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Value of Skin Biopsy as a Diagnostic Procedure in Dermatology

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Abstract

Introduction & objectives: The role of dermatopathology has expanded in the past decades from routine histology to involve immune pathology, ultra structural, and molecular biological techniques. The aim of this study was to test the value of skin biopsy as a diagnostic procedure in the diagnosis of variable skin disorders in Benghazi, Libya.

Materials and Methods: Over a period of 4 years; 200 patients were seen by a consultant dermatologist in Jumhori hospital skin department-Benghazi, Libya, for them a skin biopsy was performed to establish the diagnosis. Specimens were subjected to routine histopathological examinations (Haematoxylin and Eosin) by a general pathologist then reviewed clinically and pathologically by the dermatologist. There was a direct communication between the dermatologist and pathologist to obtain final diagnosis after clinicopathological correlation and to plan for further workup if needed.

Results: Pathological diagnosis was consistent with one of the clinical differential diagnoses in 82%, gave a new diagnosis in 6% and was non-diagnostic in 12 %. After clinicopathological reviewing of the cases; concordance between pathological and final diagnosis occurred in 58% whereas clinicopathological correlation gave the diagnosis in 18%. In 24% further investigations were required; special stains were needed in 7 %, immunofluorescent studies in 9%, electron microscopy in 2%, immunohistochemistry in 6% and molecular biological technique was required in 3 %.Special stain was done for 2%, immunohistochemistry for 1%, whereas in the remaining 21% we could not sit a final diagnosis due to the unavailability of the required techniques.

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Conclusions: Dermatohistopathology is an important diagnostic procedure in clinical dermatology, considering the clinicopathologic correlation as an essential step in the diagnostic process. It must be coupled with other techniques as immunofluorescence, immunohistochemistry, electron microscopy and molecular pathology to make the exact diagnosis of some skin diseases.

Keywords

Biopsy; Dermatologistis; Haematoxylin; Immunofluorescence

Introduction

Although most skin diseases can be diagnosed with inspection, the clinical appearance of skin lesions may overlap, mandating skin biopsy and histopathologic examination [1]. The dermatologist is responsible for obtaining the biopsy and submitting it to the pathology laboratory together with clinical information [2-5] where microscopic examination and interpretation of skin biopsy carried out by the pathologist. Interpretation of histological reports by the dermatologist is important to put it in the clinical context. The integration of clinical information with the pathological findings is important for the diagnosis of many skin disorders [3, 7]. Some skin diseases overlap clinically and pathologically and for definitive diagnosis, techniques as immunofluorescence, immunohistochemistry, electron microscopy and molecular pathology are needed [5,6]. The aim of this study was to test the value of skin biopsy as a diagnostic procedure in the final diagnosis of variable skin disorders in Benghazi, Libya.

Materials and Methods: Over a period of 4 years; 200 patients were seen by consultant dermatologists in Jumhori hospital skin department-Benghazi, Libya, for them a skin biopsy was performed to establish the diagnosis. Clinical differential diagnoses along with a brief history and clinical description was provided with the request of histopathology. Skin specimens were subjected to histopathological examinations by randomly selected general pathologists; the specimens were processed and then stained with Haematoxylin and Eosin. Special stains were used when requested and available to identify infectious agents as fungi or specific substances deposited in the skin as the amyloid. All histological specimens were reviewed by the dermatologist. There was a direct communication between the dermatologist and pathologist for discussion to obtain final diagnosis after clinicopathological correlation and to plan for further workup.

Results: Two hundred cases were studied clinically and pathologically. They included inflammatory skin diseases as well as tumours. (Table 1) Pathological diagnosis matched one of the clinical differential diagnoses in 82%, gave a new diagnosis in 6% and was non-diagnostic in 12 %. (Figure 1) Out of the 12% where the histopathological reports were non-diagnostic; the histopathology of 5% could only provide a pattern analysis; as granulomatous and interface lichnoid reaction and in 7% only a descriptive report with non-specific features had been issued. After clinicopathological reviewing of the cases; definite final

diagnosis could be sited in 76%; concordance between pathological and final diagnosis occurred in 58% whereas clinicopathological correlation gave the diagnosis in 18%. Out of the 6% new pathological diagnosis, only 1% was accepted. Figure 2 demonstrate the results after clinicopathological correlation and special tests. Reaching definite diagnoses in 24% were not possible without certain technique; special stains were needed in 7 %, immunofluorescent studies in 9%, electron microscopy in 2%, immunohistochemistry in 6% and molecular biological technique was required in 3 %. (Figure 3) Unfortunately these diagnostic tests were not available in Benghazi pathological laboratories; special stain was done for 2%, immunohistochemistry for 1%, whereas in the remaining 21% we could not sit a final diagnosis due to the unavailability of the required techniques. (Figures 4-10) show clinical and pathological results of variable cases.

