Advanced International Journal for Research (AIJFR)
E-ISSN: 3048-7641 ● Website: www.aijfr.com ● Email: editor@aijfr.com

Diagnostic role of histopathology and Immunohistochemistry in Premalignant and malignant cutaneous lesions at tertiary care centre, Telangana.

Dr. Lavanya Girigiri[1], Dr. Nagarjuna Chary Rajarikam[2], Dr. Naval Kishore[3]

[1]Post Graduate, [2,3]Professor
Pathology
Osmania Medical College

1. Introduction:

The skin is the largest organ of the body. More than hundred different types of tumours are known to be clinically apparent on the skin due to the complexity of its structure with multiple cell types. These cell types may undergo malignant transformation at various stages of their differentiation, leading to tumours with distinct histology and varied clinical behaviour(1).The common premalignant lesions are actinic keratosis, Bowen's disease, Keratoacanthoma(2). The major risk factors for premalignant lesion are age and increased ultraviolet light exposure, especially UVB Common cutaneous malignancy among Indians is squamous cell carcinoma ie., up to 89.9% of total skin carcinomas Basal cell carcinoma is commonest malignancy among the Caucasians accounting for 75%(2). Difficulties arise because of the variety and complexity of histologic, ultra-structural and histochemical study, complex nomenclature, multiple classifications and conflict in opinion regarding histogenesis of some of the entities and relative rarity of these tumours(3,4). Skin tumours, at times pose a great challenge as some of benign tumours can be confused with malignant tumours. Hence, it is vitally important to diagnose correctly, as some can become metastatic resulting in morbidity and mortality. In such cases, histopathology alone remains a diagnostic tool, and so the histopathological investigation of excised skin lesions yields a high percentage of premalignancies and malignancies(5,6) Sometimes it may not be possible to differentiate entities with overlapping clinical and histopathological features therefore immunostaining of cellular antigens is immensely helpful in such cases. Immunohistochemical methods enhance the diagnostic value of dermatopathology as well as help in assessing the prognostic markers of some disorders. Immunohistochemistry (IHC) has also been in use for targeted cancer therapy(7). Epithelial Membrane antigen (EMA), Cluster Differentiation 10 (CD10), S100, Ki67 are some of the IHC markers used for the diagnosis and also assessing the prognosis of these skin lesions

2. Materials and methods:

Study Place: Upgraded Department of Pathology, Osmania medical college, Hyderabad. **Study period**: March 2024 – September 2025 i.e 18 months. **Study Design:** The present study is a cross-sectional study conducted in the Department of Pathology. Ethical clearance for the study was obtained from the Institutional Ethics Committee of Osmania Medical College, Hyderabad. **Sample Size:** A total sample of 50 skin biopsies evaluated. **Inclusion criteria:** 1. Patients clinically confirmed premalignant and malignant cutaneous lesion and given consent. **Exclusion criteria:** 1. Patients who have not given consent 2. Inadequate specimen. All specimens were processed routinely and stained with Hematoxylin and eosin, slides are examined and histological diagnosis were made accordingly. IHC was performed using the markers mentioned above and then examined for the percentage of positivity, intensity of staining and Immunoreactive scores and evaluated, categorized as mild moderate and severe based on the expression. Diagnostic accuracy has be calculated based on the sensitivity and specificity of the IHC markers. Data were analyzed using SPSS software.

Observations and Results: A total of 50 histopathologically diagnosed cases of premalignant and malignant skin lesions were evaluated during the study period, showing age Range – 53 to 83 years, Mean Age – 71.5 years Median Age – 73 years, Mode Age – 75 years, Standard Deviation – 7.36 years. Out of 50 study population, 29(58%) patients were males and 21(42%) were females, with a male : female ratio of 1.38:1. Male predominance was observed. Out of 50 study population, 24(48%) of the lesions were Premalignant cutaneous lesions and 26(52%) of the lesions were Malignant cutaneous lesions. Out of 24 patients with premalignant cutaneous lesions, 7(29.16%) were found to be Actinic Keratosis, 7(29.16%) with Bowen's Disease, 5(20.84%) were found to be Keratoacanthoma and remaining 5(20.84%) were diagnosed with Marjolin's Ulcer. Out of 26 patients with Malignant cutaneous lesions, 9(34.6%) were found to be Squamous cell carcinoma, 9(34.6%) patients diagnosed with Basal cell carcinoma, 8(30.4%) were found to be Melanoma.

