Original Article

Histopathological diagnosis of dermatological lesions: a Hospital-based study

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ABSTRACT

Introduction: The skin is susceptible to a wide range of pathological conditions. The histopathological analysis is mandatory for the accurate diagnosis of many of these conditions. Sometimes, additional recommendations and ancillary techniques are required for its confirmation and further classification. The study aims to analyze the various ancillary techniques and recommendations status made during the histopathological diagnosis of dermatological lesions.

Methods: This cross-sectional observational study was conducted for all skin biopsies (n=129) received from January 2017 to June 2020 at the Department of Pathology, Birat Medical College Teaching Hospital, Morang, Nepal. H&E stained slides of these biopsies were retrieved from the departmental archives and reviewed under light microscopy for the diagnoses made before. The various ancillary techniques and recommendations status made during diagnosis along with its correlation between categorization of histopathological diagnoses was analyzed using SPSS version 17.

Results: Among 129 skin biopsies, various recommendations and ancillary technique status were 102(79.06%) and 78(60.46%) respectively. Among which, "special stains" and "follow up biopsy after adequate medication" status was maximum with 65(50.4%) cases each. Likewise, the "more representative biopsy" in 03 (2.3%) cases, "immunofluorescence study" and "special stain and immunohistochemistry panel study" each in 01(0.8%) cases were seen among the rare ones respectively. Infectious lesions of bacterial origin in 32 (24.8%) cases, of fungal and viral origin each in 02(1.6%) cases were the most common and rare diagnosis respectively. The categorization of histopathological diagnosis revealed significant association ($p \leq 0.001$) with various recommendations and ancillary techniques status.

Conclusion: The significant correlation among various ancillary techniques and recommendations status made during histopathological diagnoses of dermatological lesions reflected its importance in diagnosing dermatological lesions.

Keywords: Ancillary techniques, Dermatological lesions, Histopathological diagnoses, Recommendations

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INTRODUCTION

Histopathology evaluation is essential to the diagnosis of many inflammatory and neoplastic skin conditions. Skin disorders may be the sole manifestations of some systemic disorders as well.[1] Clinical presentations of such disorders generally reveal some changes as hypopigmentation, hyperpigmentation, macules, papules, nodules and others. Clinical presentations are sometimes similar and overlap with different skin diseases; hence histopathological analysis of such skin lesions is mandatory for confirmation of diagnosis.[2]

Routine histopathology examination depends upon fixation and chemical processing to create H&E stained slides. This H&E technique is one of the most durable and widely accepted techniques in pathology. However, there are many cases in which H&E evaluation alone cannot reflects the answer of every question posed at the early diagnostic level. Moreover, is not adequate during the pathologist looking for etiologic or histogenetic factors for clinico-pathological correlation. Also, there are some diagnoses for which recommendations and ancillary techniques made can be valuable to increase diagnostic certainty.[3]

Some of the recommendations in our day-to-day dermatopathology practice are: follow up biopsy after adequate medication, deep representative biopsy, close monitoring of lesions and correlate with clinical findings. Likewise, ancillary techniques used in our day-to-day dermatopathology practice are: histochemical special stains, immunohistochemistry panel study, immunofluorescence study and polymerase chain reaction study. These ancillary techniques have been shown to increase the accuracy of diagnosing dermatological cases. Hence, a laboratory dealing with histopathological specimens need to have facility for a range of special stains and other ancillary techniques for a complete diagnosis.[4] With this background, this study aims to find out the prevalence and analyze the various ancillary techniques and recommendation status made in the context of histopathological diagnosis of dermatological lesions.