Category:	**Diseases:**	**Cases number:**
Papulosquamous	Lichen planus	23
	Psoriasis	14
	Pityriasisrosea	2
	Pityriasisrubra pilaris	3
Dermatitis	Contact dermatitis	2
	Discoid eczema	2
	Nodular prurigo	5
	Stasis dermatitis	1
Neoplasia	Basal cell carcinoma	7
	Squamous cell carcinoma	2
	Kaposi sarcoma	1
Pilosebaceous diseases	Rosacea	7
	Demodex infection	4
	Acne	2
	Lupus milaridissaminatusfacii	1
Benign tumours	Seborrheic keratoses	3
	Syringoma	3
	leomyoma	1
Vascular	Vasculitis	5
	Pigmented purpura	1
	Purpurfulminans	1
Connective tissue	Scleroderma	1
	Lupus erythematosus	8
Infections	Scabies	4
	Leishmania	2
Pigment disorders	Ashy dermatosis	2
	Post inflammatory.	2
	Lentigo	2
	Beckers melanosis	1
	Reticulate pigmentation	2

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Miscellaneous	Xanthogranuloma Perforating collagenosis Others	5 9 29
Further investigations needed for final diagnosis		42
Total		200

Table 1: Various skin disorder seen in the study.

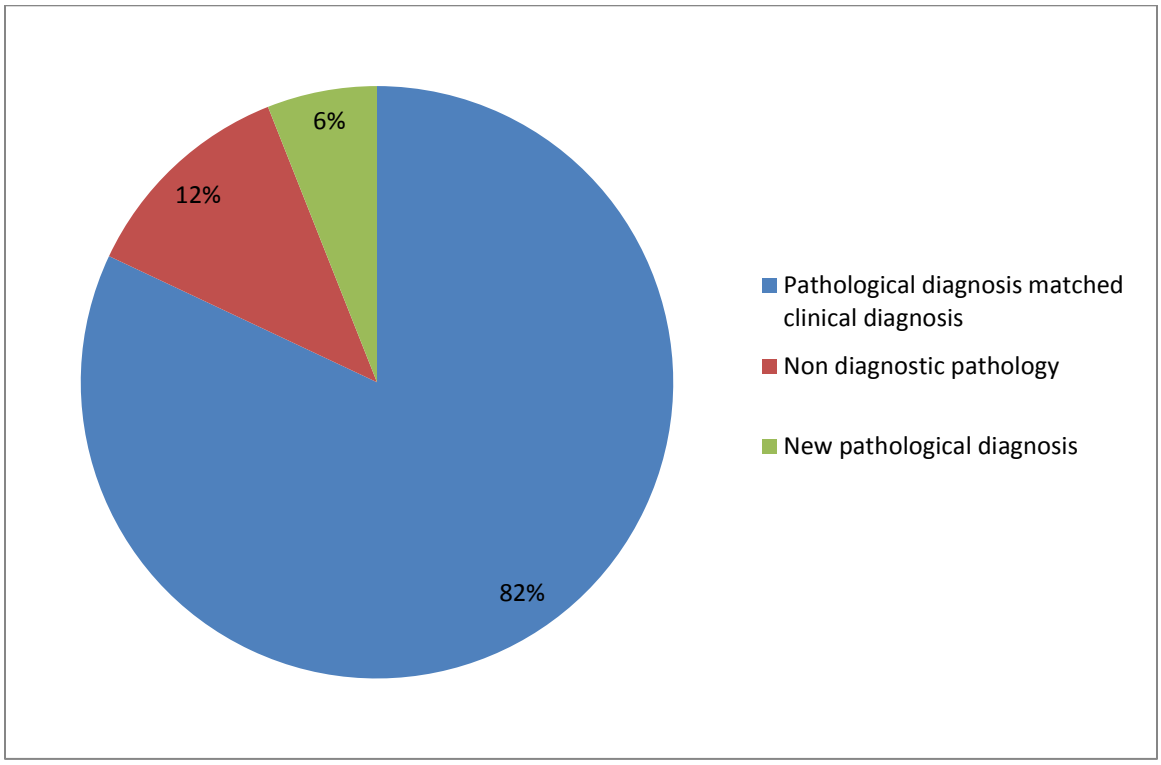

Figure 1: Initial histopathological outcome of the 200 skin biopsies.

