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An approach to the diagnosis of superficial inflammatory dermatosis

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ABSTRACT

The skin biopsy is an important diagnostic tool in dermatology because it establishes a definite diagnosis and also monitors the therapy in many systemic diseases. The microscopic features involving superficial inflammatory dermatitis are very similar, but treatment varies, hence the diagnosis of the skin biopsy requires meticulous, clinical and histopathological work up. One hundred and fifty one consecutive skin biopsy specimens where a superficial inflammatory dermatosis has been queried by Dermatologists are reviewed. The lesions of superficial inflammatory dermatosis are classified based on the integration of different morphological features into three types of tissue reactions ie. Spongiotic dermatitis, lichenoid dermatitis and psoriasiform dermatitis. Histopathological diagnosis is concluded after coorelating with clinical features, which either confirms, contributes or noncontributory to the clinical diagnosis. The study revealed that the Psoriasiform Dermatitis is the most frequently encountered about 46.0%, followed by the lichenoid Dermatitis 27.2% and Spongiotic Dermatitis 16.6%. The clinico-histopathological discrepancy between few cases like Dermatitis Herpetiformis & Prurigo Simplex, Polymorphous light eruption & Leprosy, Hypertrophied Lichen Planus & Prurigo nodularis, Mycosis Fungoides & Exfoliative Dermatosis is discussed in detail. Correlation of the histopathological diagnosis with clinical diagnosis is seen in 95.6% cases of Psoriasiform Dermatitis, 92.87% cases of Lichenoid Dermatitis and in 92.3% of cases of Spongiotic Dermatitis. The present study also contributed that the histopathological diagnosis is confirmatory, diagnostic or non-contributory in 90.6%, 4.6% and 4.8% cases respectively to the clinical diagnosis. This article thus emphasizes the importance and utility of classification of superficial inflammatory dermatosis. The data showed the distribution of the lesions in three categories was helpful in reducing the number of inconclusive biopsies.

Introduction

The histopathological feature of superficial inflammatory dermatosis involves the epidermis and the superficial dermis [Zip C et al 1993]. [1] The changes in the architectural pattern or infiltrate are not so discerning that even an ingenious Dermatopathologist finds arduous to arrive at the conclusive histopathological diagnosis [Massone C, 2007]. [2] The use of a systematic approach during histological evaluation is essential to narrow the differential diagnosis, thereby achieving the most accurate and appropriate diagnosis. This study aims to objectively quantify the value of the skin biopsy as a diagnostic test with reference to superficial inflammatory dermatosis. The study also segregates the cases of superficial inflammatory dermatosis based on varied histological patterns into three different categories ie. Spongiotic Dermatitis, Lichenoid dermatitis and Psoriasiform Dermatitis. The correlation between clinical diagnosis and histopathological diagnosis is done after considering the clinical features.

Materials and methods

The study has been carried on one hundred and fifty one consecutive skin biopsy specimens where a superficial inflammatory dermatosis is suspected on patients who consulted the Dermatology department of MVJ Medical and Research Hospital, Bangalore from September 2011 to September 2012. Wedge biopsy is the preferred method under local anesthesia for obtaining skin biopsies. The inclusion criteria includes cases where a differential diagnosis of superficial inflammatory dermatosis is suspected by the clinician and mentioned on the specimen collection form. Exclusion criteria are vesicobullous/pustular inflammatory dermatosis, deep inflammatory lesions, bacterial, viral and fungal infections. The lesions of superficial inflammatory dermatosis are divided into two different morphological features- the tissue reaction pattern and the pattern of inflammation. The tissue reaction pattern is further subdivided into spongiotic dermatitis, interface dermatitis and psoriasiform dermatitis [Alsaad KO et al 2005]. [3] (Figure 1). Spongiotic dermatitis is characterized by the presence of epithelial intercellular oedema. It has been histologically subclassified into acute, sub acute, and chronic dermatitis depending upon the clinical stage of the patient. The clinical features include reactions that vary from simple erythema to purpura to blistering skin rash or weeping plaques with a greasy appearance and irritation on the sites of exposure. Interface dermatitis is classified histologically into two categories; (a) Interface dermatitis with vacuolar change: This pattern of inflammatory dermatosis is characterised by the presence of a mild inflammatory cell infiltrate along the dermoepidermal junction, with vacuolar change within the basal keratinocytes. These necrotic keratinocytes in the basal layer are also known as Civatte or Colloid bodies. This category has patients with delimited erythematous to hyperkeratosis atrophic patches on the face, neck, scalp and less frequently the arms and trunk. (b)

