

Histopathology and Ancillary Testing in the Accurate Diagnosis of Complex Skin Lesions

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Abstract

Background: Skin conditions are among the most common health problems and not always easy to diagnose. In some cases, the disease may present with atypical modes of presentation affecting uncommon sites occurring at times that differ from that reported in the literature, where they become challenging and create complex cases. The most accurate diagnosis is the one that closely correlates with the clinical presentation, and if they do not fit the clinical situation, then the disparity must be corrected by using histopathology and its related ancillary tests. Therefore, the correlation between histopathology and clinical features is essential to solve this problem.

Aim of the study: This study aims to evaluate the correlation between clinical and histopathological diagnosis in complex skin lesions, and the role of confirmatory tests (IHC and special stains) in enhancing diagnostic accuracy.

Material and Methods: A cross-sectional prospective study was conducted in the Department of Histopathology and Dermatology at Al-Sadr Teaching Hospital and Basrah Teaching Hospital, Basrah, Iraq, from October 2023 to October 2024. Two hundred nineteen cases inclusion criteria include a complex skin lesion were collected to find out how much the histopathological diagnosis and its related ancillary tests are of help in the diagnosis of these lesions. History and clinical findings were obtained from each patient, and histological sections were stained using immunohistochemistry (IHC) and special stains, as required for each case, to enhance diagnostic accuracy in correlation with the clinical findings. The results were tabulated and analyzed.

Results: Among 219 cases, a significant number of 142 cases (64.8%) were given a definite pathological diagnosis consistent with the clinical diagnosis so were not considered complex cases, only 77 cases (35%) were considered complex in which histopathological diagnosis did not correlate with the given clinical diagnosis, which included 58 cases (26.5%) with disagreement between histological and clinical diagnosis and 13 cases (5%) with a clinicopathological agreement, after using special stains, in addition to 6 cases (2.7%) which remained undiagnosed (inconclusive). Most patients were females (54.5%) and most prevalent in the 60 years and older age group (24.7%), non-neoplastic lesions were the major entity (53%) in which infections and infestations were the most common lesions (16.8%). Among the neoplastic lesions, the most frequent diagnosis was benign tumors and cysts (29.9%).

Conclusion: Histopathological evaluation plays a significant role in managing complex skin lesions. The integration of clinicopathological correlation is crucial for achieving accurate and quick diagnosis. IHC and special stains are essential in diagnosing some complex cases, especially IHC in mycosis fungoides and special stains in infectious dermatitis. In this study, skin lesions were commonly reported and widely distributed in both sexes; most were found in females. Advanced diagnostics reduced inconclusive cases and improved patient outcomes. Non-neoplastic skin lesions were the major entity, with leishmania was the most prevalent lesion. Mycosis fungoides was the most common neoplastic complex lesion. Further

studies with larger sample sizes and a broader panel of markers are warranted to optimize diagnostic accuracy and minimize clinicopathological discordance.

Keywords: Skin lesions , complex cases , clinico-pathological correlation, ancillary tests, histopathological diagnosis.

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Introduction

Histopathological diagnosis of skin diseases faces distinct difficulty in the assessment of various lesions involving the skin than other organs and it should be correlated with a list of differential diagnosis to give the pathologist a wide range of possibilities to reach a proper diagnosis (1) . If the histological findings do not correlate with the clinical diagnosis, then it is considered a complex case. The correlation between histopathological and clinical diagnosis is recommended to solve this problem(2). When a skin biopsy is indicated, the skin lesion is removed and sent for histopathological examination to establish the diagnosis and assist in the management of the patient (3). In the case of complex lesions, the efficacy of the histological diagnosis is confirmed by immunohistochemistry or special stains. Some of these challenging diagnoses cannot be detected by routine hematoxylin and eosin stains alone such as in many infections that can be detected easily by specific staining for organisms(4).