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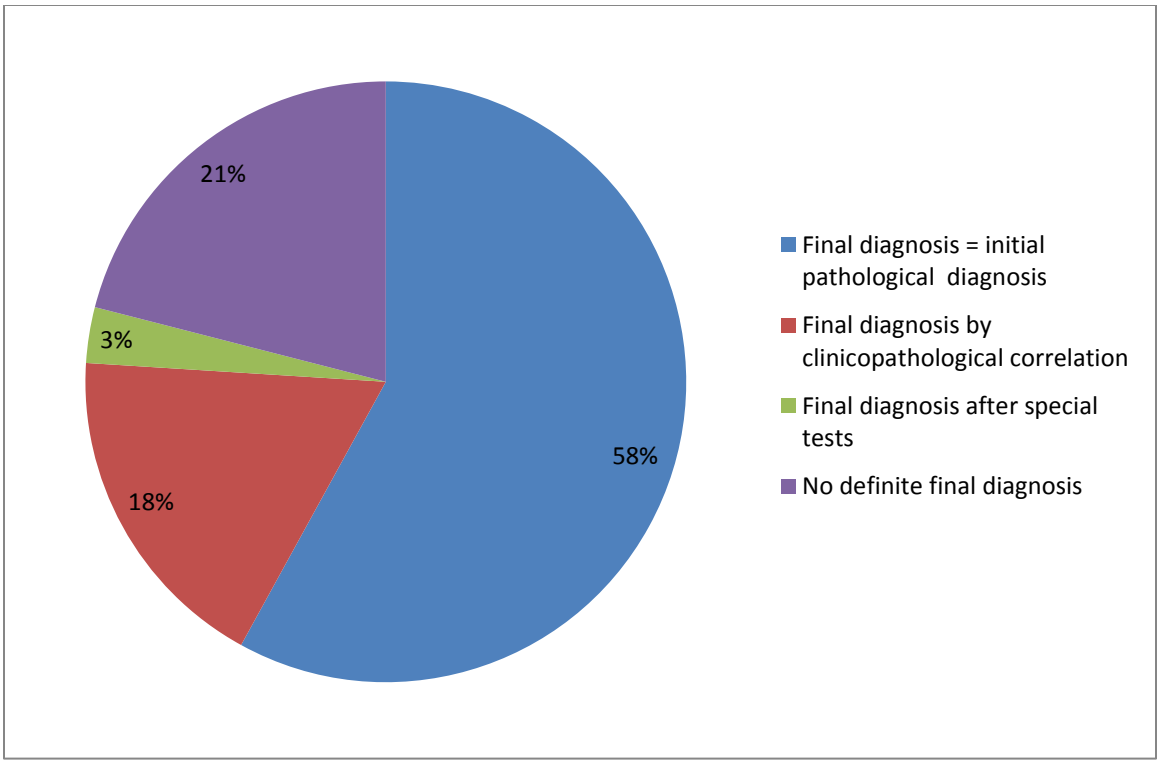

Figure 2: Results in figure 1 after clinicopathological correlation and special tests.