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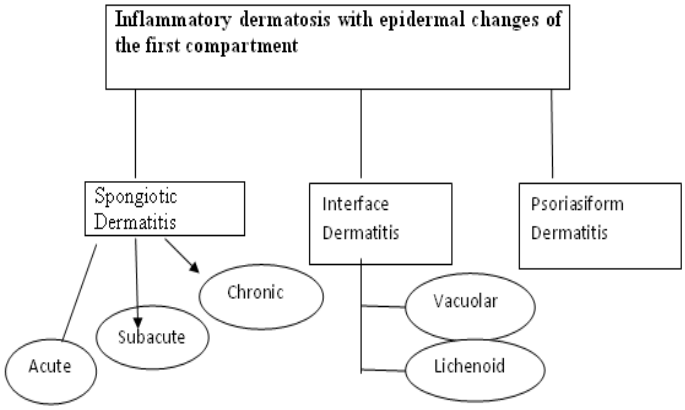
Interface dermatitis with lichenoid inflammation; is characterised by the presence of thick band-like, dense accumulation of chronic inflammatory cells in the papillary dermis, almost hugging the dermo–epidermal junction. The patient usually has voilaceous papulosquamous dermatitis on flexor aspects of skin and oral mucosa. Psoriasiform dermatitis is characterised by the presence of acanthosis, regular elongation of the rete ridges, hyperkeratosis, and parakeratosis and thinning of suprapapillary plate and dilated, tortuous blood vessels within these dermal papillae are often present. A superficial perivascular inflammatory cell infiltrate is usually seen. The clinical features include an itching, small to widespread silvery white scaly patches or plaques on the extensor surface of elbows and knees on the outer surface, including scalp, palms of hand and soles of feet and genitals. The pattern of inflammation is manifested histologically by a superficial perivascular infiltrate (PVI), allowing further subclassification of the (PVI) into six groups: lymphocytic, lymphoeosinophilic, lymphoplasmacytic, mast cell infiltrate, lymphohistiocytic and neutrophilic [Alsaad KO et al 2005]. [3] (Table 1).Histopathological diagnosis was concluded after placing them into individual category according to the classification and taking into consideration the clinical features and also the areas of distribution of the lesion on the body. Then this histopathological diagnosis has been compared with the clinical diagnosis. This study also critically assesses the efficacy of a skin biopsy in superficial inflammatory dermatosis and consequently whether the histopathological diagnosis is confirmatory, diagnostic or non-contributory.

Figure 1 : Types of inflammatory dermatosis with epidermal changes

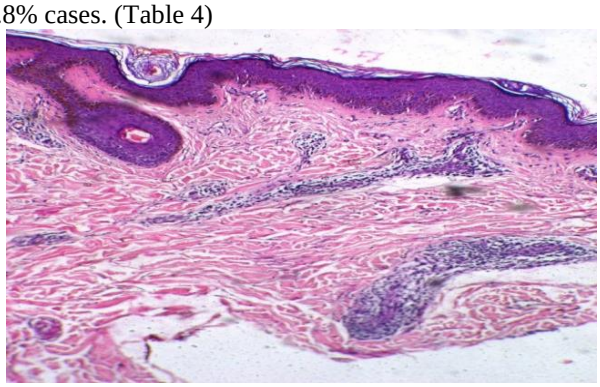


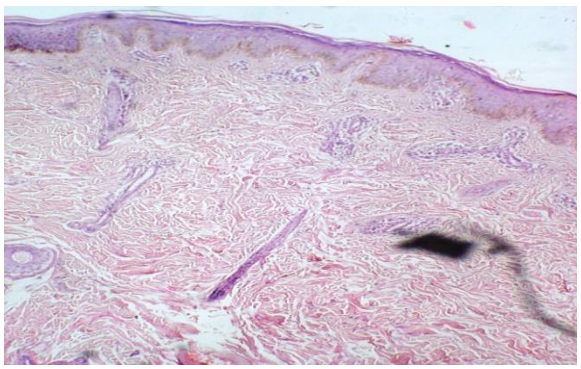
Statistics

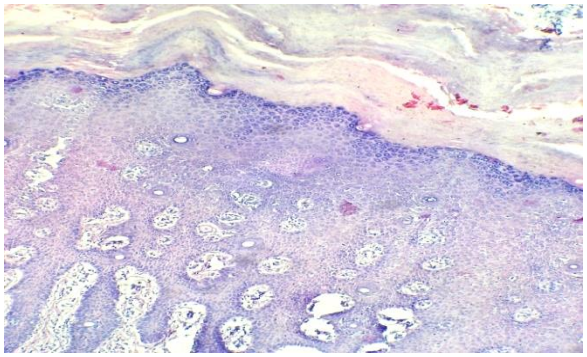
The concordance between clinical and histopathological diagnosis is calculated and expressed as percentage. The mean of the total cases where histopathological diagnosis is confirmatory, diagnostic or non-contributory in all categories is taken.

