Net Study

A study of clinicohistopathological correlation in patients of psoriasis and psoriasiform dermatitis

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ABSTRACT

Background: Psoriasis has different clinical variants, which mimic diverse dermatological conditions and may require a histopathological confirmation of the diagnosis. Studies to establish a clinicohistopathological concordance (and its determinants), in psoriasis and psoriasiform dermatitis are lacking**. Aims**: The present study was designed (a) to correlate the clinicohistopathological features of psoriasis and psoriasiform dermatitis, and (b) to identify determinant(s) that may contribute to the diagnosis of psoriasis and psoriasiform dermatitis. **Methods**: This was a prospective study involving 100 patients, with a single clinical diagnosis of psoriasis or with psoriasis as one of the differential diagnoses, and its correlation with histopathological features. **Results**: The clinical features of typical scale (P = 0.0001) and Auspitz's sign (P = 0.0001), and histological evidence of suprapapillary thinning (P = 0.0001) and absent granular cell layer (P = 0.0001) were found to be statistically significant contributors to the clinicohistological concordance in cases of psoriasis. Vertical orientation of collagen bundles (P = 0.0001) and lymphocytic exocytosis (P = 0.003) were found to be significantly associated with diagnosis of psoriasiform dermatitis. **Conclusion**: The present study reconfirms the diagnostic accuracy of silvery white scale, Auspitz's sign, and Koebner's phenomenon in a clinical setting suggestive of psoriasis. However, in their absence, histological evidence of suprapapillary thinning and absent granular layer, in addition to the Munro microabscess and Kogoj's abscess, may contribute to the diagnosis of psoriasis. Similarly, vertical orientation of collagen bundles and lymphocytic exocytosis may point toward a diagnosis of psoriasiform dermatitis.

Key words: Clinicohistological correlation, Histopathology, Psoriasiform dermatitis, Psoriasis

INTRODUCTION

Psoriasis is a common, relapsing chronic inflammatory condition affecting about 1.5–3% of the world's population, causing significant morbidity.[1] The presence of a well-defined margin and a silvery white scale, over a glossy homogenous membrane, is clinically diagnostic of psoriasis.[2] The successive removal of the psoriatic scales usually reveals an underlying smooth, glossy red membrane with multiple bleeding points where thin suprapapillary epithelium is torn off (Auspitz's sign).[3] When the scaling is not evident, it can be induced by light tangential scratching with the edge of glass slide (Grattage). Psoriasis often involves nails, scalp, mucosae, and joints, as well.

Psoriasis has different clinical variants that mimic diverse dermatological conditions. Besides, clinical features in one patient may differ at different times and sometimes, the diagnosis may get obscured, as in case of erythroderma. These patients often prove to be a diagnostic dilemma for the clinician and warrant a histopathological confirmation. Histologically, psoriasis vulgaris must be differentiated from psoriasiform dermatitis. The term psoriasiform implies that the lesion either clinically or histologically mimics psoriasis.[4,5] This group includes: psoriasis, seborrheic dermatitis, pityriasis rubra pilaris, allergic dermatitis, atopic dermatitis, nummular dermatitis, lichen simplex chronicus, pityriasis rosea, dermatophytosis, and mycosis fungoides.[4,5]

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In standard textbooks, dilated blood vessels, regular epidermal hyperplasia, and presence of Munro microabscess and/or Kogoj's abscess have been described to be the most constant or characteristic histopathological features in skin biospy of psoriasis.[6-8] Similarly, spongiosis, irregular epidermal hyperplasia, and absence of Munro micro and Kogoj's abscess have been found consistently in psoriasiform dermatitis.[6-8]

However, the frequency with which an individual feature (or a combination of features) is seen, in clinically diagnosed cases, has not been extensively studied. Moreover, the 'diagnostic' histopathological findings of psoriasis, namely, Kogoj's spongiform pustules and Munro microabscess, can also be seen in dermatophytoses, candida infection, and others.[4] In addition, histopathological changes too, vary greatly with the stage and the clinical presentation of the disease, as seen in patients on treatment.[2]

Studies have been conducted in leprosy, basal cell carcinoma, and lichen planus to establish clinicohistopathological concordance and to identify its determinants in these diseases where, like psoriasis, concordance is important in the decision making regarding the long-term management of the disease.[9-12] However, no publications are available regarding such studies on psoriasis.

A medical audit (unpublished) at our institution, showed that of seventy-three patients with a single clinical diagnosis of psoriasis, only forty-nine (69%) patients had a histopathological report consistent with psoriasis. Besides this, the audit also highlighted that among all the dermatology patients subjected to skin biopsy in one year, 12.3% had psoriasis as the diagnosis or as a differential diagnosis. The relative paucity of information on the clinicohistopathological correlation in psoriasis and psoriasiform dermatitis prompted us to investigate the same. The present study was designed (a) to correlate the clinicohistopathological features of psoriasis and psoriasiform dermatitis, and (b) to identify determinant(s) that may contribute to the diagnosis of psoriasis.