Table 1: Association between Gender and Lesion category (n=50)

Gender	Premalignant	Malignant	Total	p-value
Male	12	17	29	0.071
Female	12	9	21	
Total	24	26	50	

Association between gender of the patients and the category of the lesion whether premalignant or malignant done, it was observed that the association was not significant statistically. Immunoreactive scores of various lesion shown below.

Figure 1: Bar diagram showing the Immunoreactive scores of different IHC markers for pre malignant Cutaneous lesions (n=24)

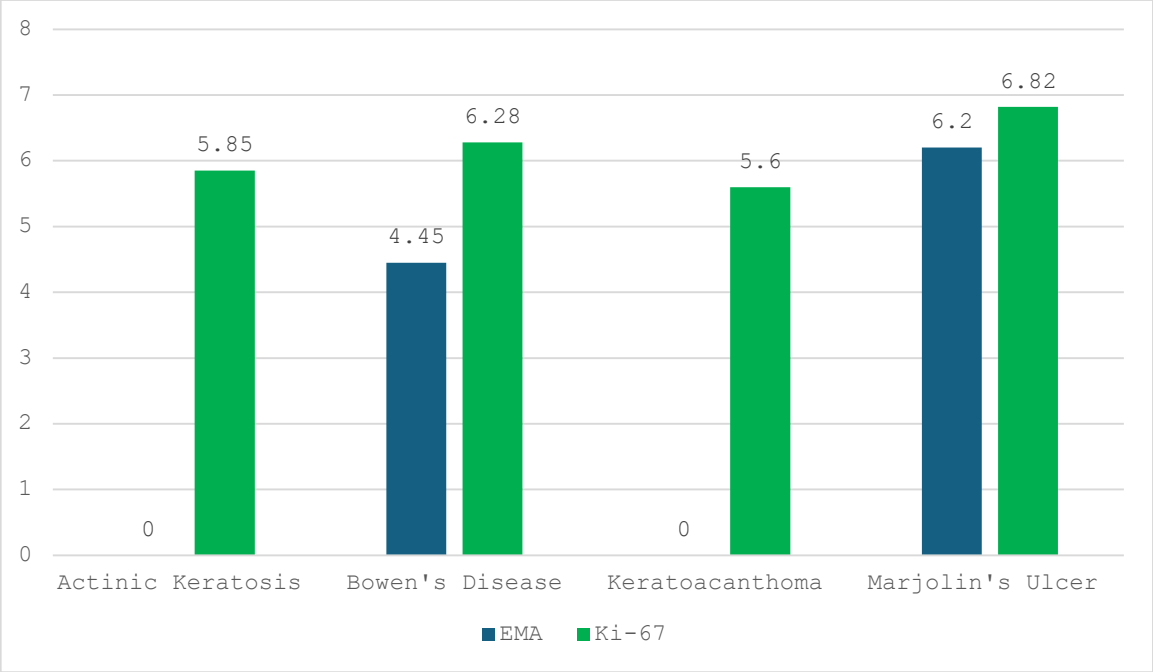


Figure 2: Bar diagram showing the Immunoreactive scores of different IHC markers for Malignant Cutaneous lesions (n=26)