There are many different reaction patterns in the skin, but most inflammatory dermatoses can be categorized into different patterns “the major tissue reaction” patterns. Occasionally, diseases express more than one major pattern, either ab initio or during their evolution (5) . The major tissue reaction patterns include lichenoid, psoriasiform, spongiotic, vesiculobullous, granulomatous, vasculopathic reaction patterns with their related lesions, in addition to benign and malignant skin tumors and infections (5).

Hematoxylin and eosin (H&E) are routine stain that are used in all tissue sections for diagnosis, but they could be inadequate, so a pathologist may require additional special staining methods for the identification of a particular tissue, structure, and pathogens(6)

In histopathology, immunohistochemistry (IHC) is a crucial diagnostic technique. IHC is used to confirm a diagnosis, distinguish between two conditions with similar morphology, and sometimes assess prognosis depending on the marker used; however, interpretation can be challenging due to overlapping findings. Therefore, clinical and histological findings should be taken into consideration when interpreting IHC.(2)

This study aims to evaluate the correlation between clinical and histopathological diagnosis in complex skin lesions and the role of confirmatory tests (IHC and special stains) in enhancing diagnostic accuracy.

Material and methods

A cross-sectional prospective study was conducted in the Departments of Histopathology, Dermatology, and Venereal Diseases. The cases were collected from Al-Sadr Teaching Hospital and Basrah Teaching Hospital in Basrah, Iraq, from October 2023 to October 2024.

- Inclusion criteria: all skin biopsies that showed definite signs of any specific pathology were included.
- Exclusion criteria: cases with insufficient biopsy material.

A total of 219 skin samples were thoroughly analyzed in the study; 142 cases were given a definite pathological diagnosis consistent with the clinical diagnosis and were not considered complex cases. In contrast, seventy-seven cases had discrepancies between pathological and clinical diagnosis and were, therefore, considered complex cases and included in the study. The proper diagnosis was achieved by weekly multidisciplinary team discussions consisting of senior dermatologists and histopathologists.

The following parameters were recorded:

- Age and sex of the patients
- Clinical features and diagnosis
- Differential diagnosis of complex skin lesions
- Histopathological diagnosis
- Group of the disease according to the histopathological diagnosis
- Results of Immunohistochemistry IHC staining for different markers
- Results of special staining methods.

Complex Skin lesions were divided into four groups according to the clinicopathological consistency:

- **Consistent:** lesions were identified when the histological diagnosis matches the clinical differential diagnosis by ordinary H&E stain.
- **Consistent with aid:** were diagnostically confirmed with an ancillary test.
- **Inconsistent:** lesions were identified when clinical and histological diagnoses were different.
- **Inconclusive lesions:** refer to lesions where the final diagnosis was not reached.

Further confirmatory tests like IHC or special stains were done accordingly to reach the final diagnosis even in the inconclusive cases.

Skin lesions were divided into several groups namely, lichenoid skin diseases, psoriasiform, spongiotic, granulomatous, vesiculobullous, vasculopathic, infections and infestations, benign tumors and cysts, and malignant tumors. On the other hand, general types of skin lesions are classified based on histopathology into neoplastic, non-neoplastic, and inconclusive.

The equipment used in processing and staining the histological sections are displayed in box1:

Box 1: Equipment & Instruments	Timer
Drying oven	Glass staining jar
Pressure cooker	Slide holder
Microscopic slides	Slide marker pen
Cover slip	Tissue paper
Light microscope	Rubber gloves

The chemicals used to obtain paraffin-embedded sections for both H&E staining and IHC staining are displayed in box2:

Box 2: Chemicals
Formaldehyde solution 10%
Ethanol Alcohol with different concentrations (50%, 70%, 90%, absolute)
Xylene
Paraffin wax
Washing buffer solution PH 7.6
Tap water
Distilled water
Mayer's hematoxylin and eosin solutions
DPX (Dibutylphthalate Polystyrene Xylene)

Immunohistochemical-specific detection kits are shown in box 3. All the reagents and antigen retrieval are included within the Bond Polymer Refine Detection kit from Leica Biosystems code number DS9800 are displayed in box3:

Box 3: Immunohistochemistry-specific detection kit.
Peroxidase Block: 3-4% (Leica Biosystems) Hydrogen peroxide.
Post Primary: Rabbit anti-mouse IgG in 10% animal serum in tris buffered saline 0.09% HRP conjugate.
DAB chromogen 3.3 diaminobenzidine tetrahydrochloride hydrate in stabilizer solution.
DAB substrate Buffer (polymer), buffered solution contains $\leq 0.1\%$ hydrogen peroxide in stabilizer solution.
Hematoxylin $< 0.1\%$

Formalin-fixed paraffin-embedded blocks (FFPE) were collected, and three to five micrometers thickness sections were obtained and stained with routine hematoxylin and eosin stains. The slides were reviewed to confirm the diagnosis. Then, additional sections using positively charged slides were provided for immunohistochemical

Technique	Application
Excisional biopsy	For removal of a single lesion; an elliptical or fusiform-shaped area of skin is removed
Incisional biopsy	Similar to excision, but narrower; to include fat in suspected panniculitis; some normal perilesional skin is included for comparison
Punch biopsy (3–6 mm)	Useful if the tissue available is limited, but accurate sampling is essential; a rapid procedure, sometimes useful in children
Curettage	For hyperkeratotic lesions, e.g. seborrheic keratoses, viral warts, basal cell carcinomas; usually accompanied by cautery
Shave biopsy	For facial protuberant lesions, e.g. benign intradermal Nevi

staining that was carried out by the use of BOND-MAX fully automated IHC Strainer from Leica Bio systems. Specific markers used (CD3 and CD5 for Mycosis fungoides, SMA, Desmin for Dermatomyofibroma ,S100 for schwannoma and melanocytic nevus), and antibodies were applied as primary antibodies that have been specifically optimized for use with Bond Polymer Refine Detection. Rabbit anti-mouse IgG reagent was applied as the secondary antibody to localize the primary antibody. DAB chromogen (3.3 diaminobenzidine) visualized the complex as a brownish precipitate. Finally, counterstaining with hematoxylin was performed followed by dehydration, clearing and mounting with DPX.

Special stains were used to confirm the diagnosis, used for all consistent, consistent with aid, inconsistent and inconclusive, done accordingly on need to reach final diagnosis, stains used like fite-Faraco stain used for leprosy cases, Ziehl Neelsen stain to confirm or exclude tureculosis cases, Periodic acid schiff stain for fungal infection cases and histoplasmosis, Giemsa stain used for lieshmaniasis cases, Grocott's methenamine silver for fungal infection , and Reticulin stain for anetoderma cases, as shown in table 1.

Table (1): Special stains for demonstration of microorganisms(7).

Stains	Indication	Interpretation
Giemsa Stain	inclusion bodies, plasma cell cytoplasm, mast cell granules, Histoplasma, Rickettsia, Leishmania	Purple or blue
Periodic Acid-Schiff (PAS)	basement membrane, glycogen, some mucins, mucopolysaccharides, fungi, and Histoplasmosis.	Red/Purple
Zeihl-Neelsen Stain (ZNS)	acid-fast tubercular bacilli	Red
Grocott's methenamine silver (GMS)	Fungal infection	Black
Fite stain	Mycobacterium leprae	Red

There are variable skin biopsy techniques to obtain a specimen as shown in (Table 2):

Table (2): Skin biopsy techniques(8).

Statistical Analysis: SPSS software, version 26, was used to analyze the obtained data statistically. Qualitative data were expressed in frequency plus percentage. The Pearson Chi2 test was used to investigate the probability of associations. A p-value of less than 0.05 was considered to determine a statistically significant association.

Results

Demographic characteristics: Among the 77 (35%) complex cases, 19 (24.7%) cases were in the age group 61 years and older, followed by 14 (18.2%) cases in the age group 11-20 years. Most patients were females (54.5%), as shown in Table 3. There was no significant statistical association between the frequency of skin lesions, age groups ($p=0.1003$), and sex characteristics ($p= 0.423$).

Table (3): Demographic characteristics of the complex skin cases.

