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ASSOCIATION AND CORRELATION OF DERMATOGLYPHICS AND CHEILOSCOPY IN HEAD AND NECK CANCER- UNSNARLING CONUNDRUM.

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ABSTRACT

Introduction: oral cancer is a devastating disease. Many cancers occur due to abnormalities in the DNA sequences. The influence of genetic or environmental factors on early development of cancer is often reflected by the altered fingerprint and lip print. Hence this study was conducted to determine if any specific finger and lip print pattern can be considered as genetic marker in the development of cancer.

Methodology: 100 subjects with the history tobacco consumption, residing in urban and rural areas were divided into 2 groups, group a- oral cancer (n=50) and group b- controls (n=50) respectively. Lip and finger prints were recorded and analyzed by two examiners.

Results: the subjects who resided in the rural were found to be having cancer (31 out of 57), when compared to those residing in urban areas (19 out of 43). It was also noteworthy that the rural residents with cancer had more prevalence of straight and branched lip patterns (17.5% each), when compared to the urban residents (p=0.026). Similarly, whorl (21.1) and arch (28.1) pattern constituted to the majority of finger prints in rural cancer prone population.

Conclusion: Presence of few specific lips and finger print patterns could be associated to the individual with cancer having a history of tobacco consumption and this could act as genetic marker.

KEYWORDS : Dermstoglyphics, Cheiloscopy, Cancer

Introduction:

Cancer is one of the menaces of our generation. It is the class of diseases characterized by out-of-control growth of cells. Most cancers occur due to abnormalities in DNA sequence[1]. Squamous cell carcinoma (SCC) is a widespread disease associated with a considerable amount of morbidity and mortality. It is a major worldwide health problem and the number of sufferings is increasing rapidly due to more and more people embracing deleterious habits such as tobacco chewing, smoking, and alcohol abuse. Although tobacco is the main etiological factor but it has been correlated with nutrition, p53, homeo-box genes, androgen receptor genes, etc. Although the etiology is multifactorial, but regardless of the accelerating factors, neoplasm is thought to arise clonally from transformed cells that have undergone specific genetic and epigenetic alterations in oncogenes or tumor suppressor genes[2].SCC is one name that causes panic and holds an undeserved high ranking as a killer. There is an important global need to explore new techniques for early prediction of oral cancer. Most of the screening methods available are invasive, expensive, and not available easily.

Dermatoglyphic and cheiloscopic analysis have been useful in understanding basic questions in biology, medicine, genetics, evolution, and forensics. They are now beginning to prove themselves as an extremely useful tool for preliminary investigations into conditions with a suspected genetic basis[3]. Dermatolyphics has proved to be a very important tool used for identification of many gene-linked abnormalities or diseases. Same can be said of lip prints which as dermatoglyphics are unique to individuals and has been shown to be useful genetic markers in some congenital and clinical diseases[4]. The science of dermatoglyphics involves the study of epidermal ridges present on the surface of the palms, finger, soles and toes whereas lip prints are normal lines and fissures in the form of wrinkles and grooves present in the zone of transition of human lip, between the inner labial mucosa and the outer skin, examination of which is known as cheiloscopy[5]-[6]. The aim of the study was to determine if any specific finger and lip print pattern can be considered as a genetic marker in expectance of cancer.

Methods and materials

The study comprised of 100 subjects in the age group of 30-60 years with tobacco history of minimum 5 years belonging to urban and rural background, divided into group a- 50 individuals having oral cancer and group b- 50 normal individuals. Subjects having no history of tobacco, subject with lip and finger deformity, subjects with lip cancer were not included in the study.

Informed consent was obtained from all the individuals participating in the study. Cheiloscopic records were obtained from the lip prints taken with dark coloured lipstick and with the help of cellophane tape. Dermatoglyphics records were obtained from the finger prints taken on inkpad and pressing the finger on a blank paper. Both the prints were analysed by two different examiners.