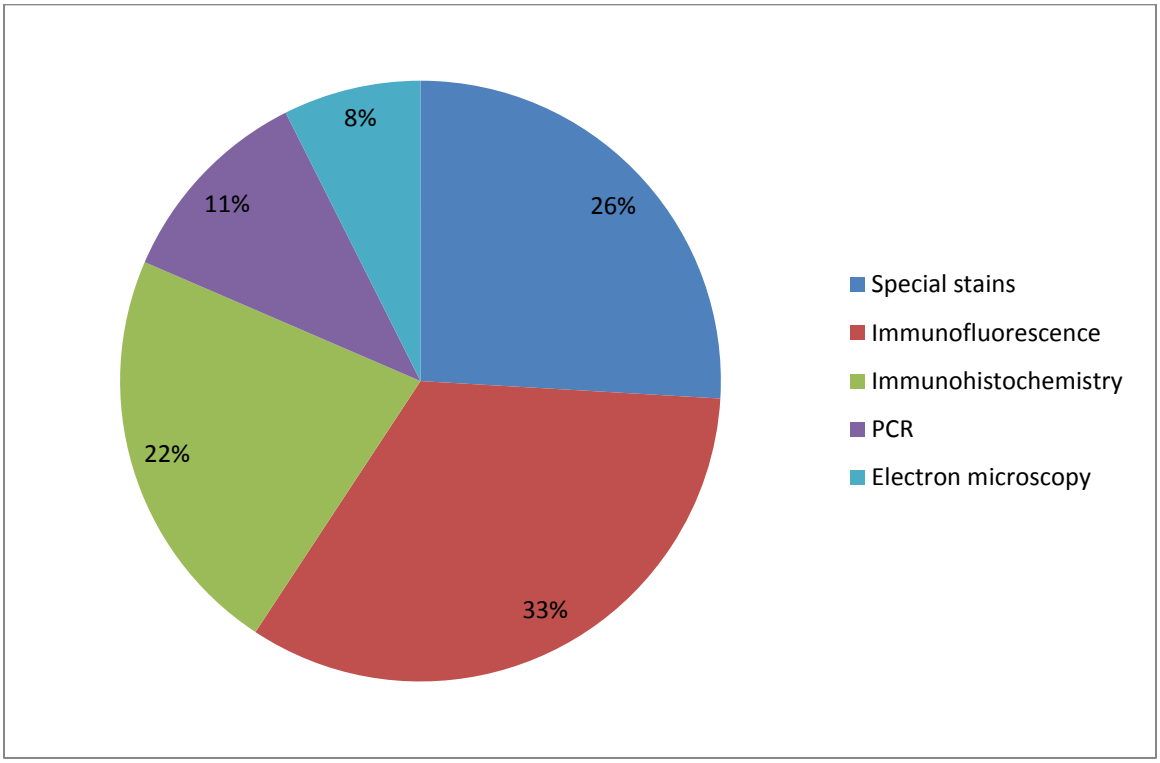

Figure 3: Techniques needed to reach definite diagnoses.

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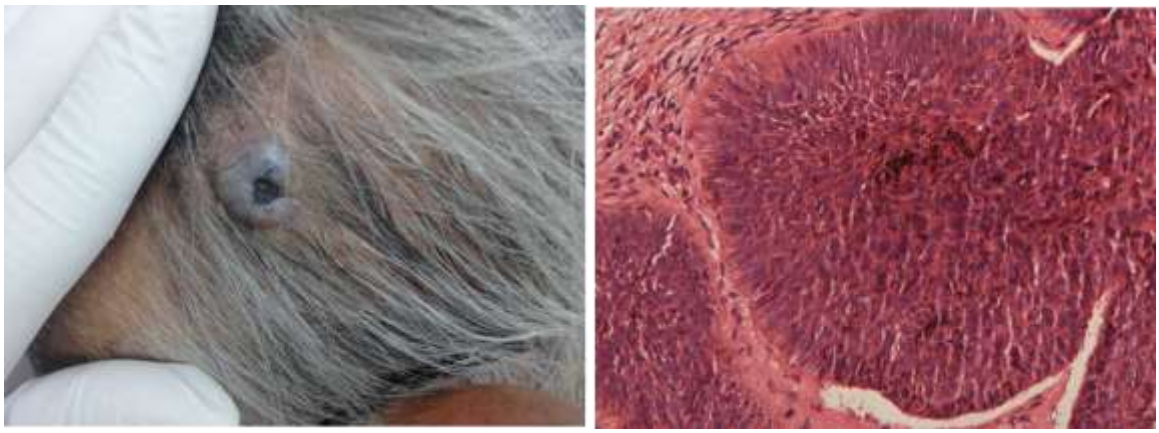

Figure 4: A case of basal cell carcinoma, Pathological diagnosis match clinical diagnose