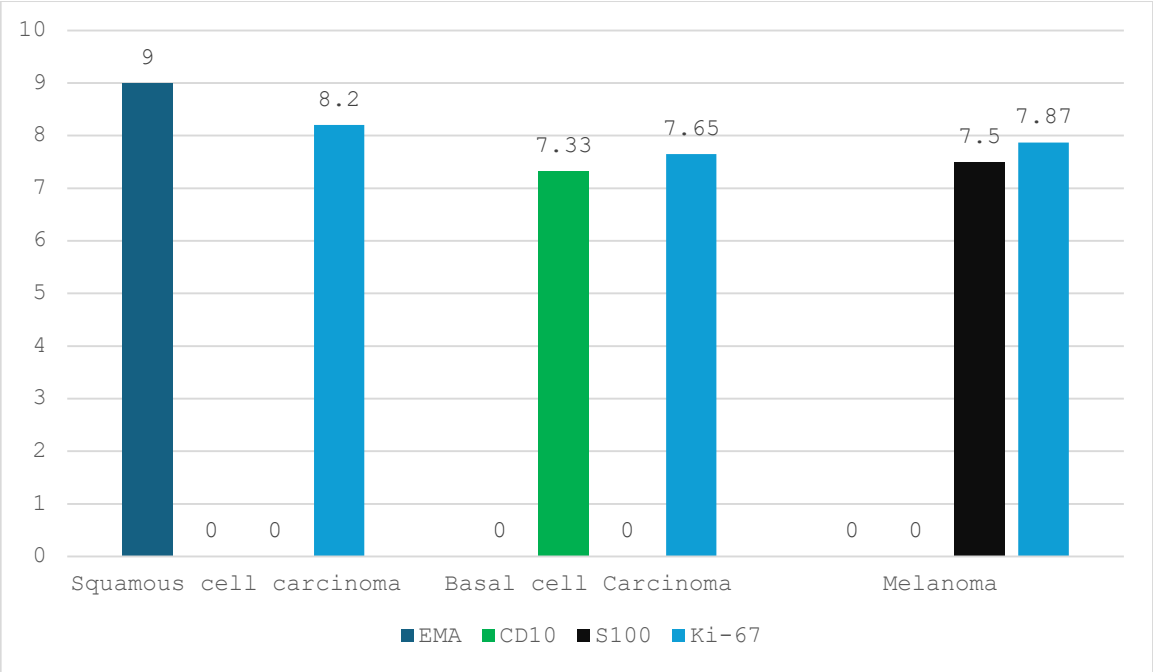


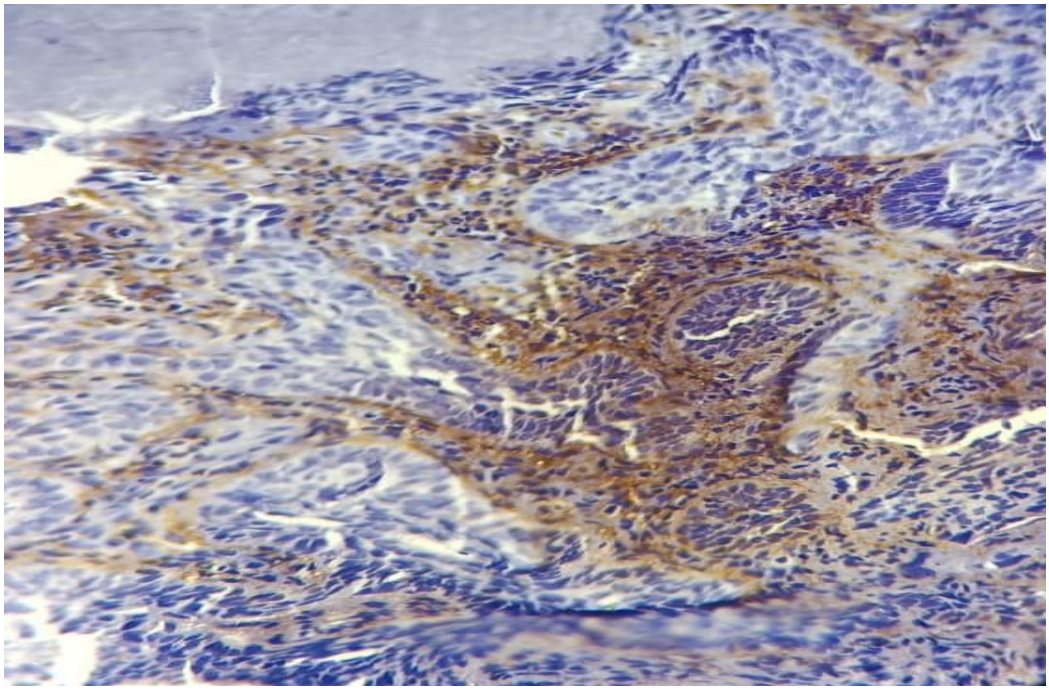
Table 2: Diagnostic Accuracy of IHC markers in Malignant Cutaneous lesions (n=26)