Variable	Frequency	Percent (%)	P value
Age groups (Year):			
10 years or younger	8	10.4	0.1003*
11-20	14	18.2	
21-30	12	15.6	
31-40	6	7.7	
41-50	8	10.4	
51-60	10	13.0	
61 or older	19	24.7	
Sex:			0.423*
Male	35	45.5	
Female	42	54.5	
Total	77	100%	

*Pearson Chi2 test

Regarding a total of 219 cases, a significant number of 142 cases (64.8%) showed that the histopathological diagnosis was concordant with the clinical diagnosis directly, 13 cases (5.9%) showed agreement after applying special tests. In comparison, 58 cases (26.5%) displayed disagreement between histopathological and clinical diagnosis and only 6 cases (2.7%) couldn't produce any fruitful histopathological finding (inconclusive cases), as in table 4. The association of the results of consistency and inconsistency was statistically significant ($p=0.0001$).

Table (4): Distribution of consistency between clinical and histopathological diagnosis.

Clinicopathological agreement	Number	Percentage	p value
Histopathological diagnosis matched with clinical diagnosis (consistent)	142	64.8	0.0001*
Histopathological diagnosis correlated with provisional diagnosis after special tests performance (Consistent with aid)	13	5.9	
Total Consistency	155	70.7	
Histopathological and clinical diagnosis were different (Inconsistent)	58	26.5	
Inconclusive	6	2.7	

Total	219	100%
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*Pearson Chi2 test

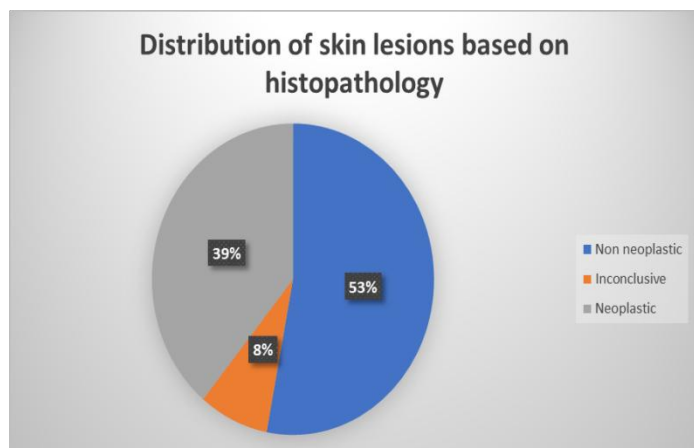
In this study, out of 77 cases, the most common type of skin lesions were benign tumors and cysts that represented 23 cases (29.9%), followed by 13 cases (16.8%) of skin infection and infestation, as in Table 5. A significant statistical association can be seen between the distribution of complex cases among groups of skin lesions ($p=0.0001$).

Table (5): Distribution of skin lesion groups among patients.

Group of skin lesions	Frequency	Percent (%)	P value
Lichenoid skin diseases	3	3.9	0.0001*
Psoriasiform skin diseases	5	6.5	
Spongiotic skin diseases	9	11.7	
Granulomatous skin diseases	4	5.2	
Vesiculobullous skin diseases	2	2.6	
Vasculopathies skin diseases	2	2.6	
Infection and infestation	13	16.8	
Sclerosing disorders	3	3.9	
Benign tumors and cysts	23	29.9	
Malignant tumors	7	9.1	
Inconclusive	6	7.8	
Total	77	100%	

* Pearson Chi2 test

Out of 77 cases, 30 cases (39%) were neoplastic, and 41 cases (53%) were non-neoplastic, and histopathological diagnosis was inconclusive in 6 cases (8%), as shown in figure 1.



Figure(1): Distribution of skin lesions based on histopathology.

Additional tests like IHC were performed in 10 cases (13%) with confirmative diagnosis in 95% of complex cases. Eight cases were stained with CD3 and CD5 for mycosis fungoides as shown in (Figure 2,3). Two cases were stained with S100 (one for schwannoma and the other for melanocytic nevus), and only one case was stained with Desmin and SMA for dermatomyofibroma. Each case was stained with more than one stain, as in table 6. A significant statistical association can be seen of the confirmative and non confirmative IHC results ($p= 0.0003$).