Results

The study included 151 cases of superficial inflammatory dermatosis of the total 559 skin biopsies reported in the Department of Pathology in our Institute. The distribution of tissue patterns and the various entities in each spectrum have been shown in Table 3.Out of 150 cases; 86 are females and 64 males. The age distribution pattern affirmed that the maximum biopsies about 68.6% are in the age range of 20-50 years and the least number has been in the youngest age range of 0-10 years and older age group above 60 years. We had a case of an old man with age of 90 years. An analysis of the broad categories revealed that the most frequently encountered lesion is the Psoriasiform dermatitis (46.0%), followed by Lichenoid dermatitis forming 27.2% of cases and the least common Spongiotic dermatitis is 16.67% of the total cases. The distribution of various lesions has been discussed in the Table 2 and 3.In the first category of Psoriasiform dermatitis, Psoriasis vulgaris had the highest number of lesions 34.7%, followed by equal number of cases of Lichen Simplex Chronicus and Prurigo nodularis (17.4%).Amongst the Lichenoid group of lesions, interface dermatitis constituted 60.9% of the total lesions and vacuolar dermatitis about 39.1%. In interface dermatitis, Lichen planus confirmed the highest percentage of cases 52.0%, followed by Hypertrophic lichen planus 24.0%. In Vacuolar lichenoid dermatitis, Discoid lupus erythrematous (50.0%) showed the highest number. Spongiform dermatitis constituted 16.6% cases; allergic contact dermatitis had the highest score of 32.0%. Mixed cases either with combination of Psoriasiform dermatitis with Spongiotic dermatitis or Lichenoid dermatitis with Spongiotic dermatitis assured 5.3% of the total cases. Inconclusive biopsies aggregated to 4.6% of the total cases. Psoriasiform dermatitis exhibited clinicopathological correlation in 95.6% of the cases, vacuolar lichenoid dermatitis and interface Lichenoid dermatitis in 93.7% and 92.3% of cases respectively. Spongiform dermatitis showed correlation in 92.3% of the cases. (Figure 2). After comparing the results, histopathology confirmed the clinical diagnosis in 90.6% of cases gave the diagnosis in 4.6% cases and is non-contributory in 4.8% cases. (Table 4)







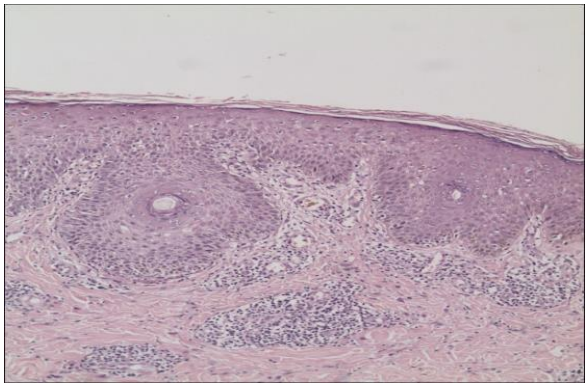
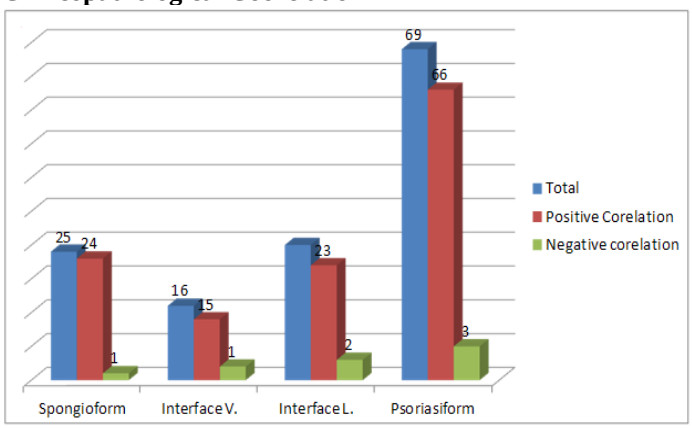