METHODS

Inclusion criteria

The study group constituted 100 self-reporting patients with lesions diagnosed clinically as psoriasis on the basis of one or more features, namely: well-defined border, nonadherent silvery white scales, and positive Auspitz's sign, or when psoriasis was given as one the differential diagnosis, by two dermatologists independent of each other. The patient was labeled to have psoriasiform dermatitis if he presented with ill to well defined erythematous scaly plaques irrespective of presence of Grattage sign.

Patients on topical or systemic therapy in preceding four weeks were excluded. The cohort of 100 patients was divided into two groups on the basis of clinical diagnosis; group A constituted patients with a single clinical diagnosis of psoriasis, and group B consisted of patients with psoriasis as one of the differential diagnosis. Result of a detailed history and clinical examination were noted on a predesigned proforma. Disease severity assessment was done determining the psoriatic area severity index recorded (PASI) score for each patient. After an informed consent, all the patients were subjected to a skin biopsy from a clinically unmodified lesion. Hematoxylin and eosin stained sections from each biopsy were studied and the important histological features observed were subsequently noted on each patient's proforma.

The patients in clinical group A were compared to group B patients with respect to individual clinical and histopathological features and the level of significance was determined for each feature. The presence of two or more of the (earlier mentioned) constant or characteristic histopathological features of each of the categories, psoriasis and psoriasiform dermatitis, were considered histologically diagnostic for that category. Based on these histological outcomes, all the 100 patients were then recatagorized into three groups, namely: psoriasis (group C), psoriasiform dermatitis (group D), and unclassified (group E). Group E included patients who did not have characteristic features fulfilling either psoriasis or psoriasiform dermatitis. Subsequently, a comparison of histological groups (C and D) was performed with the clinical groups (A and B) and two new categories were derived, (i) clinicohistologically concordant psoriasis (group F) and (ii) clinicohistologically concordant psoriasiform dermatitis (group G).

Statistical methods

The comparison of patient in the clinical groups (A and B), histological groups (C and D), and the

clinicohistologically concordant groups (F and G) was performed using univariate analysis and the level of significance was recorded. Chi-square test was used to calculate the predictive values of the variables in this study. '*P*' values of <0.05 and 0.01 were considered significant and highly significant, respectively.

RESULTS

Clinical group A, which had patients with a single diagnosis of psoriasis, comprised of 61 patients and group B, which had 39 patients, included those who had psoriasis as one of the differential diagnoses.

Clinical profile

The baseline clinical profile of the cohort of 100 patients including clinical groups A and B separately has been tabulated in Table 1.

- Both typical scales and Auspitz's sign were observed in 42 (42%) patients.
- History of Koebner's phenomenon was positive in 19 patients (19%).
- The PASI score ranged from 0.8–66 with a mean score of 9.04 ± 8.901.

Nail changes

Among the nail changes, 'nail pits' were the most frequent abnormality observed in 24 patients (24%) and correlated positively with the PASI score.

The patients of group A were compared with group B patients in terms of individual clinical and histopathological features [Tables 2 and 3]. The presence of Auspitz's sign and silvery white scales ($P = 0.0001$) were found significantly more frequent in group A. The histological evidence of Munro microabscess ($P = 0.014$) [Figure 1], absence of granular cell layer ($P = 0.0001$), suprapapillary thinning ($P = 0.0001$), regular epidermal hyperplasia ($P = 0.001$), and dilated blood vessels ($P = 0.041$) [Figure 2] were found more frequently in patients with a single clinical diagnosis of psoriasis (group A), as compared to group B patients. Spongiosis ($P = 0.001$), lymphocytic exocytosis ($P = 0.039$), vertical orientation of collagen bundles ($P = 0.014$), and irregular epidermal hyperplasia ($P = 0.002$) [Figure 3] were found to be significantly more frequent in patients with psoriasis as one of the differential diagnoses (group B). Other histological features such as dermal edema, perivascular infiltration, erythrocyte extravasations, mitotic figures, keratinocyte pallor, and Kogoj's abscess were not statistically significant in either of the two groups.