S.No	IHC Marker (Lesion)	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
1.	EMA (SCC)	92.8	84.0	76.2	80.4

2.	CD10 (BCC)	91.7	88.2	78.4	82.5
3.	S100 (Melanoma)	92.0	90.3	76.0	79.6
4.	Ki-67 (Malignant lesions)	87.7	92.6	73.4	86.2

Chi-square or Fisher's exact tests were performed to evaluate whether marker positivity correlated significantly with malignancy status (Premalignant vs Malignant). Association between EMA marker positivity and malignancy, p-value came out to be 0.001 and was significant statistically. Association between CD10 marker positivity and malignancy, p-value came out to be 0.005 and was significant statistically. Association between S100 marker positivity and malignancy, p-value came out to be 0.002 and was significant statistically,

Figure: Basal cell carcinoma CD10 marker



3. Discussion:

In the present study it was found that the age range of the study population was from 53 years to 83 years with majority (46%) of the patients are from the age group of 70-79 years of age followed by 60-69 years of age group (34%) and 80-89 years with 16% of the study population. The Mean age was found to be 71.5 years. In a study by **Wang R. Chen et.al.,** it was observed that The global burden of skin cancer among adults 65 years or older is growing, and those living in high-socioeconomic countries, highlighting the need for effective prevention and management strategies (8). In the present study, it was found that majority of the study population (58%) were males and the rest were (42%) female patients. In a study by **Alizadeh.N et.al.,** on the frequency of skin lesions, it was observed that Malignant skin tumours are more prevalent in males and those over the age of 50, highlighting the need for better preventive policies in these populations(9). In the present study, 52% of the patients were diagnosed with malignant cutaneous

lesions and the rest 48% with premalignant lesions. In a study by **Kim H.et.al.,** it was observed that the incidence of cutaneous premalignant lesions was 0.10% and that of Malignant lesions was 0.25%, showing high malignant lesion incidence(10). In the present study, it was found that malignant lesions are more in males (58.63%) than premalignant lesions (41.37%) but in females premalignant lesions are majority (57.14%) than malignant lesions (42.86%). In a study by **Alizadeh N** on the frequency of skin lesions, it was observed that females had a higher frequency of malignant tumours , whereas males represented a higher rate of malignant tumours(9). In a study by **Jaiswal N et. al.,** it was found that EMA's immunoreactive score, reflecting its expression level, is significant for identifying malignancy in such ambiguous cases. EMA's immunoreactive scoring is well-supported for diagnostic differentiation between premalignant and malignant glandular cells, while immune-based scores provide complementary prognostic information in cancer management(11). In a study by **Salman H et al.,** on effectiveness of (Ki-67) a Cell Proliferative Marker for Distinguishing Overlapping Skin Lesions, it was observed that Ki- 67 expression was seen in all cases ranging in intensity between 3-70%. Moderate expression was noticed in (79%) of BCC cases whereas (43%) of well-differentiated SCC cases had mild expression. Ki-67 can be used as a significant biological marker to differentiate between benignity and malignancy of overlapping(12). In a study by **Pop A et.al.,** it was found that The IHC markers S-100, SOX10, and Melan-A contributed to better evaluation of the melanoma invasion, especially in thin melanomas, but their impact on staging and consecutive treatment remains to be confirmed by future studies(13). In a study by **Shafaei, S et.al.** it was found that CD10 is a useful immunohistochemical marker to differentiate between basal cell carcinoma and squamous cell carcinoma, favouring BCC over SCC in some cases(14). In a study **by Vyas, N et.al**. it was found that A high Ki67 rate was 71.4%-90.9% sensitive and 40%-56% specific for the diagnosis of nevus requiring re-excision or melanoma (15). In a study by **Bolovan, L et.al**., it was found that S100 shows very high sensitivity (~89–100%) for primary cutaneous melanomas, but specificity only ~70–79% because it stains many non-melanocytic tumours and benign cells(16).