MATERIALS AND METHODS

This is a cross sectional observational study conducted for all skin biopsies received from January 2017 to June 2020 at Department of Pathology, Birat Medical College Teaching Hospital, Morang, Nepal. The study included total of 129 skin biopsies of patients with irrespective of age and sex. Clinical details and pathological reports were collected from the record/case sheets and archive of detail histopathological reports. H&E stained slides of dermatological biopsy was retrieved from the archives of the department of pathology and reviewed under the light microscopy for diagnosis made before. The necessary recommendation and ancillary technique status made for histopathological diagnosis of the dermatological lesions were recorded in the proforma. These recommendations were grouped as: "follow up biopsy after adequate medication", "more deeper representative biopsy" and "close monitoring of the lesions and correlate with clinical findings" in the study. Similarly, ancillary techniques were grouped as: "histochemical special stains", "immunohistochemistry panel study", "immunofluorescence study" and "polymerase chain reaction study" in the study. The spectrum of histopathological diagnoses were categorized as: eczematous, non infectious papulosquamous disorder, infectious (bacterial, viral, fungal origin), vesicobullous disorder, inflammatory disorder, pigment disorder, degenerative disorder, mesenchymal disorder, vasoproliferative disorder, vasculitis, descriptive reports, benign neoplasm and malignant neoplasm.[5] The descriptive non-specific diagnosis was kept under the category of descriptive report. The ethical clearance for conducting this study was taken from the Institutional Review Committee (IRC) of Birat Medical Teaching Hospital. Data were coded, checked and entered in MS Excel sheets and analyzed by SPSS version 17. The categorical variables including primary variables were expressed using a frequency table. The association between the categorization of histopathological diagnosis with recommendations and ancillary technique status was observed. Statistical significance was calculated using Fisher's exact test and p-value $\leq$ 0.001 were considered significant.

RESULTS

In our study, prevalence for various recommendations and ancillary technique status made during histopathological diagnosis was 102 (79.06%) and 78 (60.46%) cases respectively, among the total of 129 dermatological cases (Figure 1).

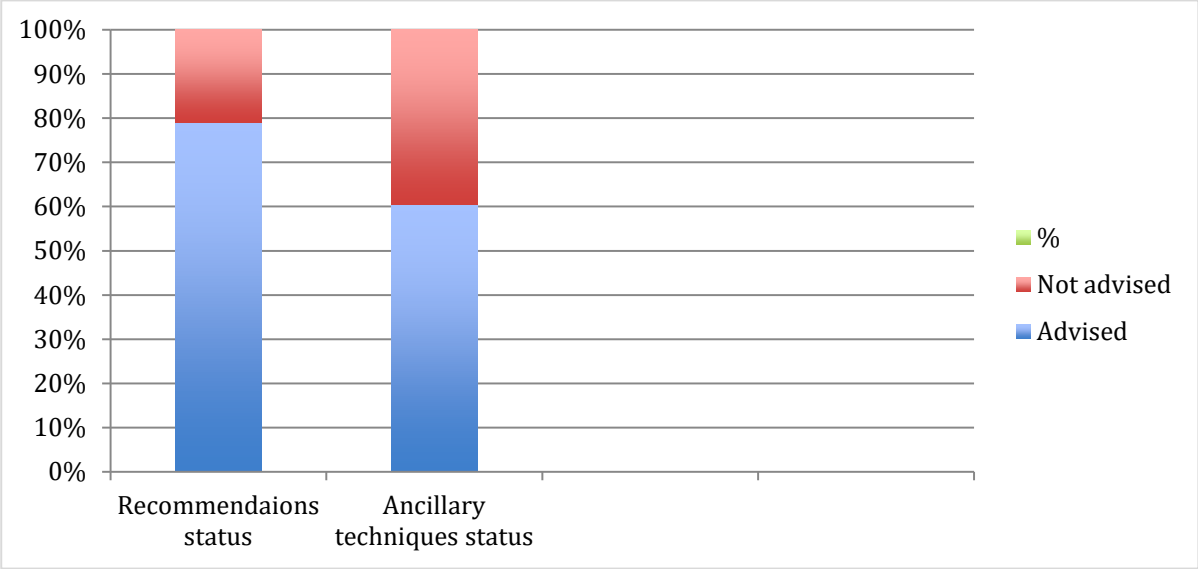

Figure 1: Recommendations and Ancillary technique status among histopathological diagnosis

Infectious lesions of bacterial origin were the most common categorization of histopathological diagnosis among different dermatological lesions followed by non-infectious papulosquamous disorder. The infectious lesions of fungal followed by viral origin and vasoproliferative disorders were among the rare categorization of histopathological diagnosis observed (Figure 2).

