How to Cite:
Shukla, D., Shukla, C., Singh, D., Sharma, A., Patel, N., & Mehta, D. N. (2022). Role of platelet count in diagnosis of oral potentially malignant disorders and oral squamous cell carcinoma. *International Journal of Health Sciences*, *6*(S1), 4280–4286. https://doi.org/10.53730/ijhs.v6nS1.5765

Role of platelet count in diagnosis of oral potentially malignant disorders and oral squamous cell carcinoma

Dr. Devashree Shukla
M.D.S. Oral Medicine Radiology, Assistant Professor, Department of Dentistry, LN Medical College and JK Hospital, Bhopal, Madhya Pradesh, India.

Dr. Chandresh Shukla
M.D.S. Orthodontics and Dentofacial Orthopaedics,Reader, Department of Orthodontics and Dentofacial Orthopaedics , Peoples College of Dentistry and Research Centre, Bhopal, Madhya Pradesh, India

Dr. Dilraj Singh
Senior Lecturer, Department of Oral Medicine Radiology, Ideas Dental College, Gwalior, Madhya Pradesh, India

Dr. Ayushi Sharma
Post Graduate Student, Department of Public Health Dentistry, College- people's college of dental science and research center, Bhopal, India

Dr. Nidhi Patel
Post Graduate Student, Department of Oral Medicine Radiology, Maharana Pratap college of Dentistry and Research Centre, Gwalior, India

Dr. Dhaval Niranjan Mehta
Professor and Head, Department of Oral Medicine and Radiology, Narsinhbhai Patel Dental College and Hospital, Sankalchand Patel University, Visnagar, Gujarat, India.

***Abstract*---**Introduction: Platelets play an important role in the metabolic functions of malignant tissues. Platelet count is the major marker for malignancy and their increase in number can depict stages, severity and metastasis of cancer. Increase in number of platelet count can be used in early diagnosis of cancer. However, use of some chemotherapeutic agents is associated with low platelet count. Therefore, the platelet to cancer cell ratio varies through the course of the disease and is highly affected by treatment. Aim: To assess correlation between platelet count and progression of malignancy. Materials and method: Platelet counts were retrieved from

International Journal of Health Sciences ISSN 2550-6978 E-ISSN 2550-696X © 2022.
***Corresponding author**: Dr. Devashree Shukla; Email: devashreeshukla17@gmail.com*
Manuscript submitted: 27 Feb 2022, Manuscript revised: 18 March 2022, Accepted for publication: 09 April 2022

patients diagnosed oral potentially malignat disorders and oral squamous cell carcinoma based on clinical data. The collected data is analyzed to correlate the platelet count in oral potentially malignat disorders and oral squamous cell carcinoma compared to healthy control patients. Result: Nonsignificant differnce was noted in platelet count in oral potentially malignat disorders and oral squamous cell carcinoma compared to healthy control patients. Conclusion: Thrombocystosis is a poor predicator for malignancy, platelet count alone cannot determine the severity of malignancy, correlation with histopathologic data can better establish the grading of malignancy.

***Keywords*---**Leukoplakia, Oral Submucous fibrosis, Oral squamous cell carcinoma, platelet count.

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 platelet 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 platelet counts in pre -cancerous lesions and conditions and to compare the platelet counts between control & study group of pre- cancerous lesions and conditions and oscc patients.

Material and Methods

OSMF patients, Oral Leukoplakia patients, Oral Lichen Planus Patients,patients with Primary squamous cell carcinoma from head and neck were inckuded in the study. Patients with platelet disorders, patients with metastatic OSCC from other sites and uncooperative patients were excluded from the study.