4. Conclusion:

The study highlights that a combined Clinicohistopathological and immunohistochemical approach enhances diagnostic precision, assists in differentiating morphologically overlapping lesions, and provides additional information regarding tumour behaviour. Routine use of a focused IHC panel in tertiary care centres can facilitate accurate diagnosis, appropriate management, and improved patient outcomes.

References:

1. Shekhani F, Sudhamani S, Patel M, Roplekar P. Histomorphological study of Premalignant and Malignant Lesions of Skin. Indian Journal of Applied Research, 2016;6(6):51-56
2. Bhat YJ, Zeerak S, Rasool F, Akhtar S, Shah IH, Yaseen A. Management of pre-malignant and malignant non-melanoma skin cancers: a study from a tertiary care hospital of North India. J Cutaneous Aesthetic Surg. 2022;15(2):118.
3. Gundalli S, Kolekar R, Pai K, Kolekar A. Histopathological Study of Skin Tumors. Internation Journal of Health Sciences, 2015; 2(2):155-163.

4. Choi SH, Kim KH, Song KH. Clinical Features of Cutaneous Premalignant Lesions in Busan City and the Eastern Gyeongnam Province, Korea: A Retrospective Review of 1,292 Cases over 19 Years (1995~2013). Ann Dermatol. 2016;28(2):172–8.
5. Elder DE and Elenitsas R. Benign pigmented lesions and malignant melanoma. In: Lever's histopathology of skin. 9th ed., Philadelphia; Lippincott Raven:2005: pp.715-804.
6. David W. Tumors of cutaneous appendages. In: Weedon David's Skin Pathology. Churchill Livingstone: 2002: pp.859-916.
7. Rosai J. Gross techniques in surgical pathology. In: Rosai J, editor. Rosai and Ackerman's Surgical Pathology. 9th ed. St. Louis: Mosby; 2004. p. 25-91.
8. Wang R, Chen Y, Shao X, Chen T, Zhong J, Ou Y, et al. Burden of skin cancer in older adults from 1990 to 2021 and modelled projection to 2050. JAMA Dermatol. 2025;161(7):715-22.
9. Alizadeh N, Darjani A, Rafiei R, Nejad KB, Ziabari AR, Eftekhari H. The frequency of skin lesions in Guilan Province, Iran. J Dermatol Nurses Assoc. 2024;16(2):99-104.
10. . Kim H, Cho E, Bae J, Yu D, Oh S, Kang H, et.al., Recent trend in the incidence of premalignant and malignant skin lesions in Korea between 1991 and 2006. J Korean Med Sci. 2010;25(6):924-9.
11. Jaiswal N. EMA-AND USEFUL IMMUNOCYTOCHEMICAL MARKER AT DIFFERENTIATION OF GLANDULAR MALIGNANT CELLS FROM ATYPICAL MESOTHELIAL CELLS ON CELL BLOCK PREPARATION OF BODY EFFUSIONS. J Med Pharm Allied Sci. 2021
12. . Salman H, Chalabi Q, Harbawi A. Effectiveness of (Ki-67) a cell proliferative marker for distinguishing overlapping skin lesions. Indian J Forensic Med Toxicol. 2021;15(3):3476-82.
13. Pop A, Monea M, Oláh P, Moraru R, Cotoi O. The importance of immunohistochemistry in the evaluation of tumour depth of primary cutaneous melanoma. Diagnostics. 2023;13(14):2387.
14. Shafaei S, Sharifian M, Hajian-Tilaki K. Immunohistochemical expression of CD10 in cutaneous basal and squamous cell carcinomas. Caspian J Intern Med. 2015;6(2):103-7.
15. Vyas NS, Charifa A, Desman GT, Goldberg M, Singh R, Phelps R, et al . Observational study examining the diagnostic practice of Ki67 staining for melanocytic lesions. Am J Dermatopathol. 2019;41(7):488-91.
16. Bolovan L, Ceaușu M, Stanciu A, Panait M, Busca A, Hotnog C, et al. Correlation studies between S100 protein level and soluble MIA or tissue MelanA and gp100 (HMB45) expression in cutaneous melanoma. J Pers Med. 2023;13(6):924.