Table (6): Frequency of the IHC markers used with their diagnostic confirmatory ability.

IHC	Frequency	Confirmative	Non-confirmative	P value
CD3	8	8	0	0.0003*
CD5	8	7	1	
S100	2	2	0	
Desmin	1	1	0	
SMA	1	1	0	
Total	20	19	1	
Percent	100%	95%	5%	

* Pearson Chi2 test

Special stains were performed in 23 cases (29.8%) each case was stained with more than one stain with confirmative diagnosis in 58.6% of complex cases. Eleven cases were stained with Giemsa stain for diagnosis of leishmaniasis, ten cases were stained with PAS stain for fungal infection and histoplasmosis as shown in (Figure 4) , three cases were stained with GMS stain for fungal infection, two cases were stained with reticulin for anetoderma cases and leprosy cases were stained with Fite-Faraco stain and GMS as shown in (Figure 5), and

only one case was stained with ZNS stain for tuberculosis, as in table 7. A significant statistical association can be seen between confirmative and non confirmative special stains results ($p= 0.0002$).

Table (7): Frequency of the special stains used with their diagnostic confirmatory ability.

Special stain	Frequency	Confirmative	Non-confirmative	P value
PAS	10	3	7	0.0002*
Giemsa	11	10	1	
GMS	3	0	3	
Reticulin	2	2	0	
ZNS	1	0	1	
Fite	2	2	0	
Total	29	17	12	
Percent	100%	58.6%	41.4%	

* Pearson Chi2 test

Nine cases (11.6%) were solved by IHC, and sixteen cases (20.7%) were confirmed by special stains, as in table 8. There was no significant statistical association between the frequency of complex skin lesions and the percentage of solved cases ($p= 0.1655$).

Table (8): Frequency of complex cases solved by

Variable	Number	Percentage	P value
IHC	9	11.6%	0.1655*
Special stain	16	20.7%	
Total	25	32.3%	

confirmatory tests.

* Pearson Chi2 test

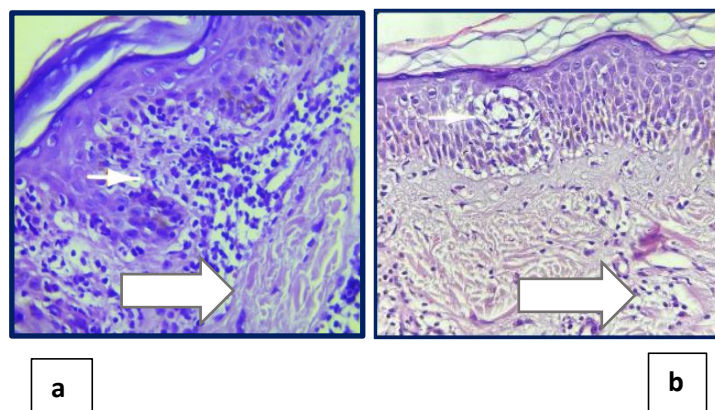


Figure (2): Mycosis fungoides. Band-like upper dermal lymphoid infiltrates and prominent epidermotropic

hyperchromatic lymphocytes with paupier microabscess (white arrow) (H&E) **a)** 400X, **b)** 100X

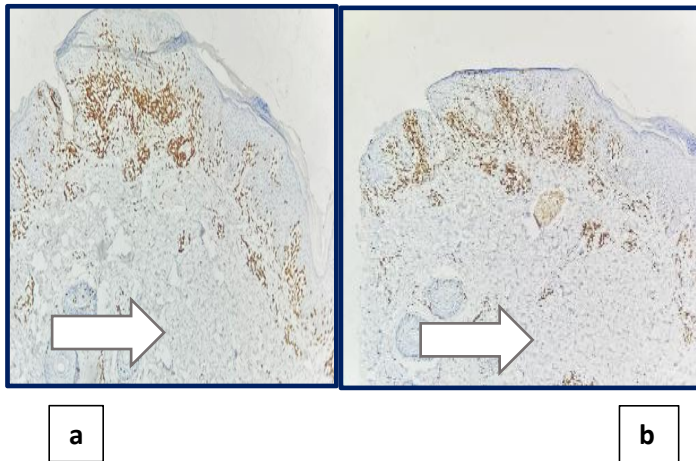


Figure (3): Mycosis fungoides. Positive T-cells within the epidermis and upper dermis (IHC,100X). **a):** CD3, **b)** CD5.

