

Spectrum of Histopathological Features in Non Infectious Erythematous and Papulosquamous Diseases

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This prospective study consisted of 38 patients clinically diagnosed as having one of the papulosquamous diseases. Appearance and distribution of the lesions were recorded. The histopathological features of the lesions were studied in the weekly clinicopathological conference. The cases were subgrouped into 8 categories. 25 of these patients were males and rest females, showing predominance of males suffering from this skin disease. Maximum number of patients fell in the age group of 21 to 30 years. Clinicopathological correlation was carried out. 29 out of 38 cases (76.30 %) showed compatible clinical as well as histopathological diagnoses. Microscopic features of all the biopsies were scrutinized. It was noted that the majority of the findings of our cases agreed to the literature findings. The additional findings present in our study cases not given in the literature were mentioned separately. The diagnostic microscopic features not present in our cases were also recorded.

Key words: Papulosquamous diseases, Psoriasis, Lichen planus, Pityriasis rosea, Pityriasis rubra pilaris, Prurigo nodularis, Lichen planopilaris, Lichen nitidis.

Introduction

Papulosquamous diseases characterized by scaling papules or plaques compose the largest conglomerate group of diseases seen by the dermatologist. These assume considerable importance because of their frequency of occurrence. As all are characterized by scaling papules, clinical confusion may result in their diagnosis, therefore dermatopathology is important for more definite differentiation. Separation of each of these becomes important because the treatment and prognosis for each tends to be disease specific. This group includes skin diseases like psoriasis, lichen planus and lichenoid reactions, pityriasis rosea, pityriasis rubra pilaris, prurigo nodularis, lichen planopilaris, lichen nitidis and pityriasis lichenoides.

Patients and Methods

The study was carried out on patients who consulted the dermatology department of Pakistan Institute of Medical Sciences Islamabad from June 2002 to October 2002. It was part of a larger study comprising of more than 200 patients undergoing skin biopsy. Wedge biopsy was taken under local anesthesia. The tissue was immediately fixed in 10 %

formalin and processed for 24 hours in the tissue processor of Shandon corporation limited. The sections were stained by hematoxylin and eosin. The stained sections were systemically evaluated in the weekly clinicopathological conference regularly held in the pathology department with the collaboration of the dermatology department, for various parameters including hyperkeratosis, parakeratosis, atrophy, acanthosis, exocytosis, spongiosis, state of rete ridges, pseudoepitheliomatous hyperplasia, basal cell damage and vacuolization, thickening of the basement membrane zone, dermal edema and fibrosis, dermal and perivascular inflammation, collagen degeneration, periappendigeal damage, dermal inflammation and fibrosis. The findings were compared with those mentioned in the literature. Additional findings not mentioned in the literature were noted separately as well as those findings mentioned in the literature but not present in our study cases.

Results

The study included 38 cases of papulosquamous diseases. The disease entities isolated among these patients have been shown in table 1.

Out of 38 cases, 25 were males and 13 females. The age ranged from 8 to 64 years with maximum

patients (11), falling in the age group of 21-30 years. Out of 38 cases, 29 (76.30 %) showed compatible

clinical as well as histopathological diagnoses. Various disease entities studied are detailed below.

Disease entity	No of cases	Percentage	Males	Females
Psoriasis	14	36.8	11	3
Lichen planus	12	31.5	8	4
Pityriasis rosea	3	7.9	2	1
Pityriasis rubra pilaris	2	5.3	1	1
Prurigo nodularis	2	5.3	0	2
Lichenoid reactions	2	5.3	1	1
Lichen planopilaris	2	5.3	1	1
Lichen nitidis	1	2.6	1	0

Psoriasis: Gross features: Appearance and distribution was variable ranging from well demarcated scaly papules, plaques and lichenified and hyper pigmented lesions over scalp, back, extensor surfaces of the limbs and dorsum of hands, to generalized erythroderma.

Microscopic features included moderate to marked acanthosis and hyperkeratosis, parakeratosis, regular elongation and clubbing of rete ridges, absent granular layer, Munro micro abscesses and mild spongiosis in the majority of the cases, while supra papillary thinning, exocytosis and telangiectatic vessels were present in more than half of the cases. Other features including Kogoj abscesses, attenuated granular layer and irregular elongation of rete ridges were seen in less than 50 % of the cases. Moderate to marked hyper pigmentation, marked spongiosis and thickened basement membrane zone were present in 2 cases and basal layer damage was observed in 1 case.

