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White blood cells count as a pathological diagnostic marker for Oral pre-cancerous lesions and conditions: A Randomized Blind trial

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Abstract

Background

Oral cancer is one of the most prevalent cancer in human population. Oral cancer accounts for approximately 3% of all malignancies and results in significant worldwide health problems. Many Oral Squamous cell carcinoma's develop from Oral pre-cancer such as Leukoplakia, Oral sub mucus fibrosis, and Lichen Planus. The early detection of cancer is of critical importance because of survival rates markedly improve, when the oral lesion is identified at an early stage. The present study was conducted to find out if WBC count can be used as a screening marker for diagnosis of Oral pre Cancer & compare their levels in precancerous lesions and healthy individuals.

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Methodology

A prospective study was conducted which comprised of 60 samples out of which 30 were pre-cancerous lesions and 30 were healthy controls. In both the study and control group WBC count was measured & compared by the standard "t" test.

Results

TLC & DLC showed no significant differences observed between control and study group. except in group C (Lichen planus) vs Control in TLC & Eosinophil count (p- value <0.01) .Total study group vs healthy individuals in the lymphocyte count found to be statistically highly significant differences exists (p- value <0.001).

Conclusion: Our study suggested that WBC count is not a reliable method as a marker for oral pre-cancerous lesions but further detailed evaluation with larger samples required to establish the significance of these markers.

1. Introduction:

Oral cancer is one of the most prevalent cancers in the human population and it accounts approximately 3% of all carcinomas and results in significant health problems worldwide. Five Percent of Oral Squamous cell carcinoma develops from Oral pre-cancers such as Leukoplakia, Oral sub mucus fibrosis, and Lichen planus etc.

Cancer is initiated in cells when there is unwanted growth of new cells without older cells die out. Deleterious habits such as tobacco smoking, hookah smoking, chewing tobacco and alcohol have been attributed significantly to the development of oral cancer.

An early detection can make all the difference in our battle against cancer. Cancer if detected at initial stages can be completely cured with modern therapy and person can live a longer healthy & happy life. Latest discoveries in medical sciences have led to the detection of cancer even before the person is aware of the symptoms.

Several bio-markers have been discovered such as urine [1] and saliva [2] for early diagnosis of oral cancer and pre cancer.

For several cancers an association with WBC count has been reported [3] but so far no studies have been documented for pre-cancer with WBC count. Therefore the aim of current research was to determine the changes in the level of WBC counts in pre - cancerous lesions and conditions and to compare the WBC counts between control & study group of pre- cancerous lesions and conditions.

2. Material & Methods:

Chosen for evaluation were total sixty subjects {30 healthy controls, 30 study group comprising of Osmf (no. of patients=7), leukoplakia (no. of patients=7), Lichen Planus (no. of patients=7).

3. Results:

Highly significant correlation (p value < 0.01) was found in Eosinophil count & T.L.C. between group C (Lichen planus) and group D (Healthy individuals) {Table – 2}
Highly significant correlation was also found between total study group (A+B+C) and group D (Healthy individuals) in Lymphocyte count (p value <0.01).
{Table-2}

TABLE 1: Mean values & standard deviation of TLC & DLC in all groups

GROUPS	TLC cells/ cmm	DLC %			
		N	L	E	M
GROUP A (Leukoplakia)	8041.18 ± 1217.55	66.53 ± 5.29	28.47 ± 5.49	3.65 ±1.57	1.53 ± 0.78
GROUP B (OSMF)	7644.44 ± 887.08	65.67 ± 4.64	29.00 ± 4.81	3.22 ± 1.31	2.11 ± 0.74
GROUP C (Lichen Planus)	9750.00 ± 1883.48	63.75 ± 13.83	23.50 ± 4.77	10.25 ± 10.54	2.50 ± 2.69
GROUP D (Healthy)	7793.33 ± 1146.86	66.33 ± 5.24	28.50 ± 5.06	3.07 ± 0.89	1.80 ± 0.87
TOTAL	8150.00 +1404.93	65.90 ± 6.98	22.97 ± 5.97	4.40 ± 4.69	1.83 ± 1.27

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TABLE 2. COMPARISON OF TLC & DLC IN CONTROL vs STUDY GROUP

GROUPS	TLC (cell/cumm)	DLC %			
	T – test	N	L	E	M
		T-Test	T-Test	T-Test	T-Test
A vs D	0.696	0.062	0.019	1.622	1.060
P Value	>0.05	>0.05	>0.05	>0.05	>0.05
B Vs D	0.358	1.522	0.263	0.396	0.967
P Value	>0.05	>0.05	>0.05	>0.05	>0.05
C Vs D	2.977	0.827	1.866	0.043	1.126
P Value	<0.01 (H.S.)	>0.05	>0.05	<0.01 (H.S.)	>0.05
A+B+C Vs D	1.077	0.458	4.057	1.526	0.107
P Value	>0.05	>0.05	<0.01 (H.S)	>0.05 (S)	>0.05

P > 0.05 Not significant , P< 0.05 Significant , P < 0.01 Highly significant

4. Discussion

This is the first ever study in this geographic region assessing the blood parameters in precancerous lesions and conditions. The purpose of this study was an attempt for a simple and cost effective method for diagnosis of oral pre cancer lesions and conditions. White blood cell count is highly variable because it is responsive to diverse acute and chronic stimuli. It is increased in infection, stress and smoking [4]. In 1863 Rudolf Virchow postulated induction hypothesis that cancer originates at site of inflammation because he observed the presence of leukocytes in neo-plastic tissue [5]. Increasing evidence suggest that inflammation may be linked to the pathogenesis of cancer. The stromal tissue of tumors have high WBC count and

inflammatory cells and their cytokine production seems to co-relate with tumor severity [6].

Due to its non-specificity WBC count can predict the risk of multiple diseases including cancer. Grim *et al* (1985) reported that WBC count was associated with risk of cancer death. Erlinger *et al* (2004) postulated WBC count with cancer mortality. [7] Shankar *et al* (2006) also found an association between high WBC count and cancer mortality[8]. The evidence seems to be increasing that, cellular proliferation in an environment rich in, inflammatory cells, growth factors and activated stroma is associated with DNA damage that can potentiate the growth of cancer cells [9].

In our study highly significant co-relation (p value < 0.01) of Eosinophilic count & T.L.C. between group C (Lichen planus) and group D (Healthy individuals) was seen {Table – 2}. This could be due to unequal sample size in all study groups .Highly significant co-relation (p value < 0.01) of Lymphocyte count was also found between total study group (A+B+C) and Healthy individuals (group D) was seen. This could be attributed that, major role of Lymphocytes in the pathogenesis of pre-cancer & cancer. Since in our study only lymphocytes count showed drastic changes.

5. Conclusion:

We concluded that chronic inflammation is an underlying pathology might have causative factor in the progression of precancerous lesions into cancer. Future recommending that, evaluating the study with larger samples including grades of dysplasia to establish the significance of WBC count as a diagnostic marker.

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