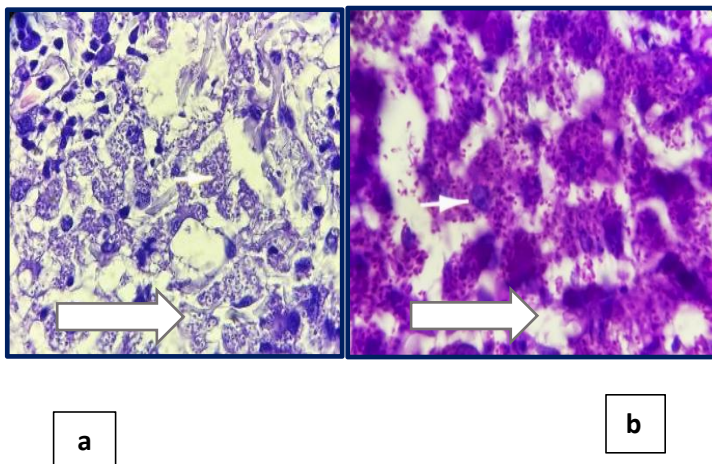


Figure (4): Histoplasmosis **a)** Yeasts are seen as inclusions within the cytoplasm of histiocytes (white arrow) (H&E, 100X), **b)** Periodic acid Schiff (PAS) stain

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positive purple-colored-yeasts within the cytoplasm of histiocytes (white arrow) (400X).

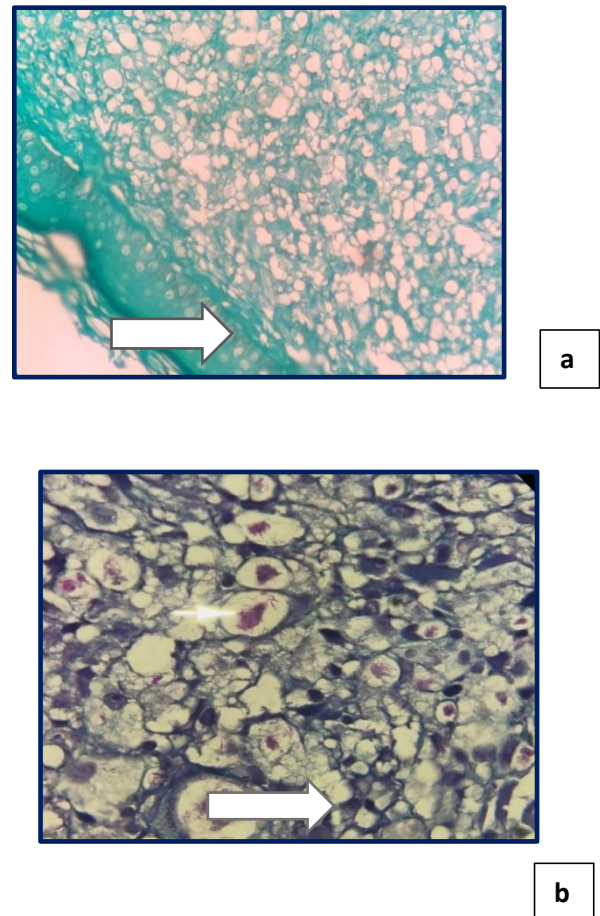


Figure (5): Lepromatous leprosy. **a)** Grocott methenamine silver (GMS) stain is negative for lepra bacilli (400X), **b)** Fite Faraco stain shows red-colored acid fast lepra bacilli within the cytoplasm of the foamy histiocytes (white arrow) (400X).