Fig 2a: Prurigo Simplex confused as DH; 2b: Polymorphous light eruption suspected clinically as Leprosy; 2c: Exfoliative Dermatitis, a close differential to Mycosis Fungoides; 2d: Hypertrophic lichen planus mimicked Prurigo Nodularis Clinicopathological Coorelation



Discussion

Superficial Inflammatory dermatosis comprises 27.0% of all skin biopsies in our department. The lesions comprised 18.40% of the total load of surgical pathology and 35.2 % of total number of skin biopsies in MVJMC & RH, Bangalore. Psoriasiform dermatosis is most frequently seen in the 20-40 years of age. It has been reported in the middle aged adults in the 5th- 6th decades by few authors [Sigurgeirsson B et al 1991]. [4] Childhood occurrence is unusual, except in the familial cases, yet other authors have reported it in young to middle aged adults [Crowson AN et al 2001]. [5] The next most frequently seen lesion is lichenoid dermatosis, most commonly seen in the 30-40 years age range. Most authors, however, have cited a younger or older age range in the literature. Fry [6] mentioned that two-thirds occurred before the age of 30 years, 22% in the age range of 30-50 years [Fry L 1988]. The Spongiotic lesions are common in younger age group. The sex distribution pattern revealed that about 57.3% of the total biopsies were female patients. The sex distribution pattern published by Grace D' Costa is male predominant (60.25%) while Tumay Ozgur et al (2012) found a female predominance of 51.2% [Tumay Ozgur et al 2012, Grace D' Costa et al 2010] [7,8] Psoriasiform dermatitis is most frequently encountered lesion, constituting 46.0 % followed by Lichenoid dermatitis, composed of 27.2 % of total cases and the least common is Spongiotic dermatitis (16.6%). In a study [7] conducted by Tumay Ozgur et al stated that psoriatic lesions are the commonest (50.7%), classic generalized plaque variant psoriasis (89%) being the most frequent [Tumay Ozgur et al 2012]. But Grace D' Costa [8] reported, lichenoid lesions are more common lesions [Grace D' Costa et al 2010]. There is a considerable overlap of the lesions among Psoriasiform, Spongiotic and Lichenoid dermatosis. They are grouped among the mixed category. Seborrhoeic dermatitis shows features of both spongiform and psoriasiform changes. Discoid lupus erythematosus has finding of both spongiform and interface lichenoid dermatitis. Conditions like drug reactions and cutaneous lupus erythematosus has features of Psoriasiform dermatitis with interface changes. In partially treated psoriasis, the granular cell layer may be present, so that clinical–pathological correlation is crucial for accurate diagnosis because increase in the intensity of the granular cell layer is associated with chronic spongiotic dermatitis [Alsaad KO et al 2005]. [3] Lichen simplex chronicus which occurs in the setting of atopic dermatitis, often with plaques with excoriation may also resemble many lichenoid lesions [Lever's Hitopathology 1997]. [9] It is also worth mentioning that psoriasiform hyperplasia can be seen in reactive reparative epithelium after surgery or trauma, with stasis changes (stasis dermatitis) [Lever's Hitopathology 1997]. [9] Few cases need special discussion as there is clinico-histopathology discordance. The first case was 49 male with history of symmetric lesions over the extremities and scalp since 3 years. On close examination, multiple discrete papules and few excoriated lesions are noted and a clinical diagnosis of Dermatitis Herpetiformis (DH) is made. Histopathology proved features of Prurigo Simplex composed of hyperkeratotic epidermis with acanthosis and parakeratosis, elongation of rete ridges and irregular with a dense dermal infiltrate consisting of neutrophils, eosinophils, histiocytes and monocytes. (Figure 2a) The presentation of lesions in DH are often variable like the main symptoms are severe itch, followed by small blisters resembling those caused by herpes simplex virus [Collin P et al 2003]. [10] The lesions are often scratched, eroded and crusted secondary lesions, resembling the cutaneous lesions of excoriated Prurigo [Paulo Ricardo Criado et al 2012]. [11] Even less common, DH can cutaneously manifest as urticarial papules [Nicolas ME et al 2003] [12] or purpuric or petechial lesions on the hands and feet [McGovern TW et al 1994]. [13] Diagnosis of dermatitis herpetiformis (DH) is established on the basis of clinical, histologic, serologic, and direct immunofluorescence findings. Dapsone recommended for DH has been avoided in this case. Another case worth mentioning is a male of 20, a farmer by profession with few hypo pigmented macules over arms, neck and bilateral lower limbs since 2 years. A clinical diagnosis of Leprosy has been suspected. Microscopy showed features of Polymorphous Light Eruption (PMLE) with no microscopic features of leprosy ie. Atrophied epidermis and macrophages (histiocytes) and lymphocytic infiltration around the nerves. (Figure 2b) PMLE starts as reddish itchy lesions and leave a hypo pigmented lesion; sun exposure is a must for PMLE to occur. It is possible to get baffle Leprosy with long standing patches and macules of PMLE. One to two isolated macules in young children are often not pathological; in adults such lesions may occur frequently as a result of sun exposure [Vanderhooft SL et al 1996]. [14] PMLE is a recurrent condition that may persist for years. However, the severity often improves with time. In a follow-up study of 114 patients with PMLE, 57 percent of patients noted decreasing sun sensitivity over the course of seven years, including 12 patients (9 percent) who reported complete resolution [Jansén CT et al 1984]. [15] The unnecessary use of antileprosy drugs has been averted to applying sunscreens and abstinence from sunlight.