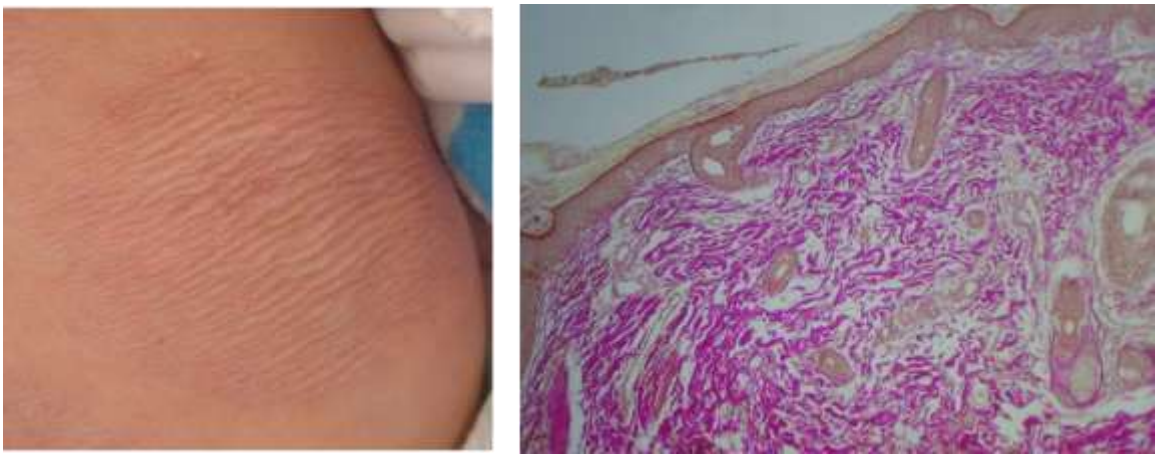

Figure 5: A case of cutis laxa ,Verhoeff-Van Gieson staining showed marked decrease in the number of elastic fibers in the dermis.

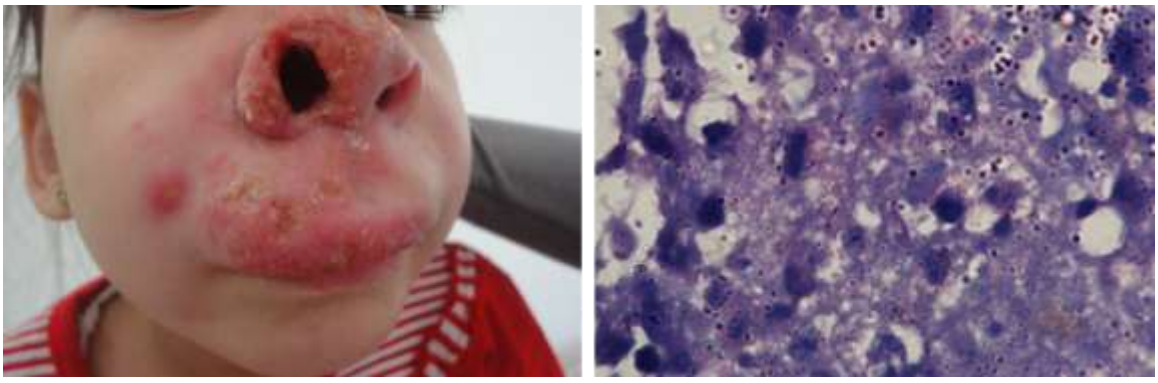

Figure 6: A case of mucocutaneous leishmaniasis, amastigotes in macrophages were evident by Giemsa stain.