These examiners were trained and calibrated in the department of oral medicine and radiology. There existed a substantial inter-rater agreement between the examiners (kappa=0.76)

Classification used for analyzing lip prints was given by suzuki and tsuchihashi (1970)[7] which includes:
Type i- clear-cut grooves running vertically across the lip (complete vertical)
Type ii- the grooves are branched
Type iii- the grooves are reticular
Type iv- grooves are intersected
Type v- grooves cannot be differentiated morphologically.

Classification used for analyzing finger prints was given by Henry which includes:
Type i- loop pattern
Type ii- whorl pattern
Type iii- arches pattern.

These data were entered in the Microsoft excel sheet and subjected to SPSS (IBM version 20). Descriptive statistics and chi-square tests were applied to assess the statistical association between lip and fingerprint patterns among the study subjects.

Results:

The data revealed that among those with cancer more than 50% subjects presented with straight (28%) and branched (26%) lip

patterns. Whorl (40%) and loop (46%) finger print patterns contributed to about 86%. Whereas in the control group, branched lip patterns constituted the majority (44%). (table 1 and 2) and the similar patterns of finger prints prevailed. However when the analyses included the locality of their residence (urban or rural), it was found that 31 subjects out of 57 rural individuals (54.4%) were found to have cancer when compared to the urban population 19 out of 43 (44.2%). Even though there was no statistically significant association with the finger print patterns, few specific lip print patterns i.e., straight and branched (20 subjects out of 31) were commonly noted among the cancer-prone individuals of rural areas, when compared to urban individuals which constituted of intersected and reticular patterns (10 out of 19 subjects). The associations were found to be statistically significant. (table 3 and 4) despite the significant association, the correlation between the dermatoglyphic and chelioscopic components were found to be very weak and insignificant (table4).

Table 1: distribution of cancer group subjects according to their lip and finger prints.

Sl no	Lip print pattern	Number of subjects (percentage)	Finger print pattern	Number of subjects (percentage)
1	Straight	14 (28)	Whorl	20 (40)
2	Branched	13 (26)	Loop	23 (46)
3	Intersected	8 (16)	Arch	7 (14)
4	Reticular	8 (16)		
5	Un-differentiated	7 (14)		
Total		50 (100)		50 (100)

Table 2: distribution of control group subjects according to their lip and finger prints

Sl no	Lip print pattern	Number of subjects (percentage)	Finger print pattern	Number of subjects (percentage)
1	Straight	8 (16)	Whorl	20 (40)
2	Branched	22 (44)	Loop	22 (44)
3	Intersected	7 (14)	Arch	8 (16)
4	Reticular	11 (22)		
5	Un-differentiated	2 (4)		
Total		50 (100)		50 (100)

Table 3a: comparison of finger print patterns among cancer and control group subjects according to their locality of residence.

Locality	Group	Finger print pattern			Total n (%)	Chi – square & P value
		Whorl n (%)	Loop n (%)	Arch n (%)		
Urban	Control	9 (20.9)	12 (27.9)	3 (7.0)	24 (55.8)	$X^2 = 0.949$ p = 0.62 (ns)
	Cancer	8(18.6)	7(16.3)	4 (9.3)	19 (44.2)	
	Total	17 (39.5)	19 (44.2)	7 (16.3)	43 (100)	
Rural	Control	11 (19.3)	10 (17.5)	5 (8.8)	26 (45.6)	$X^2 = 1.50$ p = 0.47 (ns)
	Cancer	12 (21.1)	16 (28.1)	3 (5.3)	31 (54.4)	
	Total	23 (40.4)	26 (45.6)	8 (14.0)	57 (100)	

Table 3b: comparison of lip print patterns among cancer and control group subjects according to their locality of residence.

