E-ISSN 2250-0944
ISSN 2250-1150
doi: 10.48047/ijprt/16.02.223

Research Article

HISTOPATHOLOGICAL INSIGHTS INTO HYPERPIGMENTED SKIN LESIONS – A CLINICOPATHOLOGICAL STUDY

Dr. Rashmi N.[1], Dr. N. S. Kamakeri[2], Dr. Pratibha J.[3]

[1]Senior Resident, Department of Pathology, Chamarajnagar Institute of Medical Sciences, Chamarajanagar, India.
[2]Professor, Karnataka medical College and research institute, Hubballi, India.
[3]Assistant Professor, Department of Microbiology, Kempegowda Institute of Medical Sciences, Banglore, India

Received Date: 23/05/2026 Accepted: 22/06/2026 Published Date:25/07/2026

Corresponding Author: Dr. Rashmi N., Department of Pathology, Chamarajnagar Institute of Medical Sciences, Chamarajanagar, India.
Email: rashmishoba@gmail.com

ABSTRACT

Background: Hyperpigmentary disorders are a common dermatological concern that can cause considerable cosmetic, psychological, and emotional distress to affected individuals and their families. These disorders encompass a broad spectrum of conditions, including infectious, inflammatory, autoimmune, lymphoproliferative, and sclerosing diseases. Owing to their diverse etiologies and overlapping clinical presentations, histopathological examination plays a pivotal role in establishing an accurate diagnosis. A definitive histological diagnosis is essential for guiding appropriate management, determining prognosis, and ensuring disease-specific treatment. **Objectives:** To evaluate the diagnostic utility of histopathological examination in differentiating clinically similar hyperpigmented skin lesions and guiding appropriate patient management. **Methods:** Fixed skin biopsy specimens with 10% neutral buffered formalin satisfying the inclusion and exclusion criteria received in the pathology department at KIMS should be sectioned. Standard grossing procedure is followed after fixation of it. Then the tissue bits are submitted for paraffin block preparations, followed by standard H & E staining and some special stains like Fontana masson, PAS etc. **Results:** Out of the 40 cases studied, 29 (72.5%) were non-neoplastic, and 11(27.5%) were neoplastic. The most commonly affected age group was individuals between 40-60years with a male preponderance. Among non-neoplastic lesions, morphea was the most frequent (45%), followed by discoid lupus erythematosus (20%). Among neoplastic lesions, basal cell carcinoma was the most common (20%), followed by melanoma (7.5%). **Conclusion:** Both melanocytic and non-melanocytic lesions may present clinically as hyperpigmented skin lesions across all age groups, often with overlapping morphological features. Histopathological examination is essential for establishing a definitive diagnosis, particularly when a pigmented lesion clinically raises suspicion for melanoma, as many of these lesions are ultimately identified as benign melanocytic or non-melanocytic entities. Accurate histopathological diagnosis not only prevents unnecessary anxiety and inappropriate management but also provides reassurance to patients.

Furthermore, comprehensive clinical information and a strong clinicopathological correlation enable the histopathologist to render a precise diagnosis, thereby facilitating appropriate treatment and improving patient outcomes.
Key words: Hyperpigmented, Histopathology, Clinicopathological, Neoplastic.

INTRODUCTION

Hyperpigmentary skin disorders are characterized by an increase in skin or mucosal pigmentation that is sufficiently noticeable to prompt affected individuals to seek medical attention. Since not all forms of hyperpigmentation result from increased melanin production, terms such as hypermelanosis, melanosis, and melanoderma should not be used interchangeably to describe these conditions. Thus, hyperpigmentation is considered a relative rather than an absolute phenomenon. It may present as an isolated cosmetic concern or serve as a clinical manifestation of an underlying systemic disease, often providing an important diagnostic clue and, in some cases, representing its earliest presentation.

Based on the anatomical distribution of the pigment, hyperpigmentary disorders are broadly classified into epidermal, dermal, and mixed types.

Epidermal hyperpigmentation is predominantly caused by increased melanin deposition within the epidermis and typically appears brown in color. In contrast, dermal hyperpigmentation, often referred to as blue hyperpigmentation or ceruloderma may result from the accumulation of either melanin or non-melanin pigments within the dermis. Epidermal pigmentation may occur with or without an increase in the number of melanocytes.

Mixed hyperpigmentation develops when melanin-containing dermal macrophages (melanophages) or ectopic dermal melanocytes coexist with epidermal pigmentation. Melanocytic epidermal hyperpigmentation is observed in conditions such as physiological delayed tanning following sun exposure, psoralen-ultraviolet A (PUVA) therapy, and lentigines, where increased melanin deposition is primarily confined to the basal layer of the epidermis.