Dermal features included slight to moderate perivascular chronic inflammation in the majority. The infiltrate also included eosinophils in 9 and neutrophils in one case. Perivascular edema, perifollicular fibrosis, pigmentary incontinence and thickened vessels and nerves were seen in around 50 % cases. Upper dermal edema and inflammation were seen in a few cases (in one case, it consisted of mononuclears, neutrophils and eosinophils, in the 2nd it consisted of neutrophils and in the 3rd consisted of mononuclear cell and eosinophils).

Unusual features included marked spongiosis, linear Munro abscesses, focal acantholysis, broad globular thickened and confluent rete ridges, blood and fibrin

in the corneal layer and perivascular plasma cells in one case each.

Lichen planus: Gross features varied from itchy raised flat topped to crusty erythematous and violaceous papules over both anterior surfaces of legs, forearms, chest trunk, axillae and neck.

Microscopic features included moderate to marked hyperkeratosis, mild to marked acanthosis, basal cell damage with pigmentary incontinence, basal cell vacuolization, Civatte bodies and prominent granular layer in the majority of the cases. Moderate to marked hyperpigmentation, moderate spongiosis, slight to marked atrophy, clefting at dermoepidermal junction and thickened basement membrane were noted in almost half of the cases. Rete ridges showed saw toothing in 7 and were absent in 2 cases. Follicular plugging and exocytosis were seen in a small number of cases. **Dermal features** included band like upper dermal lymphohistiocytic infiltrate in all the cases and perivascular mononuclear inflammation; edema, dermal fibrosis, thickened vessels and nerves in a small number of cases. **Unusual features** included nesting effect in the upper dermal infiltrate in 4 (33.3 %) cases; eosinophils were also present in the dermal and perivascular infiltrate in 2 (16.6 %) cases; marked pigmentary incontinence along with inconspicuous upper dermal band like infiltrate in 1 case; appendicular damage; vertical bands of collagen in the papillary dermis and collagen damage in 1 case each.

Pityriasis rosea: Gross features: Small itchy erythematous scaly popular to targetoid and confluent plaque like lesions on whole of the body except hands,

feet and face.

Microscopic features included hyperkeratosis, slight to marked acanthosis, moderate spongiosis with spongiotic vesicles and exocytosis in all the three cases.

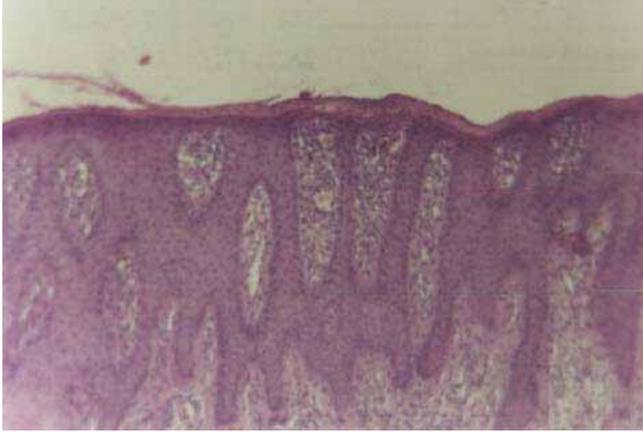


Fig. 1: Psoriasis: Plaque psoriasis showing Parakeratosis, Munro microabscesses, Regular elongation of rete ridges and Suprapapillary thinning. (H&E X 100)

Parakeratosis was seen in two cases. Other features included thickened basement membrane, irregular elongation of rete ridges; slight to moderate hyperpigmentation and pigmentary incontinence in one case each.

Unusual epidermal feature included presence of blood and spores of dermatophytes in the stratum corneum of one case.

Dermis was showing slight to moderate perivascular lymphohistiocytic infiltration, with one showing eosinophils as well. The additional findings included marked dermal and perivascular edema, moderate lymphohistiocytic dermal inflammation with eosinophils in 2 cases, marked dermal fibrosis, granulation tissue, thickened vessels and perivascular eosinophils seen in 1 case each.

Pityriasis rubra pilaris: Gross features: Papulosquamous plaques over arms, elbows and feet, with variable itching.