Patients were divided into 5 groups with 15 subjects in each and sample size of 75.The study group was under third to seventh decade of life. The groups were classified as subjects clinically and histologically diagnosed with oral submucous fibosis, leukoplakia, oral squamous cell carcinoma, oral lichen planus and healthy patients-control group. Clinical details like age, sex along with pre-operative platelet counts of such cases were obtained. The platelet counts of these

cases were obtained by staining the peripheral blood smears with Leishman staining. Platelet counts were recorded of all these subjects and comparetive evaluation was done to determine the increase in platelets of the disease having high risk of malignancy. The platelet counts were divided into low(less than 1.5 lakh/cumm),normal(1.5 lakh/cumm – 3.15 lakh/cmm) high normal (3.15- 3.99 lakh/cumm) & high (more than 4 lakh/cumm).[4]

Results

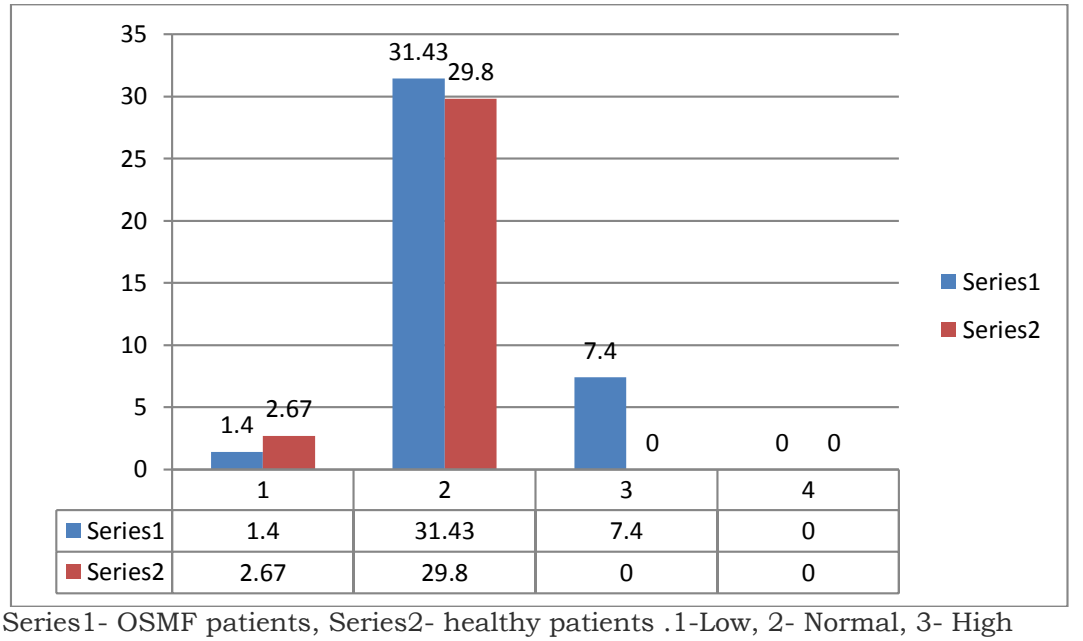
Table 1
Demographics of the study

Group	Male	Female
OSMF	11	4
Leukoplakia	12	3
Lichen Planus	6	9
Oral Squamous Cell carcinoma	10	5
Healthy Control	9	6

Table 2
Distribution of platelet count among cases in frequency (in %)

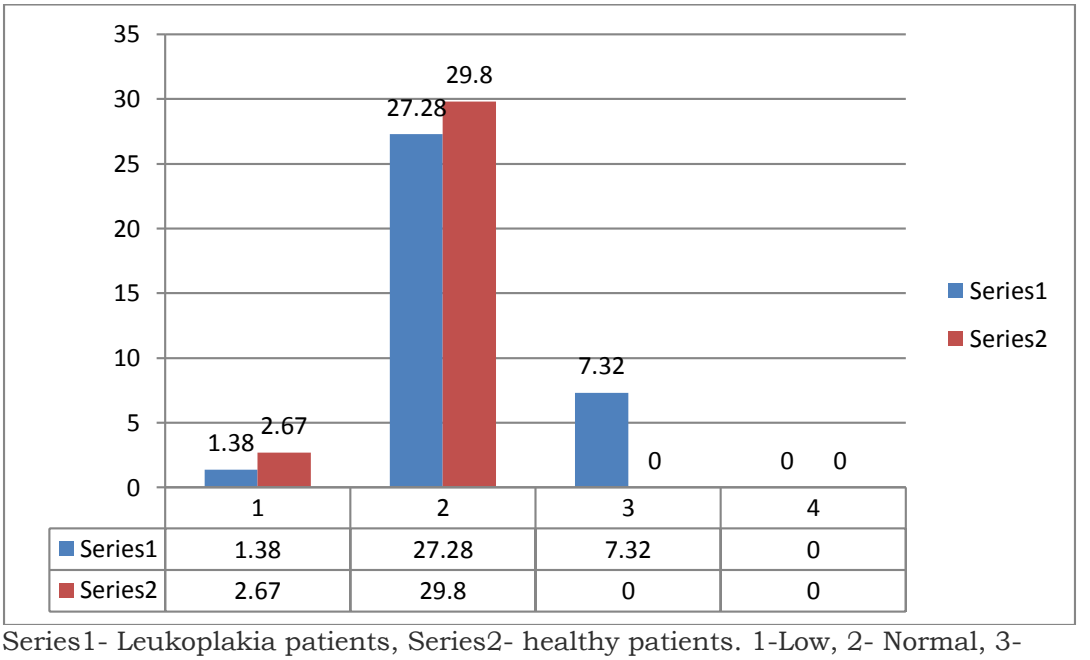
Group	Low	Normal	High normal	High
OSMF	1.4	31.43	7.4	0
Lichen Planus	1.32	30.86	0	0
OSCC	4.17	27.23	7.12	0
Leukoplakia	1.38	27.28	7.32	0
Healthy Control	2.67	29.08	0	0