The various recommendation status made during the histopathological diagnosis of dermatological lesions revealed the "follow up biopsy after adequate medication" in 65(50.4%) cases, as the commonest one. The "more representative biopsy" recommendations were among the rare ones comprising of 03(2.3%) cases. There were "no recommendations" made for 27 (20.93%) cases for its histopathological diagnosis (Table 1). Among the various ancillary techniques advised during the histopathological diagnosis of dermatological lesions, the "special stains" was the commonest one in 65(50.4%) cases. The "immunofluorescence study" and "special stain and immunohistochemistry panel study" were among the rare ones comprising of 01(0.8%) cases each. There were "no ancillary techniques" advised further for 51(39.5%) cases during its histopathological diagnosis (Table 2). The categorization of histopathological diagnosis in the study correlated well (p-value ≤ 0.001) with the recommendation and ancillary techniques made within the histopathological diagnosis of dermatological lesions (Table 3).

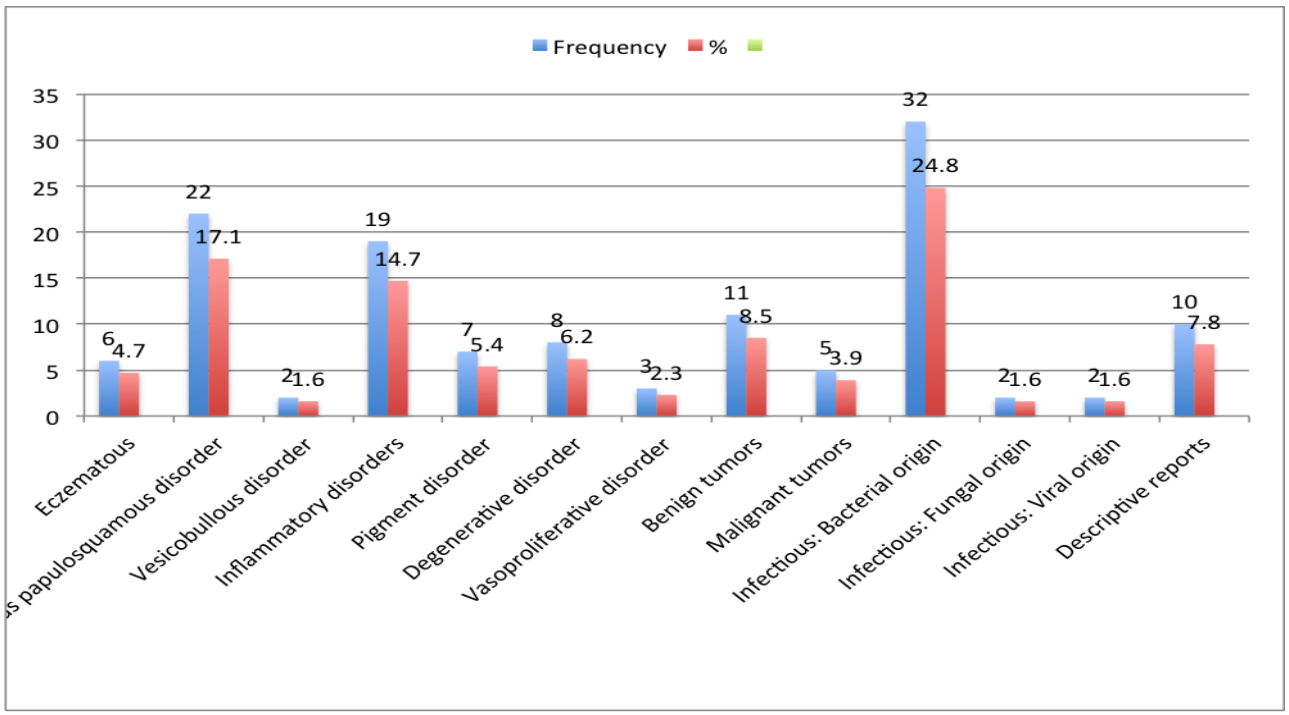

Figure 2: Frequency of skin diseases in our study.