Microscopic findings included moderate to marked acanthosis, hyperkeratosis, persistence of granular layer and irregular elongation of rete ridges in both the cases while perifollicular parakeratosis in one case. Other findings included spongiosis, thickened basement membrane and slight to moderate hyperpigmentation in both the cases, spongiotic vesicles and pigmentary incontinence in 1 case each.

Dermal findings included moderate lympho-

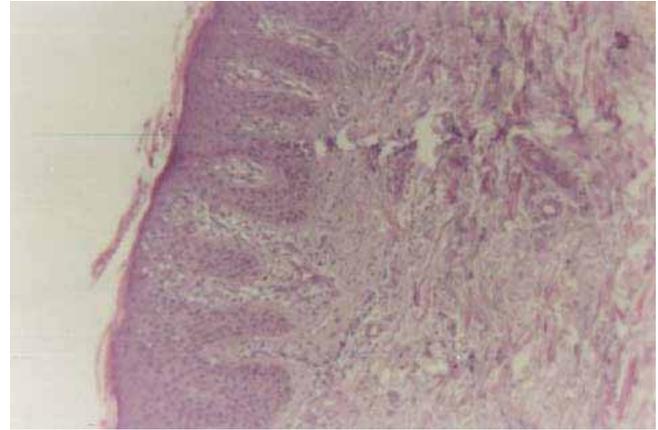


Fig. 2: Psoriasiform dermatitis mimicking psoriasis with respect to regular elongation of rete ridges. (H&E X 100)

histiocytic perivascular inflammation and moderate dermal fibrosis in both the cases and granulation tissue in 1 case.

Prurigo nodularis: Gross features: Very itchy papular hyper pigmented lesions over external surfaces of legs, forearms, elbows and buttocks.

Microscopic features included marked hyperkeratosis and acanthosis, parakeratosis, elongated rete ridges with pseudoepitheliomatous hyperplasia and moderate to marked spongiosis in both the cases, exocytosis and thickened basement membrane zone in one case each.

Dermal features included moderate to marked perivascular lymphohistiocytic infiltrate with perivascular edema, thickened nerves, moderate to marked fibrosis and granulation tissue in both the cases and upper dermal edema in 1 case.

Drug related lichenoid reactions: Gross features: Flat topped violaceous papules and plaques on arms, abdomen, chin and neck.

Microscopic features included moderate hyperkeratosis, prominent granular layer and moderate hyperpigmentation with incontinence of the pigment in both the cases, acanthosis in 1 case and atrophy in the other. Exocytosis, saw toothing and loss of rete ridges, moderate spongiosis, Civatte bodies, basal cell damage and vacuolization (in 1 focal), thickened basement membrane and focal vesicle

formation and clefting at the dermoepidermal junction and band like upper dermal lymphohistiocytic infiltrate including eosinophils in 1 case each.

Dermal features included moderate perivascular lymphohistiocytic infiltrate with eosinophils in both the cases, band like upper dermal infiltrate including eosinophils, marked fibrosis and slight edema in 1 case each.

Lichen planopilaris: Gross features: Varied from flat, mildly itchy longitudinal hyperpigmented

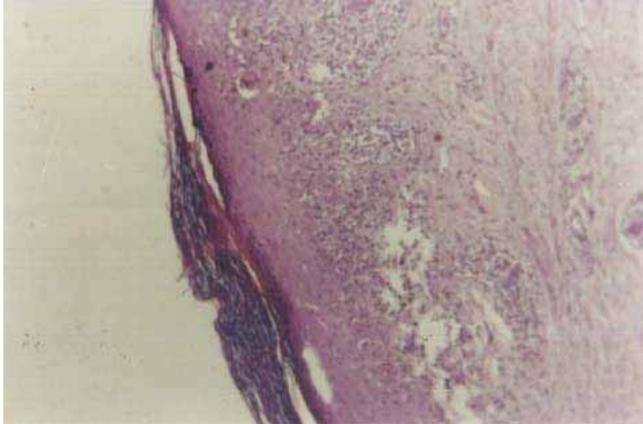


Fig. 3: Lichen Planus showing Hyperkeratosis, Prominent granular layer, Basal cell damage, Clefting at DEJ and Band like upper dermal infiltrate (H&E X 100)

macular lesions on cheeks to generalized body erythematous papular eruption mostly on arms, legs and hip region.