Maximum number of patients of all groups showed normal platelet count followed by high normal platelet count. None of patients of this study showed high platelet counts. (Table 2) In OSMF and oral lichen planus patients, more number of patients showed normal platelet counts compared to healhy control patients. (Chart 1 & 4) In OSSC and leukoplakia, less number of patients showed normal platelet count compared to healthy controls. (Chart 2 &3) High normal platelet counts were more in patients with OSMF, Leukoplakia and OSCC compared to halthy controls. (Table 2)



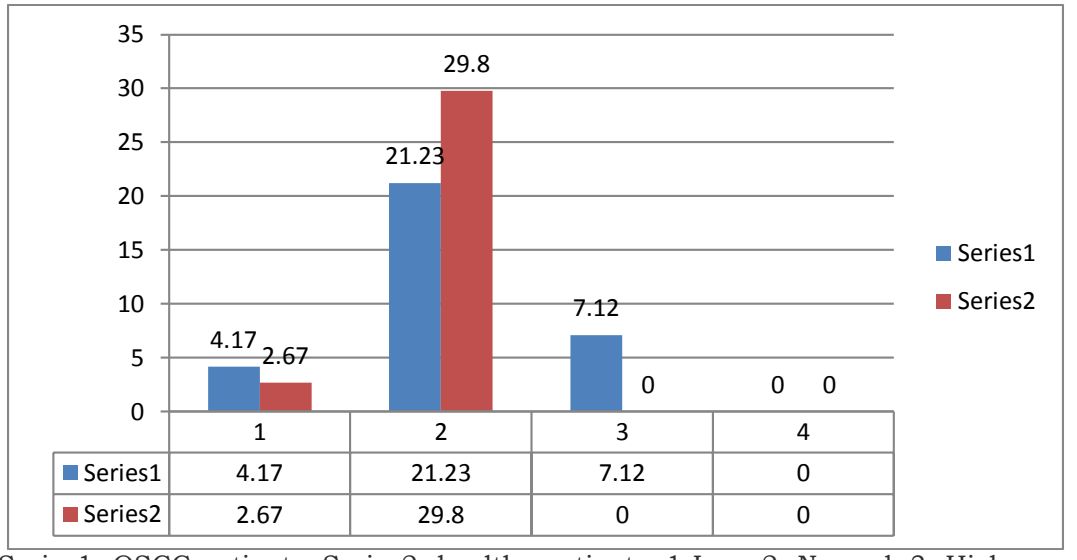
Series1- OSMF patients, Series2- healthy patients .1-Low, 2- Normal, 3- High Normal, 4- High

Chart 1: Comparision of mean platelet count in subjects with osmf and without lesion



Series1- Leukoplakia patients, Series2- healthy patients. 1-Low, 2- Normal, 3- High Normal, 4- High