Discussion:

Skin lesions are heterogeneous lesions with a wide range of presentations from simple rashes to life-threatening cancers; most conditions are diagnosed based on thorough history taking and clinical examination(9). Skin biopsy is vital for confirming the clinical diagnosis in diagnostic dilemmas; sometimes, the pathological findings differ from the clinical diagnosis, leading to clinicopathological discordance. Clinicopathological correlation is essential for making a final diagnosis to achieve the appropriate treatment(9,10).

The histopathological picture depends on various factors that influence the diagnosis; these include the clinical

information provided, the age and stage of the lesion, the technique used to obtain the biopsy, and the fixation and processing of the tissue (11).

In the current study, 77 cases (35%) were sorted as complex skin lesions, demonstrating a slight female preponderance (54.5%), which aligns with the Saudi study, where (58.1%) of the biopsies were from female subjects (12). Also, a study from Nepal had found female predominance (13). This contrasts with another study by Mamatha et al., in which males were more frequently affected by skin lesions, with a male-to-female ratio of 1.5:1 in their cohort of 105 patients (14). This could be attributed to various factors, including occupational exposures, lifestyle choices, and biological differences that predispose to this gender disparity.

The most common age group was 61 years old and above (24.7%), which was not statistically significant in this study, like a study in India (15). However, it differed from the other study by Bezbaruah et al., which showed that most cases were 21-30 years old (10), comparable to the study conducted by Abubaker et al. (16). This variation is possibly attributed to factors like geographic variation, environmental influences, or genetic predispositions that might contribute to these differences.

The study showed that histopathological examination by H&E alone was consistent with clinical diagnosis in 142 cases (64.8%); this is the same as a study by Venugopal et al., which showed that out of 403 skin biopsy samples, the clinicopathological consistency in diagnosing skin diseases is (67.5%) (17).

The remaining 77 cases (35%) were considered complex cases where histopathological examination was inconsistent with the clinical diagnosis, necessitating other diagnostic aids to reach the final diagnosis, which was achieved in 13 cases (5.9%). Accordingly, the histopathological examination and diagnostic aids collectively helped in the diagnosis of 155 cases (70.7%); this study was statistically significant, consistent with other international studies, same as Jha et al. found an overall concordance of 76.5% and discordance in 23.5% of cases (13). A 68% consistency of clinical and histological diagnoses was observed in a retrospective cohort study by Korfitis et al. (18). All conclude that histopathology and its related confirmatory tests greatly help diagnose skin diseases. The use of other diagnostic aids like IHC and special stains helps remarkably in the diagnosis of complex cases where H&E alone is not enough.

Only CD3 and CD5 were used for IHC, and they were confirmative in 95% of the complex mycosis fungoides cases.

CD3 was positive in all cases, like a study in Baghdad (19). Positive in all cases except one. Tumor cells of MF usually show strong CD3 positivity, loss T cell markers, most commonly CD7, followed by CD5, which may indicate the neoplastic nature of these cells, and increase CD4+/CD8, and various other combinations may be observed (20,21). Unfortunately, although the markers used in this study were IHC markers, other markers were not used because they are expensive and limited in availability.

Although IHC can aid in diagnosis, sometimes interpretation can be difficult as there may be overlapping findings. Thus, IHC should not be interpreted in isolation and should be done in the context of clinical and histological findings (20).

On the other hand, special stains confirmed the diagnosis in (58.6%) of the complex skin cases included in this study, which was higher than a study by Kiprono et al., found that a proper histopathologic diagnosis with hematoxylin and eosin alone was possible in 344 (89.1%) samples. Further special stains were necessary in 45 (11.6%) cases, mostly skin infections (22).

The results of this study indicate the importance of using different special stains in cases where histopathological diagnosis is not definite. Zaaroura H et al. (2019) used periodic acid-Shiff (PAS) stain to diagnose fungal infection in biopsies (23), who found that only 3% of the stained specimens were PAS positive. This result is nearly the same as this study's (3.8%). Processing effects, staining technique, and whether the lesion was modified by previous topical and systemic treatment before the biopsy was taken are possible explanations for the small positive results of PAS-stained specimens in different studies.

