in the health education programme so that it can be detected early in those high risk patients with history of chronic exposure of UV radiations, history of taking intoxicants and history of chronic exposure of ionizing radiations. Environmental, occupational and life style factors which are risk for development of cutaneous malignancy should be included into the health education programmes so that the disease can be prevented.

2) Moreover, some screening tests should be held periodically by the health agencies to detect the disease early, especially in persons taking intoxicants for long duration who are high risk for development of cutaneous malignancy. Health agencies should be encouraged to organize periodic camps, health mela for screening of the disease.

3) Preventive maintenance is wiser and less expensive than crisis management. So, promoting awareness about the concept of environmental, occupational and life style risk factors for development of cutaneous malignancy and its common symptoms and to involve community in the process of their mitigation, there is need to conduct awareness campaign programmes in the community level.

4) The study was a descriptive study. So, any conclusions drawn will have to be guarded and will have to confirm with further trials in India.

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