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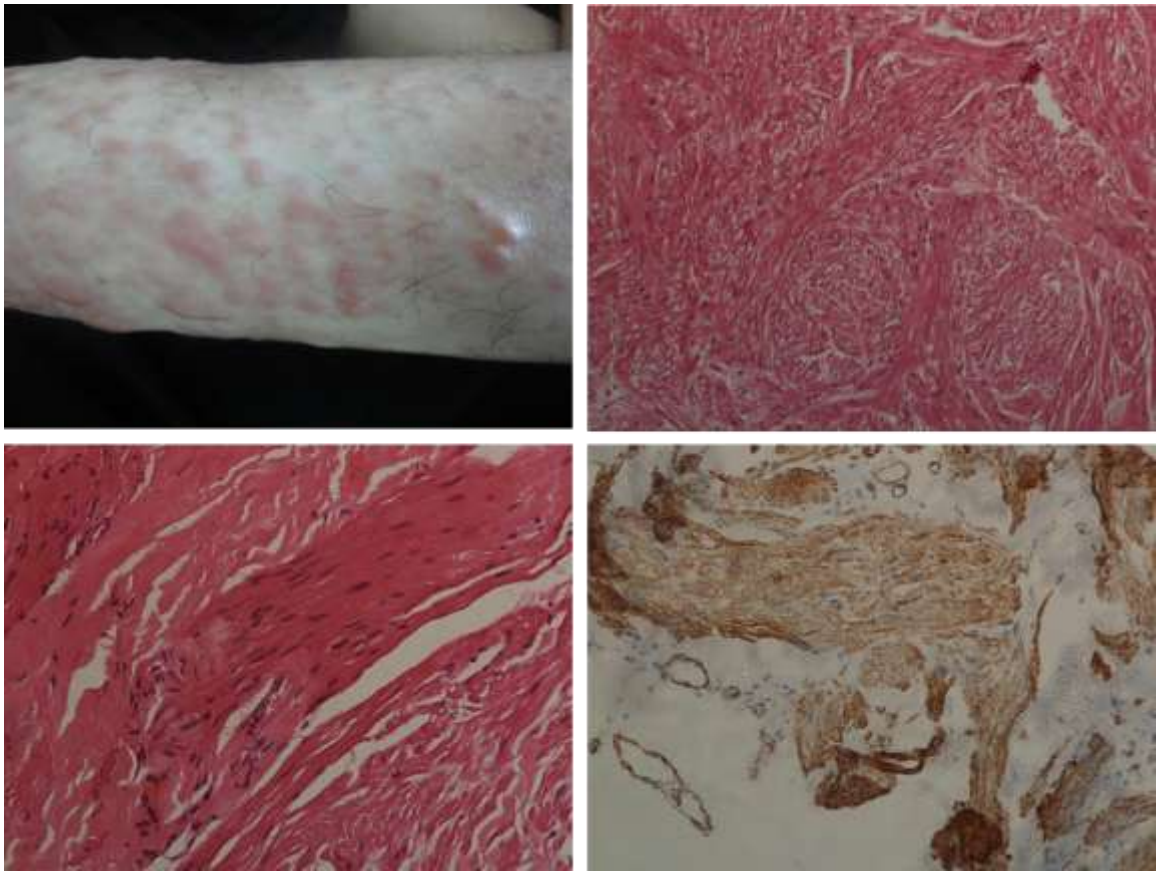

Figure 7: A case of leiomyoma where final diagnosis was confirmed by immunohistochemical stainfor smooth muscle acting.