Melanotic epidermal hyperpigmentation, the most frequently encountered pattern, results mainly from increased melanosome production. It is characterized by enhanced melanin synthesis, maturation, and melanization within melanocytes, accompanied by increased transfer of melanosomes to adjacent keratinocytes. In contrast to epidermal melanin, dermal pigment tends to persist for a considerably longer duration because it is not eliminated through the normal process of epidermal turnover. Instead, its clearance occurs slowly via the lymphatic system, accounting for the prolonged persistence of dermal pigmentation [(3)].

AIMS AND OBJECTIVES:

- To evaluate the diagnostic utility of histopathological examination in differentiating clinically similar hyperpigmented skin lesions and guiding appropriate patient management.

MATERIALS AND METHODS

Fixed skin biopsy specimens with 10% neutral buffered formalin satisfying the inclusion and exclusion criteria received in the pathology department at KIMS should be sectioned. Standard grossing procedure is followed after fixation of it. Then the tissue bits are submitted for paraffin block preparations, followed by standard H & E staining and some special stains like Fontana masson, PAS etc.

Sample size: 40 cases

RESULTS

Table 1: Demographic characteristics of the study populations

Age group (Years)	Frequency	Percentage (%)
<20	7	17.5
20-40	8	20
40-60	20	50
>60	5	1.5
Total	40	100

Most commonly affected age group was between 40-60years and MALE predominance was observed.

Table 2: Distribution of lesions among study populations

Lesions	Frequency	Percentage (%)
Morphea	18	45
Discoid lupus erythematosus	8	20
Lichen planus	3	7.5
Basal cell carcinoma	8	20
Malignant melanoma	3	7.5
Total	40	100

Out of 40 cases, morphea constitute majority of cases (45%).

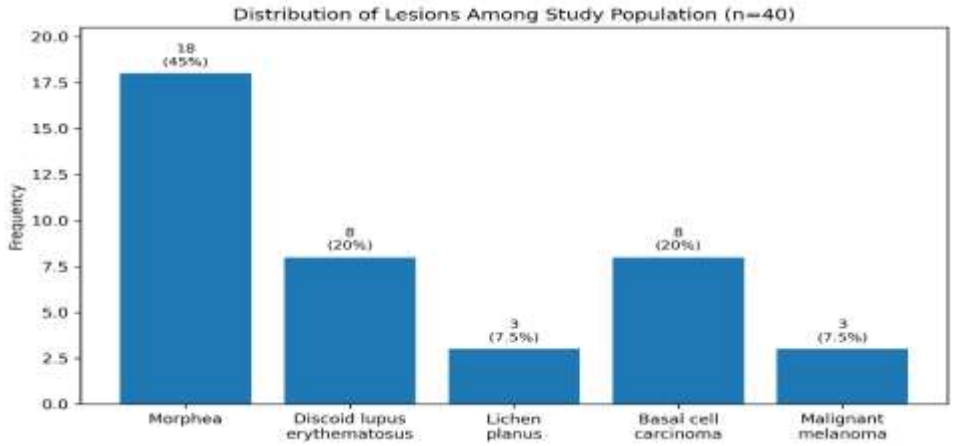

Figure 1: Distribution of lesions among study populations

Table 3: Distribution based on the type of lesions

Type of lesion	Frequency	Percentage (%)
Neoplastic	11	27.5
Non-neoplastic	29	72.5
Total	40	100

Among 40cases, non-neoplastic lesions comprising of 72.5% followed by neoplastic lesions (27.5%).

Table 4: Clinical and histopathological correlation of pigmented skin lesions

Lesions	Consistent with clinical diagnosis	Inconsistent with clinical diagnosis
Morphea	15	3 – Lichen sclerosis atrophicus

Discoid lupus erythematosus	5	2 -Lichen planus 1 - Rosacea
Lichen planus	2	1 – Discoid lupus erythematosus
Basal cell carcinoma	6	2 -Nevus
Malignant melanoma	2	1 -Nevi