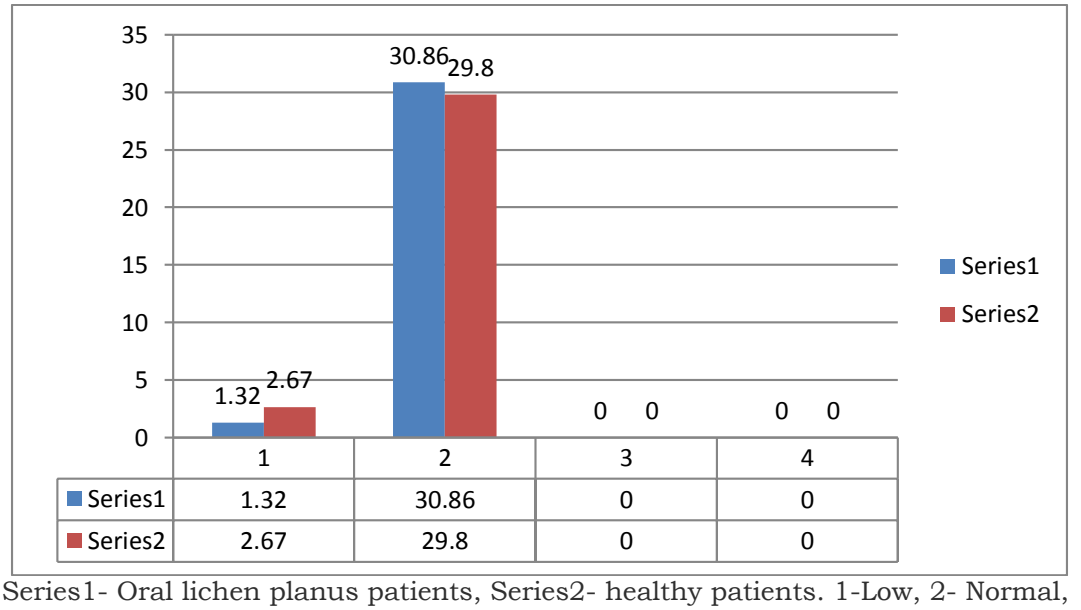
Chart 2: Comparision of mean platelet count in subjects with leukoplakia and without lesion



	1	2	3	4
Series1	4.17	21.23	7.12	0
Series2	2.67	29.8	0	0

Series1- OSCC patients, Series2- healthy patients. 1-Low, 2- Normal, 3- High Normal, 4- High

Chart 3: Comparision of platelet count between subjects with oral squamous cell carcinoma and individuals without any oral oral lesions



	1	2	3	4
Series1	1.32	30.86	0	0
Series2	2.67	29.8	0	0

Series1- Oral lichen planus patients, Series2- healthy patients. 1-Low, 2- Normal, 3- High Normal, 4- High

Chart 4: Comparision of platelet count between subjects with lichen plannus and individuals without any oral and oral lesions

Discussion

Head and neck squamous cell carcinoma is associated with significant morbidity and mortality rate. It is one of the most common malignancies across the world and is mainly linked to tobacco smoking, Human Papilloma Virus and alcohol consumption.[5] Apart from these factors recent studies have shown certain haematological parameters which include neutrophils, lymphocytes, monocytes and platelets which can predict the prognosis of the malignancies. Numerous studies have shown pre-treatment thrombocytosis to correlate with shorter survival and hence proved to be a poor prognostic indicator in a number of malignancies. [6-9] Surgery is the preferred treatment for these malignancies. However, even after great progress in chemotherapy, radiotherapy and targeted therapy, prognosis of head and neck squamous cell carcinoma is poor owing to aggressive local invasion and metastasis leading to recurrence.