On the basis of histological outcomes, all the patients

Table 1: Frequency distribution of baseline parameters in clinical groups A and B

Clinical parameter	A (n = 61)	B (n = 39)	Total (N = 100)
Sex distribution (M: F)	33:17	27:23	60:40
Mean duration of illness	15.87 ± 25.14 (1-120 months)	5.95 ± 6.26 (0.25-24 months)	12.7 (0.25-120 months)
Winter exacerbation	24	4	28
Positive family history	6	Nil	6
Mean PASI	11.9	4.6	9.04

Group A, clinical psoriasis; group B, clinical psoriasiform dermatitis

Table 2: Frequency distribution of clinical features in groups A and B

Clinical feature	A(*n* = 61)	B (*n* = 39)	*P* value
Auspitz's sign	+ 47	9	0.0001/ ***
	- 14	30	
Typical scales	+ 52	10	0.0001 / ***
	- 9	29	
Presence of both Auspitz's sign and typical scales	+ 42	9	0.0001/ ***
	- 19	30	
Koebner's phenomena	+ 14	5	0.297 /*
	- 47	34	
Nail pits	+ 14	11	0.638/ *
	- 47	28	

***Highly significant (*P*-value < 0.01)

**Significant (*P*-value between 0.01 and 0.05)

*Not significant (*P*-value > 0.05)

Table 3: Frequency distribution of histological features in groups A and B

Histological feature	A (*n* = 61)	B (*n* = 39)	*P* value
Dilated blood vessels	+ 53	27	0.041/ **
	- 8	12	
Vertical orientation of collagen bundles	+ 13	18	0.014/**
	- 48	21	
Irregular epidermal hyperplasia	+ 9	17	0.002/***
	- 52	22	
Regular epidermal hyperplasia	+ 54	23	0.001/***
	- 7	16	
Suprapapillary thinning	+ 38	11	0.001/***
	- 23	28	
Spongiosis	+ 18	25	0.001/***
	- 43	14	
Lymphocyte exocytosis	+ 21	22	0.039/**
	- 40	17	
Absent granular layer	+ 51	19	0.0001/***
	- 10	20	
Munro microabscess with parakeratosis	+ 38	14	0.014/**
	- 23	25	

***Highly significant (*P*-value < 0.01)

**Significant (*P*-value between 0.01 and 0.05)

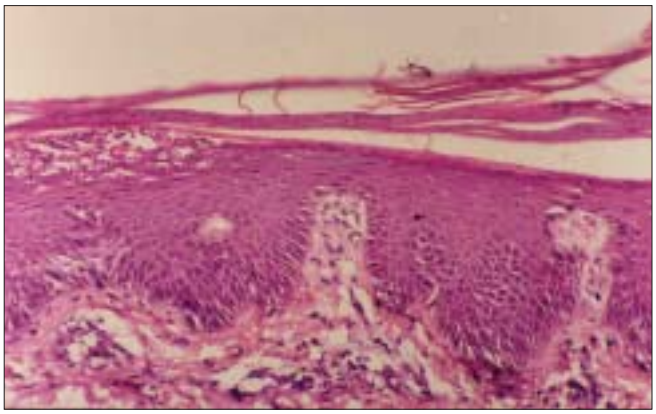

Figure 1: Skin biopsy from psoriatic plaque on the left arm showing Kogoj's and Munro microabscess (H and E, x400)

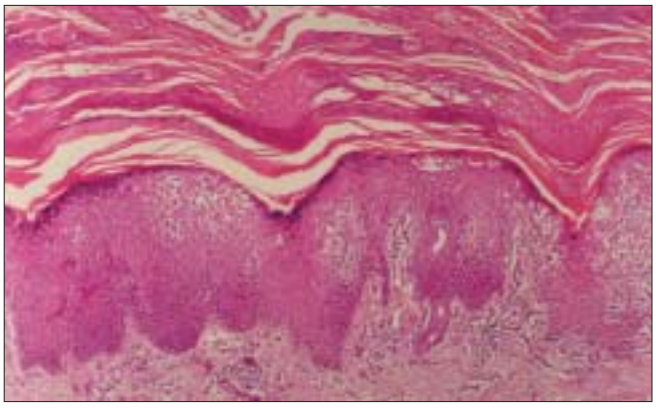

Figure 3: Psoriasiform dermatitis lesion biopsy showing vertically oriented collagen bundles, dilated dermal capillaries, perivacular infiltrate, and spongiosis (H and E, x200)

were regrouped into three categories, namely: psoriasis (group C), psoriasiform dermatitis (group D), and unclassified (group E). These categories had 58, 23, and 19 patients, respectively [Table 4].

On histological evaluation of 100 biopsies, only 57 had clinicohistologically concordant outcomes. Forty-two patients out of 61 (69%) of group A had psoriasis and constituted group F, whereas 15/ 39 (38%) of group B had psoriasiform dermatitis and constituted group G.

Clinicohistologically concordant psoriasis — n = 42 (group F)

Clinicohistologically concordant psoriasiform dermatitis — n = 15 (group G)

Table 5 summarizes the description of groups A to G.