Disagreement between the clinical and histopathological diagnosis was reported in 26.5% of the cases, which is slightly higher than other studies and was statistically highly significant. This is nearly the same as a study in Nepal that found discordance in 23.5% of cases (13), and a study in Saudi Arabia that showed that 24.1% of the cases were discordant, which was not statistically significant, and indicates a significant difference in different body sites (12), while a study in Bangladesh reported discordance of only 13.5% (24). Selection of the site for biopsy has an essential role, as clinically dissimilar lesions biopsied from the same patient can show different types of histopathology (25). In addition, many skin diseases may be misdiagnosed or overlooked because they present in unusual modes of presentation, or they may be modified by treatment or affect unusual sites that differ from predilection sites for different diseases (25).

In the current study, inconclusive results were obtained in 2.8% of the cases, which is lower than the percentages of other studies in Nepal and Pakistan, which show 4.5% and 5.65%, respectively (25,26). These inconclusive results depend on many factors like correct biopsy site and technique choice, and appropriate tissue fixation and processing methods (12).

Among complex cases, non-neoplastic lesions were more frequent (53%) than neoplastic lesions (39%), like other international studies as in Indian study showed microbial infections accounted for the majority (33.93%) (27), same by Nepalian study, most common histological spectrum was infectious group in (29.4%) (13). While other studies in Nigeria found that neoplastic lesions were the major entity, pre-malignant and malignant tumors accounted for 26.25% of all skin lesions (16), same as a study in another Indian study showed a total of 98/234 cases presented as skin tumors; of these 40 (40.81%) cases were histologically diagnosed as benign and 58 cases (59.18%) were diagnosed as malignant lesions (28). This difference can be explained by geographic, environmental, and causative risk factors in the different countries (14).

The most common malignant neoplastic skin lesion in this study was Mycosis fungoides (9%). In contrast, in other studies, such as Goswami et al. and Jha et al. study, in which Basal cell carcinoma was the most observed neoplastic skin lesion (13,15). Meanwhile, other studies found that squamous cell carcinoma was the most common lesion, as in Bezbaruah et al. study was seen in (11.5%) cases (10). Also, a study by Thapa et al. in which reported (15.74%) cases were Squamous cell carcinoma (11). The explanation of this difference in types of neoplastic skin lesions was related to the fact that only complex lesions were included in this study, so it showed a higher prevalence of rarer conditions. In contrast, other studies deal with non-complex skin lesions.

Infections and infestations were the most common (16.8%) among the non-neoplastic lesions in the study samples. Leishmaniasis was the commonest infection (6.5%) followed by tinea (3.8%), while other studies found that leprosy was the most common infectious disease reported (31.81%) in an Indian study and (14.1%) cases in a Nepalian study, respectively (13,14). This difference may be related to different susceptibilities and variations in the percentage and incidence of various diseases in different populations. In addition, some of these diseases were considered great imitators, which may show different presentation modalities, mimicking many other skin diseases.

This investigation offers a distinctive viewpoint by concentrating on intricate cases and evaluating the

significance of IHC and special stains in the diagnostic process. Unlike previous studies (13,24,25), that predominantly investigate histopathological concordance, our study explores how additional diagnostic techniques enhance diagnostic accuracy.

Conclusions

Histopathological evaluation plays a significant role in managing complex skin lesions. The integration of clinicopathological correlation is crucial for achieving accurate and quick diagnosis. IHC and special stains are essential in diagnosing some complex cases, especially IHC in mycosis fungoides and special stains in infectious dermatitis.

In this study, skin lesions were commonly reported and widely distributed in both sexes; most were found in females. Advanced diagnostics reduced inconclusive cases and improved patient outcomes. Non-neoplastic skin lesions were the major entity, with leishmania being the most prevalent lesion. Mycosis fungoides was the most common neoplastic complex lesion.

Further studies with larger sample size and a broader panel of markers are warranted to optimize diagnostic accuracy and minimize clinicopathological discordance.

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