Table 1: Subclassification of Inflammatory dermatosis with dermal changes

Type of inflammatory cell infiltrate
Lymphocytic
Lymphoeosinophilic
Lymphoplasmacytic
Lymphohistiocytic
Neutrophilic
Mast cell Infiltration

Table 2: Distribution and type of entities in each pattern (Epidermis)

Spongiotic D. (25)	Psoriasiform D. (69)	Interface Dermatitis: Vacuolar (16)	Interface Dermatitis: - Lichenoid (25)	Mixed (8)	Non specific Dermatitis : 7
Allergic Contact. Dermatitis : 8	Psoriasis Vulgaris : 24	Lichen. Simplex Atropicus : 3	Lichen Planus : 13	Polymorphous Light Eruption : 3	
Numular Eczema: 3	Pityriasis. Rubra Pilaris : 11	Fixed drug eruption: 5	Lichenoid l. Keratosis : 01	Prurigo. Simplex : 3	
Polymorphous Light Eruption : 5	Prurigo. Nodularis : 12	Discoid Lupus Erythematous : 8	Lichen Amyloidosis : 2	P. Lichenoid : 1	
Pityriasis Rosea : 3	Lichen Simplex Chronicus : 12		Hypertrophied Lichen Planus : 6	Systemic Lupus Erythematous : 1	
Atopic Dermatitis : 2	Prurigo. Simplex : 7		Lichen Nitidus : 3		
	P. Lichenoides : 4				
Chronic Dermatitis : 4	Inflammatory Linear Verrucous Epidermal Nevus : 01		Lichen Straitus : 1		
	Erythroderma : 01				
	M. Fungoides : 01				

Table 3: Distribution of lesions (PVI and Superficial Dermal infiltrate)

Lymphocytic	lymphoeosinophilic	lymphoplasmacytic infiltrate	lymphohistiocytic infiltrate	Neutrophilic infiltrate	Extravasated RBCs
Polymorphous Light Eruption	Contact. allergic Dermatitis, Pityriasis Rosea	Prurigo Nodularis, Pityriasis Rosea	Drug Reaction.	Urticaria	Pityriasis Rosea, PLEVA, Pityriasis Lichenoid Chronicus, Lupus Erythematous
Pityriasis Lichenoid et varioliformis acuta, Pityriasis Rosea, Lichen Simplex Chrinicus, Prurigo Nodularis, Pityriasis Rubra Pilaris, Pemphigus vulgaris	Lichenoid drug reactions		**Pityriasis Rosea, Prurigo. Nodularis,** Lichen Simplex	Systemic Lupus Erythematous, Psoriasis	
Lichen. Straitus, Lichen Planus, Lichen Nitidus	Prurigo Simplex, Prurigo. Nodularis			Psoriasis Vulgaris, PLEVA	

Table 4: Contribution of histopathology to the diagnosis

Description	Number and % of cases (Grace D Costa) [12]	Number and % of cases (Present Study)
Histopathology confirmed diagnosis	149 (92.5%)	137 (90.6%)
Histopathology gave diagnosis	8 (4.9%)	7 (4.6%)
Histopathology non-contributory	4 (2.4%)	7 (4.8%)
Total	161 (100%)	151 (100%)