Locality	Group	Lip print pattern					Total	Chi-square & P value
		Straight	Branched	Inter-sected	Reticular	Un-differentiated		
Urban	Control	5 (11.6)	13 (30.2)	0 (0)	4 (9.3)	2 (4.7)	24 (55.8)	X2 = 11.04 p = 0.026*
	Cancer	4 (9.3)	3 (7.0)	5 (11.6)	5 (11.6)	2 (4.7)	19 (44.2)	
	Total	9 (20.9)	16 (37.2)	5 (11.6)	9 (20.9)	4 (9.3)	43 (100)	
Rural	Control	3 (5.3)	9 (15.8)	7 (12.3)	7 (12.3)	0 (0)	26 (45.6)	X2 = 11.67 p = 0.020*
	Cancer	10 (17.5)	10 (17.5)	3 (5.3)	3 (5.3)	5 (8.8)	31 (54.4)	
	Total	13 (22.8)	19 (33.3)	10 (17.5)	10 (17.5)	5 (8.8)	57 (100)	

Table 4: relationship between lip print and finger print patterns among the subjects in control and cancer group using spearman's correlation coeffiecient.

Relationship parameter	Group	Finger print r (p)	Lip print r (p)
Finger print	Control	1.00 (na)	0.142 (0.32)
	Cancer	1.00 (na)	0.045 (0.75)
Lip print	Control	0.142 (0.32)	1.00 (na)
	Cancer	0.045 (0.75)	1.00 (na)

Discussion

Although the etiology of cancer is multifactorial, but regardless of the accelerating factors, the neoplasm is thought to arise clonally from transformed cells that have undergone specific genetic and epigenetic alterations in oncogenes or tumor-suppressor genes. Many gene alterations have been implicated in the development and progression of SCC and the stages of carcinogenesis have been clearly defined[8].

In the present study, there were total of 60 males and 40 females in the mean age of 46 years. Some documented studies have been done on dermatoglyphics and cancer while very little exist on cheiloscopy and cancer.

Elluru venkatesh, et,al did a study on palmar dermatoglyphics in oral leukoplakia and oral squamous cell carcinoma patients and concluded that arches and loops were more frequent in cases than in controls whereas whorls were more frequent in control group ($p< 0.01$) [9], whereas in our study loop finger print pattern was more prevalent in both the groups.A study conducted by Ambika Gupta and Freny R Karjodkar[8] in 2013 on role of dermatoglyphics as an indicator of precancerous and cancerous lesions of the oral cavity concluded that in oral squamous cell carcinoma, there was an increase in frequency of arch and ulnar loop patterns on fingertips which is consistent with highest frequency of loop pattern in cancer group in our study. Paranjape V, et,al did a study on digital dermatoglyphics in carcinoma breast which also resulted in loop pattern being most common.[10]A study done by Uduak umana et al showed predominance of branched lip print and loop finger pattern in cancer subjects[11], whereas our study showed predominance of straight lip print pattern. Krishnan S et al, did a study on dermatoglyphics in carcinoma breast and found out loop pattern being most common in women with breast cancer[12].In a study done by Tamgire Dw, et al, composite whorl pattern was in the highest frequency in left-hand little finger in patients with oral submucous fibrosis which is a precancerous condition[13],whereas in the present study loop pattern was prevalent in the cancer group.In 2014 a study was conducted by Mariapriscilla David, et al on dermatoglyphic patterns in subjects with potentially malignant disorders and oral carcinomas and concluded mean number of loops were found to be higher in case of subjects with potentially malignant disorders and oral carcinomas when compared to controls[14], which is consistent with the present study. Jatti D, et al did a study on role of dermatoglyphics in malignant and potentially malignant disorders of the oral cavity and concluded arch finger print pattern being most prevalent in study group[15],this may be due to demographic changes.Whorl type of fingerprint pattern was predominant in significantly higher number of individuals of SCC and Oral submucous fibrosis group than in control groups in a study conducted by Ganvirsm, et al[16] where as the present study shows loop pattern being prominent in cancer group.The study done by Kaur i, et al was planned to analyze lip prints pattern in patients with oral pre-malignant lesions. They observed that non-significant association of lip prints with oral premalignant lesions is present[17] , the present study shows significant results in control and study groups.

Conclusion

Early detection of oral cancer improves the cure rate, lowers the cost and morbidity associated with the treatment. The present study was the first of its kind where an attempt was made to predict the risk of oral cancer with the help of dermatoglyphics and cheiloscopy. This study is unique as it compares and determines association of the finger print and lip print pattern in rural and urban population.

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