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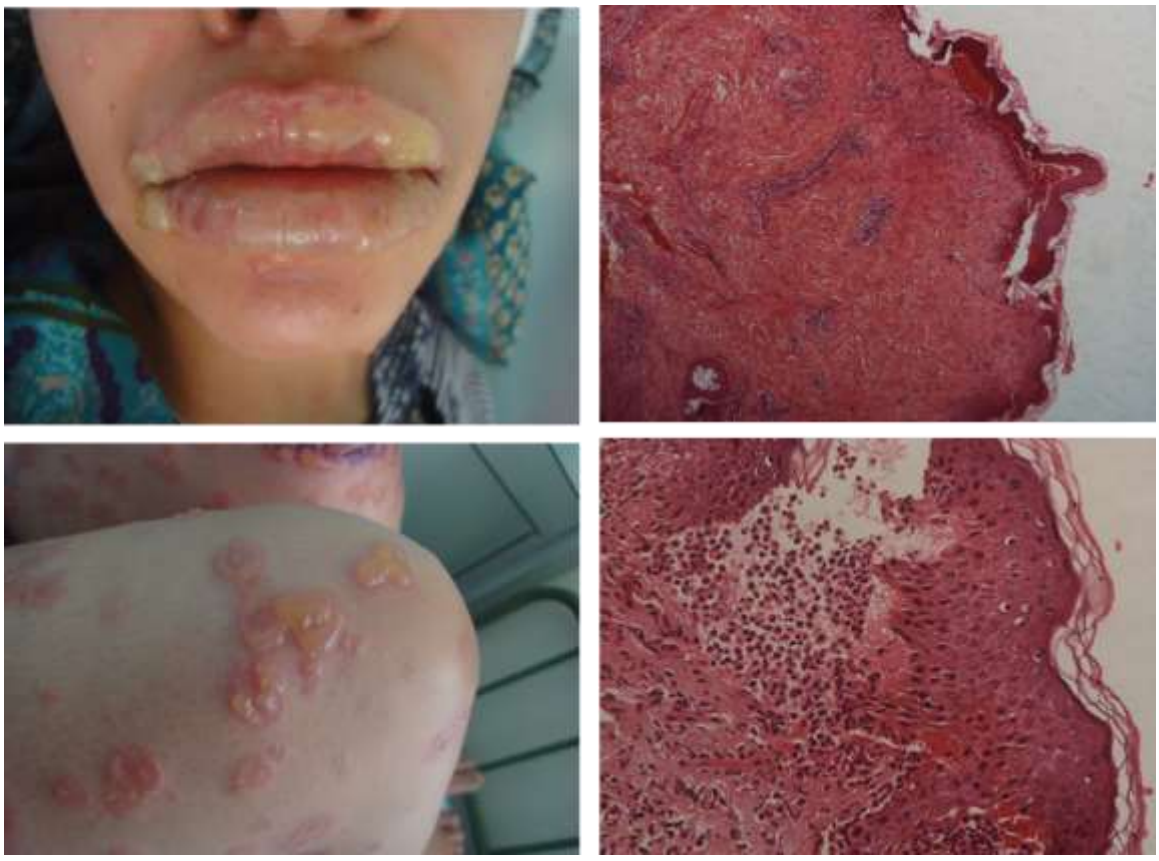

Figure 8: A case of blistering disease, need immunofluorescent study for final diagnosis.

Figure 9: A case of dermatofibrosarcoma protuberans, need immunohistochemical studies to confirm diagnosis.

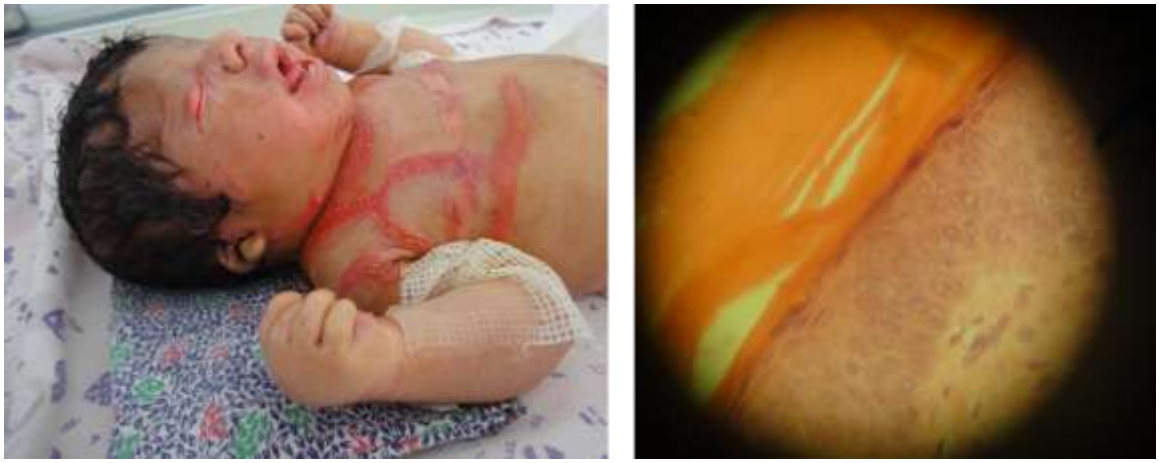

Figure 10: A case of hairlquin baby, need electron microscopy to confirm diagnosis.