The relation between circulating platelets & carcinoma progression suggest that platelets have a more important role beyond just the hemostatic function. [10] Platelets act as a mediators of angiogenesis, wound healing & immune modulation. They secrete cytokines & growth factors such as TGF β, VEGF, MMP-2, PF-4 & PDGF. [11-14] All the above mentioned factors induce carcinoma progression such as epithelial, mesenchymal transition, angiogenesis, cell migration& proliferation.[12] Platelet derived TGF β promotes carcinoma metastasis which inturn produces soluble mediators such as IL-6, GMCSF which in turn stimulate thrombopoiesis. [15]

Post-operative tumor recurrence leads to high morbidity & mortality. High platelet count & poor tumor differentiation, presence of vascular invasion, regional & distant metastasis are poor prognostic factors in patient of head & neck squamous cell carcinoma. [16]

Conclusion

In this study nonsignificant difference was noted in Oral Potentially Malignant Disorders and Oral Squamous Cell Carcinoma compared to healthy controls. Multicentric studies with more number of patients required to establish platelet count as a diagnostic marker in oral potentially malignant disorders and oral squamous cell carcinoma. Thrombocystosis is a poor predicator for malignancy, platelet count alone cannot determine the severity of malignancy, correlation with histopathologic data can better establish the grading of malignancy

References

1. Xie GX, Chen TL, Qiu YP. Metabolomics 2011.
2. Li Y, Maie A, John RS. Clin Cancer Res 2004; 10:8442-8450.
3. Lee YJ, Lee HR, Hawang UK. White blood cell count and the risk of colon cancer. Yonsei Med J 2006; 47(5):646-56.
4. Wasim M. Khatib, Dhirajkumar B. Shukla, Sujata R. Kanetkar, Atul B.Hulwan, Pradnya P. Kale. Role of Platelet Counts in Prognostication of Head And Neck Squamous Cell Carcinoma. IOSR Journal of Dental and Medical SciencesVolume 15, Issue 9 Ver. X (September). 2016), PP 81-84.

5. Bagan JV, Scully C. Recent advances in oral oncology 2007: epidemiology, etiopathogenesis, diagnosis and prognostication. Oral Oncol. 2008;44:103-108.
6. Hefler L, Mayerhofer K, Leibman B, Obermair A, Reinthaller A, Kainz C et al. Tumor anemia and thrombocytosis in patients with ulvar cancer.Tumour Biol 2000;21:309-14.
1. Symbas NP, Townsend MF, El-Galley R, Keane TE, Graham SD, Petros JA. Poor prognosis associated with thrombocytosis in patients withrenal cell carcinoma. BJU Int 2000;86:203-7.
2. Monreal M, Fernandez-Llamazares J, Pinol M, Julian JF, Broggi M, EscolaD et al. Platelet count and survival in patients with colorectal cancer:A preliminary study. Thromb Haemost 1998;79:916-8.
3. Wheler J, Tsimberidou AM, Hong D, Naing A, Jackson T, Liu S et al. Survival of patients in a Phase 1 Clinic: The M. D. Anderson CancerCenter experience. Cancer 2009;115:1091-9.
4. Jurk K, Kehrel BE. Platelets: physiology and biochemistry. Semin Thromb Hemost 2005, 31:381–392.
5. Wakefield LM, Smith DM, Flanders KC, Sporn MB. Latent transforming growth factor-beta from human platelets. A high molecular weight complex containing precursor sequences. J Biol Chem 1988,263:7646–7654.
6. Banks RE, Forbes MA, Kinsey SE, Stanley A, Ingham E, Walters Cet al. Release of the angiogenic cytokine vascular endothelial growth factor (VEGF) from platelets: significance for VEGFmeasurements and cancer biology. Br J Cancer 1998, 77(6):956–964.
7. Pilatova K, Greplova K, Demlova R, Bencsikova B, Klement GL, Zdrazilova-Dubska L. Role of platelet chemokines, PF-4 and CTAP-III,in cancer biology. J Hematol Oncol 2013, 6:42.
8. 14.Senzel L, Gnatenko DV, Bahou WF. The platelet proteome. Curr Opin Hematol 2009, 16:329–333
9. Kaser A, Brandacher G, Steurer W, Kaser S, Offner FA, ZollerH et al. Interleukin-6 stimulates thrombopoiesis through thrombopoietin: role in inflammatory thrombocytosis. Blood 2001, 98(9):2720–2725.
10. Bo Wang, Shu Zhang, Kai Yue and Xu-Dong Wang. The recurrence and survival of oral squamous cellcarcinoma: a report of 275 cases. Chienese Journal of Cancer. 2013 Nov; 32(11):614-618.