Microscopic features included marked atrophy in 1 case and slight acanthosis in the other; moderate to marked hyperkeratosis, prominent granular layer saw tothing of rete ridges, basal cell damage and vacuolization and Civatte bodies in both the cases. Mild band like upper dermal infiltrate, thickened basement membrane, clefting at the dermoepidermal junction and marked hyperpigmentation along with pigmentary incontinence were present in 1 case each.

Dermal features included moderate to marked perivascular chronic inflammatory infiltrate and appendicular damage in both the cases, periappendigeal inflammation and marked dermal edema in 1 case each.

Lichen nitidus: Gross features: Small itchy erythematous to purplish flat topped papules on both legs and arms.

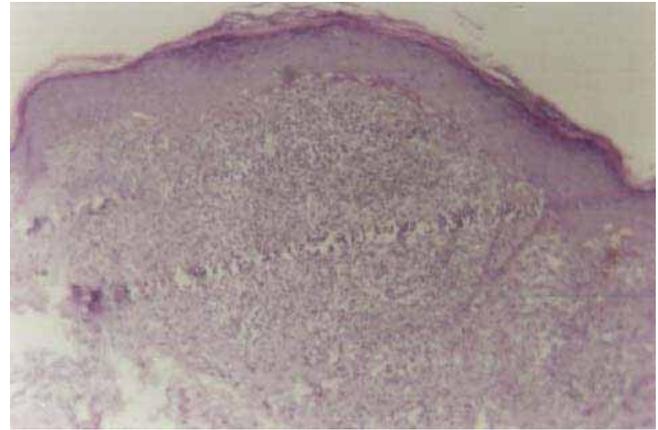


Fig. 4: Lichen Nitidus showing Epidermal atrophy, Nesting effect of upper dermal infiltrate, consisting of lympho-histiocytes, and Claw like appearance of surrounding retc ridges (H&E X 100)

Microscopic features included moderate atrophy and hyperkeratosis, prominent granular layer, saw tothing and focally strangulated rete ridges, slight spongiosis, Civatte bodies, basal cell damage and vacuolization, thickened basement membrane with deposition of brightly eosinophilic material at DEJ and marked hyperpigmentation with pigmentary incontinence.

Dermal features included prominent upper dermal lymphohistiocytic infiltrate with nesting effect, moderate edema and fibrosis, slight perivascular chronic inflammation, thickened vessels, periappendigeal inflammation and appendicular damage. Some of the histiocytes had epithelioid features. Rete ridges around the infiltrate had claw like effect.

Discussion

Psoriasis is a common papulosquamous disorder of unknown etiology showing wide variation in severity and distribution of skin lesions. It is clinically

manifested as; well-circumscribed, erythematous papules and plaques covered with silvery scales typically located over the extensor surfaces of the limbs and scalp. Psoriasis fundamentally is an inflammatory skin condition with reactive abnormal epidermal differentiation and hyper proliferation.¹

Typical histological features are seen in only a small percentage of biopsy specimens. In this study we isolated 13 cases of plaque and 1 of pustular psoriasis. All the cases showed moderate to marked acanthosis and hyperkeratosis. Parakeratosis was seen in 11 (78.5%). Therefore this parameter although diagnostic for psoriasis was not present in 2 (14.3 %) cases. Parakeratosis was found in one-third cases in one study.² Similarly Munro's micro abscesses and Kogoj's spongiform pustules were present in 10 (71.4 %) and 6 (42.8 %) cases respectively both of which are important for definite diagnosis of psoriasis on histology.³ Therefore the typical histological picture was present in less than 50 % of the cases in our study.