Discussion

Skin biopsy is an important technique in dermatology. It plays a significant role in the diagnosis of cutaneous tumors as well as inflammatory skin diseases [8 -10]. In this study 200 cases were studied clinically and pathologically. They included various skin disorders; inflammatory and neoplastic. Our results showed that clinicopathological concordance between submitting clinician and biopsy results occurred in 82% but after clinicopathologic correlation concordance between biopsy result and final diagnosis occurred in only 58%. The histological diagnosis of cutaneous diseases can be confusing, even for the most experienced pathologist and the initial pathological diagnosis may be incorrect because many diverse inflammatory skin diseases share the same basic inflammatory process. In view of this complexity and commonality, many histopathological reports used the term consistent with rather than confirming a specific diagnosis [10]. The pathologist was not able to confirm the clinical diagnosis offered by the dermatologist or to provide a specific diagnosis in 12%, this could be due to unsuitable site, technique or time of the biopsy, [1] in addition visible changes may be not characteristic and may not permit a diagnosis [4,5]. The pathologist gave a new diagnosis which was not considered clinically in 6%; after clinical-pathological correlation, the dermatologist accept the pathological diagnosis as a final diagnosis in 1% only, whereas the others were rejected as they were away from the clinical context.

Several studies emphasizes the value of clinicopathologic correlation in the histopathologic diagnosis of skin diseases[11-14], our study showed that in 18%, the final diagnosis obtained only after clinicopathological correlation. Special stains may be required for diagnosis of some skin diseases. These include Ziehl-Neelsen for mycobacteria, gram stain for bacteria, Verhoeff-van Gieson staining for elastic fibers and Congo red to detect amyloidosis [15]. In this study a special stain was required in 7% of the specimens but it was done in 2% only due to unavailability. The pathological pattern may be suggestive for diagnosis for example the granulomatous pattern is consisting with mycobacterial infection, deep fungal as well as leishmania infection. However identification of the organism is mandatory for diagnosis and starting suitable therapy. The diagnostic value of dermatopathology in the past decades was enhanced by techniques as immunofluorescence, immunohistochemistry, electron microscopy and molecular pathology which are

expensive and require an experienced staff [10,16]. The direct immunofluorescence is a method of determining the location of antigen or antibody in a tissue section by the pattern of fluorescence resulting after exposure of specimen to the specific antigen or antibody conjugated to a fluorochrome. It is rapid and reliable techniques and it has extensively developed and applied widely in recent years to support clinical and pathological diagnosis of vesiculo - bullous diseases, connective tissue disorders and vasculitides [17-19]. Pathology labs in Benghazi lack immunopathology techniques which were needed for diagnosis of 9% of cases including vesiculo - bullous diseases. Immunohistochemical is the use of immune staining of cellular antigen to detect abnormal cells and it is very helpful in diagnosing various malignant tumors, especially lymphoma and melanoma. There has been a wide expansion in this field and many newly cellular markers were detected. (20) In this study, immunostaining was required for diagnosis in 6% cases; and done only in 1%. Diagnosis of many diseases as lymphoma, histiocytosis, neurofibroma, dermatofibrosarcoma could not be confirmed as their immunehistochemical markers were not available. Ultra structure study by electron microscopy may be helpful in certain diseases as mycosis fungoides, and histiocytosis [10]. It was required in2% of our cases, for which a final diagnosis could not site due to the unavailability of this technique.

The new technology, polymerase chain reaction (PCR), use chemical reaction to amplify DNA, either fragmented or intact. A defined DNA fragment can be amplified a million fold in a few hours and DNA can be amplified from fixed pathologic specimens [21]. PCR based molecular techniques has a substantial role in the diagnosis of infectious processes in dermatopathology [16,22]. PCR was required for diagnosis of 3 % of our specimens. Unavailability of PCR testing of skin specimens, had made the diagnosis and management of such cases difficult. Immunofluorescence, immunohistochemistry and PCR assays can provide important new information to challenging cases to improve diagnostic accuracy [23]. Absence of these methods in Benghazi pathology labs have reduced the diagnostic value of dermatopathology in 21%.

Conclusion

Dermatohistopathology is an important diagnostic procedure in clinical dermatology, considering the clinicopathologic correlation as an essential step in the diagnostic process. Dermatohistopathology must be coupled with other techniques as immunofluorescence, immunohistochemistry, electron microscopy and molecular pathology to make the exact diagnosis of some skin diseases.

Recommendation

Given the importance of special staining, immunofluorescence, immunohistochemistry, electron microscopy and molecular pathology studies of skin biopsies, it is very important to afford these techniques in pathology laboratories in Benghazi. This will greatly improve confidence in diagnosis of various cutaneous disorders, as well as it will improve treatment and outcome in these conditions.

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