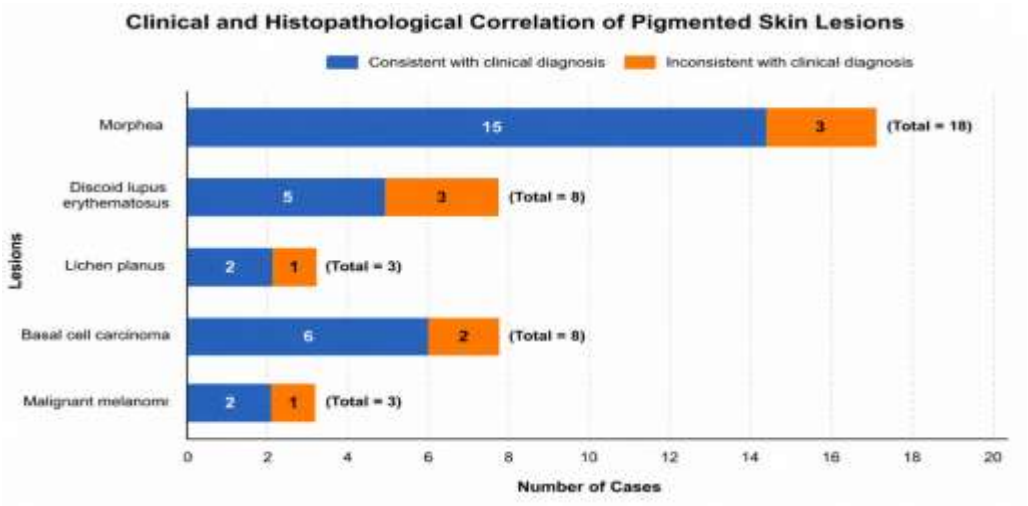

Figure 2: Clinical and histopathological correlation of pigmented skin lesions

DISCUSSION

Hyperpigmented skin lesions comprise a heterogeneous group of disorders with diverse etiologies including inflammatory, infectious, autoimmune, neoplastic, and metabolic conditions. Although many of these lesions exhibit characteristic clinical features, considerable overlap in morphology often makes definitive diagnosis difficult. Histopathological examination remains the gold standard for establishing an accurate diagnosis, differentiating clinically similar lesions, and guiding appropriate management. In the present study, a broad clinicopathological spectrum of hyperpigmented skin lesions was observed, highlighting the indispensable role of histopathology in dermatopathology practice [1,2].

The majority of cases (72.5%) in this study were non-neoplastic, with morphea being the most frequent diagnosis (45%). Among the neoplastic lesions, basal cell carcinoma (BCC)accounted for 20%, making it the most common malignancy observed in the study, followed by melanoma (7.5%).

Clinicopathological correlation in the present study demonstrated good concordance between clinical and histopathological diagnoses. Nevertheless, discrepancies were encountered in a proportion of cases, particularly among lichenoid dermatoses, chronic dermatitis, and pigmented benign lesions. These findings emphasize that clinical examination alone may be insufficient in several hyperpigmented disorders and support the routine use of skin biopsy whenever the diagnosis is uncertain or therapeutic decisions depend upon histological confirmation [4].

The major strength of the present study lies in the comprehensive clinicopathological evaluation of a wide spectrum of hyperpigmented skin lesions encountered in routine practice. However, the study is limited by its single-center design, relatively modest sample size, and the absence of immunohistochemical and molecular investigations in diagnostically challenging lesions. Larger multicentric studies incorporating advanced ancillary techniques would provide further insights

into the biological behavior and diagnostic classification of hyperpigmented skin disorders.

CONCLUSION

Overall, the findings of the present study reaffirm that histopathological examination remains the cornerstone in the evaluation of hyperpigmented skin lesions. Careful assessment of epidermal alterations, dermoepidermal junction changes, pigment distribution, inflammatory infiltrates, and associated dermal changes enables accurate diagnosis, strengthens clinicopathological correlation, and ultimately contributes to appropriate patient management.

The study further highlights the importance of clinicopathological correlation in improving diagnostic accuracy and guiding appropriate therapeutic interventions. Histopathology provides valuable insights into disease pathogenesis, confirms clinical impressions, and identifies lesions that may require specific treatment or long-term follow-up. Early and precise diagnosis is essential to prevent unnecessary treatment, reduce disease-related morbidity, and improve patient outcomes.