Attenuated or absent granular layer, suprapapillary thinning, exocytosis and telangiectatic vessels were noted in the majority. Although elongation of rete ridges was present in all the cases but in was regular in 11 and irregular in 3. Latter could mimic dermatitis. Similarly in erythrodermic psoriasis also, the picture is difficult to differentiate from chronic dermatitis.⁴ Mild spongiosis was seen in all the cases with 2 having marked intercellular edema, as found in the cases of chronic dermatitis. So a line has to be proposed for microscopic differentiation from dermatitis. Presence of blood and fibrin over the epidermal surface in one case could favor dermatitis, but other supporting features were diagnostic of psoriasis. Mild to moderate perivascular mononuclear inflammation noted in the majority of our cases is quite consistent with the literature findings. However perivascular eosinophils, as present in 64.3 % of our cases could not be explained. Upper dermal edema, noted in 5 cases along with presence of upper dermal inflammation could favour early lesions.⁵ Some of the findings noted in a significant number of the cases of plaque psoriasis, not mentioned in literature included perifollicular fibrosis, basal layer hyperpigmentation and incontinence of the pigment along with basal cell damage. Some of the cases also had thickened basement membrane zone, significance of which is not known. Only one Munro abscess in one case could be mistaken for intraepithelial vesicle suggestive of dermatitis

The pustular psoriasis had histological

features typical of psoriasis along with the presence of large pustules in the stratum corneum, which is the hallmark for diagnosis of pustular psoriasis.⁶

Lichen planus is a common inflammatory skin disease presenting with characteristic violaceous polygonal pruritic papules. Etiology is unknown but immunologic mechanisms triggered by poorly defined antigenic stimulations plays a pivotal role in the pathogenesis.^{7, 8} A number of infections, mainly hepatitis C virus infections are implicated in the triggering of lichen planus.⁹ Nevertheless, the observation that Langerhans' cells are increased in the earliest lesions^{10, 11} has been taken to indicate that Langerhan' cells may be processing antigens prior to their presentation to lymphocytes.

Lichen planus may affect all the ages and incidence is equal in both sexes but distinctly rare in children. Special variants include drug induced lichenoid reactions and lichen planus- lupus erythematosus overlap. The diagnosis can be made in more than 90 % of the cases.¹² The typical case of lichen planus shows acanthosis with orthokeratosis, although some of our cases had atrophy instead. So an otherwise typical case of lichen planus may have atrophy. Prominent granular layer was seen in 83.3% and saw toothing of the rete ridges was noted in 66.6 % cases. The above microscopic features are essential for the confident diagnosis of lichen planus. Mild spongiosis in 75 % of the cases, which should be restricted to lowermost layers according to literature findings. Hyperpigmentation of the basal layer was seen in the majority, although it is said that melanocytes are absent or considerably decreased in number in active lesions. Hyperpigmentation in our cases was probably perilesional. All of our cases showed band like upper dermal lymphohistiocytic infiltrate, basal layer damage and vacuolization and incontinence of the pigment. Similarly colloid bodies were present in the majority, which may also be seen in lupus erythematosus, symptomatic lichenoid reactions and lichen nitidis.

Clefting at the dermoepidermal junction was noted in 58.3 % which is frequently seen¹² Some of the features not mentioned in the literature included thickening of the basement membrane in 66.6 %, follicular plugging in 33.3 % and exocytosis in 8.3 % of our cases.

Unusual features included nesting of the upper dermal infiltrate in 33.3 % cases. Perivascular as well as band like infiltrate included eosinophils in some (16.6 %) of the cases, which is against the findings of the literature. One case showed marked

pigmentary incontinence along with inconspicuous band like infiltrate, which may be attributed to the partial healing of the lesions.

Pityriasis rosea is a common benign self-limited papulosquamous disease often considered to be a viral exanthem.

Microscopic features showed acanthosis, spongiosis and spongiotic vesicles in all the three cases, exocytosis and focal parakeratosis in 2 cases, which was in accordance with the literature findings. Hyperpigmentation, thickening of the basement membrane and irregular elongation of rete ridges present in our cases were the additional findings. Perivascular and dermal mononuclear inflammation along with eosinophils in all of our cases was compatible with the previous studies.¹³ The microscopic features not present included intra epidermal foci of mononuclear cells and attenuated or absent granular layer, dyskeratotic cells, multinucleate giant cells, focal acantholysis and extravasations of R.B.C's.

Pityriasis rubra pilaris is a chronic papulosquamous skin disease of unknown etiology clinically characterized by symmetrical small follicular papules, scaly yellow pink patches and palmoplantar hyperkeratosis. The microscopic features were not diagnostic. Microscopic features as mentioned in the literature included acanthosis, orthokeratotic hyperkeratosis with focal perifollicular parakeratosis as is usually found in a typical case¹⁴, persistence of the granular layer, moderate acanthosis with irregular elongation of rete ridges, which were thick and short as usually noted in these cases, pigmentary incontinence and no basal cell damage. Suprapapillary plates were thickened, not thinned as in psoriasis. Dilated hair follicles with formation of horn plugs and papillomatosis were not noted as mentioned in the literature.