Table 1: Spectrum of recommendation status within histopathological diagnosis of dermatological lesions

Recommendation status	Frequency (n)	Percentage (%)
No recommendations	27	20.9
Close monitoring of the lesions	13	10.1
Follow up biopsy after adequate medication	65	50.4
Correlate with clinical findings	13	10.1
Follow up biopsy after adequate medication and correlate with clinical findings	08	6.2
More representative biopsy	03	2.3

Table 2: Spectrum of ancillary technique status within histopathological diagnosis of dermatological lesions

Ancillary technique status	Frequency (n)	Percentage (%)
No ancillary techniques	51	39.5
Immunohistochemistry panel study	09	7.0
Special stains	65	50.4
Special stain and PCR study	02	1.6
Special stain and immunohistochemistry panel study	01	0.8
Immunofluorescence study	01	0.8

Table 3: Cross-tabulation between histopathological diagnosis with recommendations and ancillary technique status (using Fisher's exact test)

Histopathological diagnosis	Recommendations			Ancillary Techniques		
	Yes	No	P value	Yes	No	P value
Eczematous	06	00	0.001	05	01	0.000
Noninfectious papulosquamous disorder	16	06		08	14	
Vesicobullous disorder	00	02		02	00	
Inflammatory disorders	15	04		15	04	
Pigment disorders	06	01		00	07	
Degenerative disorders	04	04		01	07	
Vasoproliferative disorders	02	01		03	00	
Benign tumors	06	05		05	06	
Malignant tumors	05	00		04	01	
Infectious: bacterial origin	31	01		32	00	
Infectious: fungal origin	01	01		02	00	
Infectious: viral origin	01	01		00	02	
Descriptive reports	09	01		01	09	

-value ≤ 0.001 statistically significant

DISCUSSION

Several cutaneous disorders are heterogeneous and exhibits broad spectrum of clinical as well as histopathological patterns. The histopathological examination is the gold standard technique for diagnosing dermatological lesion. For clinical diagnosis confirmation of dermatological lesions, skin biopsy is helpful as a simple outpatient procedure.[6] There occur many histopathological spectra in the way of diagnosing dermatological lesions. Such lesions in our study were categorized into different groups as per individual histopathological features. They were as: eczematous, noninfectious papulosquamous disorder, vesicobullous disorder, inflammatory disorder, pigment disorder, degenerative disorder, vasoproliferative disorder, benign neoplasm, malignant neoplasm, infectious lesions: with bacterial, fungal and viral origin. The descriptive non-specific diagnosis was placed under the category of descriptive report. Of which, the most common category of histopathological diagnosis was infectious lesion, of bacterial origin for 32(24.8%) cases followed by non-infectious papulosquamous disorder with 22(17.1%) cases. In a study, similar spectrum of histopathological diagnosis of dermatological lesions was observed. The infectious disorder (34.6%) being the commonest ones, as of our study findings followed by the papulosquamous disorders (18.3%) and benign tumors (17.5%) respectively was noted. [5]

H&E staining used for the histopathological examination is a simple, low-cost procedure of fixation providing rapid and comprehensive information in our day-to-day practice. In H&E technique of staining slides, hematoxylin stains the nuclei while eosin counter stains cytoplasm and

different extracellular contents. In many cases, evaluation of H&E stained slides alone cannot answer all the queries generated at an early diagnostic stage. Moreover, the etiologic factors or even a histogenetic and pathogenetic correlation is not possible to know only from H&E techniques. Additional ancillary technique and necessary recommendations are needed for diagnostic confirmation in such conditions.[3]

Maingi CP and team[7] in their study reflects the utility of both recommendation and ancillary technique of deeper sections and special stains for diagnosing dermatopathological specimens. Such additional recommendations of deeper sections in their study provided diagnostic information to the pathologist in 37.3% of cases, in which they were performed. Deeper sections are more likely to provide accurate diagnosis (23.6%) rather than to establish new diagnosis not seen on the original sections (13.6%). Special stains contributed to the diagnosis in 21.1% of cases in their study. A study done from two University Hospital (Tanzania and Kenya) in East Africa[4] showed a proper histopathologic diagnosis with H&E stain slides alone for 89.1% cases. In remaining cases (10.9%), special stains were however necessary to diagnose them.