IMAGES

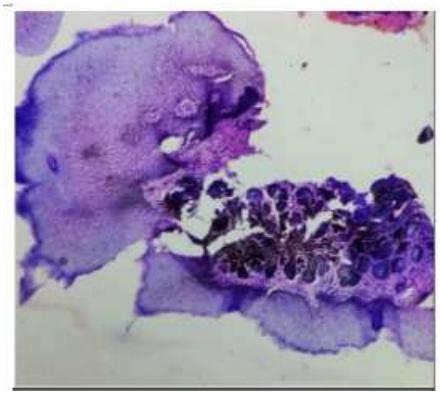

FIGURE 1

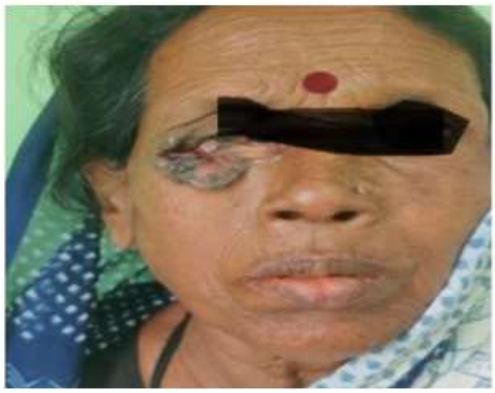

FIGURE 2

FIGURE 1: BASAL CELL CARCINOMA
FIGURE 2: BASAL CELL CARCINOMA

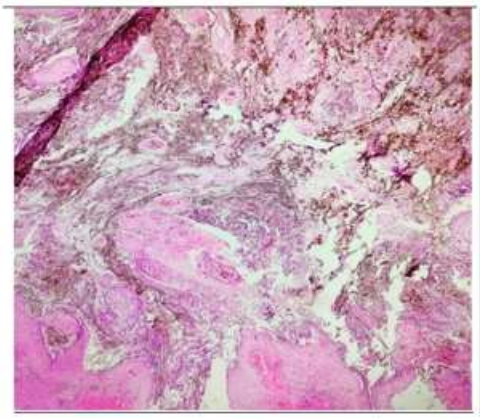

FIGURE 3

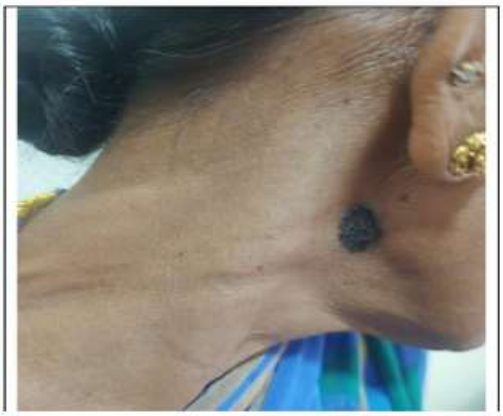

FIGURE 4

FIGURE 3: MALIGNANT MELANOMA
FIGURE 4: MALIGNANT MELANOMA

REFERENCES

1. Bolognia JL, Schaffer JV, Cerroni L. Dermatology. 4th ed. Philadelphia: Elsevier; 2018.
2. Weedon D. Weedon's Skin Pathology. 5th ed. London: Churchill Livingstone Elsevier; 2021.

3. Park HY, Pongpudpunth M, Lee J, Yaar M. Biology of melanocytes. In: Wolff k, Goldsmith LA, Katz SI, Gilchrist BA, Paller AS, Leffell DJ, editors. Fitzpatrick's dermatology in general medicine. 7th ed. Noida, India: Tata Mc Graw Hill; 2008.p. 591-608.
4. Cerroni L. Dermatopathology. 3rd ed. Philadelphia: Elsevier; 2020.
5. Davis EC, Callender VD. Post-inflammatory hyperpigmentation: a review of the epidemiology, clinical features, and treatment options. J Clin Aesthet Dermatol. 2010;3(7):20-31.
6. Elder DE. Precursors to melanoma and their mimics: nevi of special sites. Mod Pathol. 2006;19(Suppl 2):S4-S20.
7. Hafner C, Vogt T. Seborrheic keratosis. J Dtsch Dermatol Ges. 2008;6(8):664-677.
8. Boehncke WH, Schön MP. Psoriasis. Lancet. 2015;386(9997):983-994.
9. Sehgal VN, Srivastava G. Lichenoid tissue reaction/interface dermatitis: recognition, classification, etiology, and clinicopathological overtones. Indian J Dermatol Venereol Leprol. 2011;77(4):418-430.
10. Elder DE, Massi D, Scolyer RA, Willemze R. WHO Classification of Skin Tumours. 5th ed. Lyon: International Agency for Research on Cancer; 2024.
11. Patterson JW. Weedon's Skin Pathology Essentials. 3rd ed. Philadelphia: Elsevier; 2020.
12. James WD, Elston DM, Treat JR, Rosenbach MA, Neuhaus IM. Andrews' Diseases of the Skin: Clinical Dermatology. 14th ed. Philadelphia: Elsevier; 2024.
13. Lever WF, Elder DE. Lever's Histopathology of the Skin. 11th ed. Philadelphia: Wolters Kluwer; 2015.
14. Habif TP. Clinical Dermatology: A Color Guide to Diagnosis and Therapy. 7th ed. Philadelphia: Elsevier; 2021.
15. Griffiths CEM, Barker J, Bleiker T, Chalmers R, Creamer D. Rook's Textbook of Dermatology. 10th ed. Oxford: Wiley-Blackwell; 2023.
16. Kang S, Amagai M, Bruckner AL, Enk AH, Margolis DJ, McMichael AJ, et al. Fitzpatrick's Dermatology. 9th ed. New York: McGraw-Hill; 2019.