Dermis findings of moderate perivascular lymphohistiocytic infiltrate, moderate dermal fibrosis and granulation tissue agreed to the literature findings.

Additional findings included spongiosis, thickened basement membrane, slight to moderate hyperpigmentation, spongiotic vesicles and pigmentary incontinence.

Microscopic features not found in our study included follicular horn plugging and papillomatosis.

Prurigo nodularis is clinically characterized by chronic itchy nodules and histologically by marked hyperkeratosis and acanthosis.

Microscopic findings of marked acanthosis with

pseudoepitheliomatous hyperplasia, moderate to marked hyperkeratosis, spongiosis, exocytosis, parakeratosis, marked perivascular lymphohistiocytic infiltration, dermal edema and presence of thickened vessels and nerves, probably secondary to scratching¹⁵, were in accordance with the literature findings. However we noted an additional feature of thickened basement membrane zone. Dermis showed marked non-specific perivascular lymphohistiocytic infiltrate and edema, fibrosis, granulation tissue and thickened nerves which are important for the diagnosis of Prurigo nodularis.¹⁵ Dense dermal infiltrate composed of lymphocytes, histiocytes, neutrophils and eosinophils was not present.

Lichenoid reactions are defined as lichenoid tissue reactions as those exhibiting epidermal damage as the primary event, which then initiates the cascade of changes, which are seen and recognized in the fully developed histopathology of lichen planus.¹⁶

The prototype of all Lichenoid eruptions is lichen planus itself but a number of other diseases may develop a lichenoid reaction.^{17, 18}

Histologically both the patterns, which are indistinguishable as well as differentiating from lichen planus, were present in both the cases included in our study. The features simulating lichen planus included prominent granular layer, acanthosis, orthokeratosis, focal basal layer damage with formation of vesicles and clefting at the dermoepidermal junction, sawtoothing of rete ridges, colloid bodies, hyperpigmentation with incontinence of the pigment and presence of band like upper dermal lymphohistiocytic infiltrate. The microscopic features which were more suggestive of lichenoid drug reactions included exocytosis, focal interruption of the granular layer, presence of eosinophils in the upper dermal band like as well as in the perivascular lymphohistiocytic infiltrate. Eosinophils are not present in the classical case of lichen planus.

In **lichen planopilaris** there is a dense mononuclear infiltrate surrounding the hair follicles and the dermal hair papillae.

Epidermal features in both the cases were similar to those present in lichen planus although only occasionally are these features noted in the cases of lichen planopilaris.

The diagnosis of lichen planopilaris is usually made on the basis of dermal findings like dense mononuclear infiltrate surrounding the hair follicles, which was present in one of our cases. However marked appendicular damage was noted in

both the cases. Moderate to marked perivascular mononuclear inflammation was noted in both the cases, in addition one of the cases was also having marked dermal edema, which was an additional non-specific, finding.

Lichen nitidis is a chronic generally asymptomatic micropapular dermatosis usually affecting penile shaft, flexural surfaces of forearms, wrists, breasts, thighs, lower abdomen, buttocks or may be generalized. The view that lichen nitidis represents a variant of LP tends to be supported by the fact that early tiny LP papules may be clinically and histopathologically indistinguishable from lichen nitidis.^{19, 20}

The finding of upper dermal infiltrate consisting of epithelioid cells along with lymphohistiocytes having nesting appearance was very characteristic as mentioned in the literature. The infiltrate was extending into the overlying epidermis. However multinucleate giant cells were not present. The rete ridges surrounding the infiltrate were also characteristically elongated. The other features of lichen nitidis found in our case included epidermal atrophy, prominent granular layer, basal layer damage and pigmentary incontinence were also present. Partial detachment of the epidermis from underlying dermis that may be present was not noted in our study case. Parakeratosis, which is present in these cases, was not noted in our study case. Additional features not mentioned in the literature but present in our case included deposition of brightly eosinophilic material along with the basement membrane zone, thickened vessels, periappendigeal damage and inflammation and slight perivascular inflammation. The other

features represent the non-specific findings.

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