This case requires special attention as a nervous 20/F presented as multiple itchy hyperpigmented plaques on both the forearm and oozing from one lesion. The clinical diagnosis of hypertrophied Lichen Planus has been proposed. Microscopy showed hyperkeratosis and irregular acanthosis, the papillary dermis shows predominately lymphocytic inflammatory infiltrate and vertically oriented collagen bundles, which fitted into a diagnosis of Prurigo Nodularis. (Figure 2d) Darshan C (2008) also quoted that Prurigo nodularis is a close differential diagnosis of hypertrophied Lichen Planus [Darshan CV et al 2008]. [16] The extensive use of steroids has been withdrawn in this case. Exfoliative dermatitis is applied to any inflammatory skin disease with erythema and scaling which affects more than 90% of the body surface and caused by a variety of underlying conditions like pre-existing dermatosis (74.4%), idiopathic (14.6%) and related to drugs and malignancy (5.5%) [Nicolis G D et al 1973, Hasan T et al 1983]. [17, 18] In our case study, a 46 years old male came with a history of multiple discrete erythrematous plaques on both the extremities and trunk since 2 years. Diagnosis of Mycosis Fungoides has been recommended by the Dermatologists. But the histopathology ruled out any atypical lymphocytes. (Figure 2c) Exfoliative dermatitis associated with long standing dermatitis could be a possible reason in this regard. Sometimes, the underlying dermatologic disorder is often impossible to identify, but in other cases, patients have the specific clinical features of the original causative disorder [Sigurdsson V et al 1986]. [19] The avoidable course of chemotherapy had a big relief both to the patient and physicians. The authors found 7 cases (4.6 %) where the skin biopsy was less useful. Histological findings provided little information towards any definite diagnosis. This could be explained that the diagnosis also depends on the day the skin biopsy is taken. The histopathological findings may be different on the day the disease appeared and the day biopsy is taken and even after the course of treatment. The skin biopsy has been reported to be of varying usefulness in making a diagnosis [Nicolis G D et al 1973]. [17] So we finally determined that Histopathology confirmed the clinical diagnosis in 90.6% of cases, histopathology gave the diagnosis in 4.6% cases and histopathology has been non-contributory in 4.8% of total cases. (Table 5) Grace D Costa and Bhavana M [7, 8] also concluded that histopathology confirmed diagnosis in 92.5% cases; histopathology gave diagnosis in 4.9% cases and histopathology as non-contributory in 2.48% cases. The categorization of the lesions into three distinct entities is very useful to the approach in reaching the diagnosis. The Dermatologists in our hospital follows a protocol, which led us to differentiate the superficial inflammatory dermatosis. Psoriasiform lesions have to be differentiated from lichenoid lesions because systemic steroids should be avoided in psoriasiform patients [Rook's Dermatology 2010]. [20] Methotrexate is used as the 1st line of treatment in psoriasiform patients but it cannot be used in lichenoid lesions. While spongiotic lesions acute or chronic require avoidance of the inciting agent, local creams, emollients can be used in acute spongiotic dermatitis while salicyclic acid combination with steroids is given in chronic spongiotic dermatitis cases. Cyclosporin or azathioprine is used as last resort in severe cases of spongiform dermatitis, while it can be used as a first resort in psoriasiform and lichenoid lesions [Rook's Dermatology 2010]. [20] The appropriate placement of the lesions in each category will aid in differentiating the lesions earlier and help in appropriate treatment.

Conclusion

This article thus emphasizes the importance and utility of a systemic approach to skin biopsy with special reference to superficial inflammatory dermatosis. The segregation of the cases into three different categories shows its usefulness as the chances of reporting the skin biopsies as inconclusive is reduced tremendously to 4.8%. But diagnosis also depends upon which day of the disease the skin biopsy has been taken. A clinicopathological report is always very essential as the pathologist narrows on a confirmatory diagnosis. In 4.6% of cases, the biopsy provided a histopathological diagnosis, which had not been considered clinically. In 137 of 151 overall cases (90.6%) clinicopathologic correlation confirmed the clinical diagnosis. The differentiation between lichenoid, spongiotic and psoriasiform lesions is considered important because of the different lines of treatment of respective lesions.

What's new? The spongiotic, psoriatic and lichenoid lesions are treated on different lines by the Dermatologists. The skin biopsy is considered the only confirmatory test to prove the diagnosis. Hence, this classification may pave the way for Dermatopathologists to diagnose these lesions more effectively and help in treatment of the patient.

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