In our study, the prevalence of ancillary techniques and recommendation status made during the histopathological diagnosis of dermatological lesions were in 78(60.46%) and 102(79.06%) cases respectively. Likewise, histopathological diagnosis confirmation made without any recommendations and ancillary techniques were in 27(20.9%) and 51(39.5%) cases respectively (Figure 1). The various ancillary technique status (Table 2) in our study comprises special stains in 65(50.4%) cases as commonest one followed by immunohistochemistry panel study comprising in 09(7.0%) cases. Similarly, special stains with PCR study in 02(1.6%) cases followed by special stains with immunohistochemistry panel study and immunofluorescence study in 01 (0.8%) cases were among the least ones respectively. The special stains were most common among ancillary technique status advised in our study. This justifies that the most categorization of histopathological diagnosis with infectious lesion, is of bacterial origin.

Such histochemical special stain are compatible with formalin-fixed tissues, belonging to various families of chemical stains specially made for microscopic visualization of different types of human cells, tissues, pigments, parasites and microorganisms. They in turn remain as an important diagnostic tool for enhancing the diagnosis providing powerful complementary information. It can be followed by one of another ancillary technique such as immunohistochemistry panel study, immunofluorescence study and sometimes with combination between each other as well.[3] Special stains with PCR study and special stains with immunohistochemistry panel study were among the combined ancillary technique status findings in our study. The information thus achieved from using immunohistochemistry combined together with the previous morphology features revealed by H&E staining techniques yields the highest information about the disease diagnosis.[3] Study has proven that, no method other than immunohistochemical technique during the past fifth decade has much kept the importance of clinical histopathology.[8] All such techniques are interpreted in the context of pre-defined morphological features to prevent potential pitfalls and be more useful rather than be misleading.[9] Immunofluorescence study is also another ancillary technique that supports the clinical diagnosis. Moreover, it provides extra diagnostic and prognostic information as well. Especially for vesicobullous skin diseases this type of ancillary techniques are useful for further information.[10] In our study, we had one vesicobullous disorder diagnosed histomorphologically and were advised for immunofluorescence study for further evaluation. Similarly, PCR study is an ancillary technique that is fast, reliable, and sensitive with a specific central technology for clinical molecular genetic testing.[5] Likewise, such technology depends directly on capacity of DNA polymerase to

imprint a DNA strand using a short complementary DNA fragment as a sensitizing template.[11, 12] One of the cases diagnosed within the infectious lesion category in our study was recorded further for PCR evaluation, for isolation of any organisms if present. This explains the importance, usefulness and indication of ancillary techniques required during the histopathological diagnosis of such dermatological lesions.

We also evaluated various recommendation status made during the histopathological diagnosis of dermatological lesions in our study. Among which, the "follow up biopsy after adequate medication" was seen in 65(50.4%) cases, followed by "close monitoring of the lesion" and "correlate with clinical findings" each in 13(10.1%) cases respectively (Table 1). Study on the utility of deeper sections and special stains for dermatopathological specimens done by Chetan P and team[7] reflected deeper sections to provide diagnostic information to pathologist in 37.3% cases. Similarly, they were likely to provide more accurate diagnosis as well (23.6%). This recommendation is equally important to know or update about the histopathological diagnosis of the dermatological lesions retrospectively. Such practice if made mandatory will definitely flare up or disseminate to incorporate the clinicopathological finding correlation system be established before diagnosing any dermatological lesions. So, a dermatopathology laboratory should have all range of special stains and other ancillary technique facilities for a complete diagnosis.

The relation between the different categorization of histopathological diagnosis with the various ancillary technique and recommendation status was statistically significant, achieved by cross tabulating between them (Table 3). This statistically significant association enhances the importance, usefulness and indication of ancillary techniques and recommendations required during the histopathological diagnosis of such dermatological lesions.

CONCLUSION

Though histopathology procedure is gold standard in diagnostic protocol, still the procedure is inconclusive. Various recommendation and ancillary technique status in the study showed a significant correlation among different categorizations of histopathological diagnosis of dermatological lesions, thus prevailing its high diagnostic implications in dermatopathology practice.

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