The clinical and histogical features were statistically reassessed in groups F and G to determine which feature helped to achieve clinicohistologic concordance in

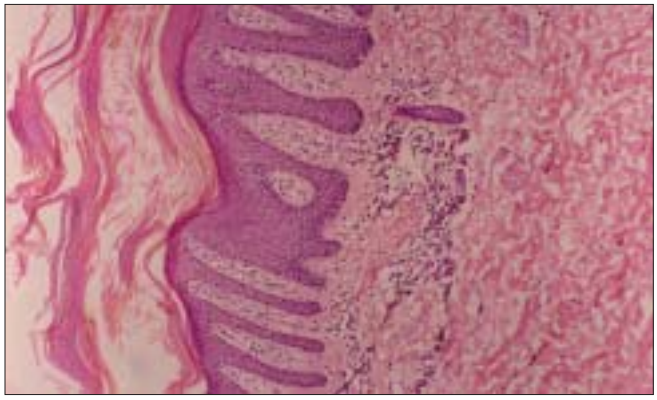

Figure 2: Lesional biopsy showing regular elongation of rete ridges, dilated tortuous capillaries, dermal edema, and tiered parakeratosis (H and E, x200)

Table 4: Histological outcomes in patients from clinical groups A and B

Group	Histopathological diagnosis	No. of patients (*N* = 100)	A	B
C	Psoriasis	58	42	16
D	Psoriasiform dermatitis	23	8	15
E	Unclassifiable	19	11	8
	Total	100	61	39

Table 5: Clinical and histological groups

Groups	Representation	Number (*n*)	Total
A	Clinically psoriasis	61	100
B	Clinically psoriasiform dermatitis	39	
C	Histologically psoriasis	58	100
D	Histologically psoriasiform dermatitis	23	
E	Unclassified	19	
F	Clinicohistologically concordant psoriasis	42	57
G	Clinicohistologically concordant psoriasiform dermatitis	15	

the diagnosis of both psoriasis and psoriasiform dermatitis [Table 6].The clinical features of typical scale ($P = 0.0001$) and Auspitz's sign ($P = 0.0001$) and histopathological evidence of suprapapillary thinning ($P = 0.0001$) [Figure 2] and granular layer absence ($P = 0.0001$) were found to be statistically significant contributors to clinicohistological concordance in the diagnosis of psoriasis. Vertical orientation of collagen bundles ($P = 0.0001$) [Figure 3] and lymphocytic exocytosis ($P = 0.003$) were two histological features that were significantly associated with the diagnosis of psoriasiform dermatitis. Other findings such as nail pits, typical distribution, dermal edema, perivascular infiltration, erythrocyte extravasation, mitotic figures and keratinocyte pallor were not

Table 6: Comparison of clinical and histopathological findings in patients with clinicohistologically concordant psoriasis (group F)/psoriasiform dermatitis (group G)

Clinical/histological feature	F *n* = 42	G *n* = 15	*P*-value
Typical scales	+ 39	6	0.0001 / ***
	- 3	9	
Auspitz's sign	+ 36	2	0.0001 / ***
	- 6	13	
Koebner's phenomena	+ 10	0	0.05 / **
	- 32	15	
Vertical orientation of collagen bundles	+ 7	12	0.0001 / ***
	- 35	3	
Suprapapillary thinning	+ 32	2	0.0001 / ***
	- 10	13	
Lymphocyte exocytosis	+ 9	10	0.003 / ***
	- 33	5	
Absent granular layer	+ 38	5	0.0001 / ***
	- 4	10	

***Highly significant (*P*-value < 0.01)

**Significant (*P*-value between 0.01 and 0.05)

statistically significant in either of the two groups.

DISCUSSION

Psoriasis is a genetically determined, inflammatory, and proliferative disease of the skin characterized by dull red, sharply demarcated scaly plaques.[2] The two clinical signs, Auspitz's sign and the Grattage test have been described as pathognomonic of psoriasis by Hellgren *et al*.[13] However, these signs are present only in untreated patients. In a typical clinical scenario, patients encountered are usually in partial remission, following some treatment. Psoriasis has many different clinical variants and can resemble other skin diseases like secondary syphilis, dyshidrotic eczema, seborrhoeic dermatitis, pityriasis rosea, psoriasiform drug rash, and parapsoriasis. Besides, the same patient can present at different times with a different clinical presentation or variant.[2,3] Less commonly, a patient of psoriasis may present with erythroderma. It is then frequently difficult to pinpoint the original causative disease of the erythroderma. Since satisfactory management of the condition requires both symptomatic and specific therapy, it is essential to reach a definitive diagnosis.[3] The recurrent nature and prognosis of psoriasis differs from that of psoriasiform dermatitis, thus, further highlighting the importance of reaching the correct diagnosis.

David Elder has considered histopathology as a "gold standard" for the diagnosis of most dermatological conditions including psoriasis.[14] In clinical practice, diagnostic dilemma and exclusion of life-threatening malignancies constitute the commonest reasons for seeking histopathological evaluation. Clinical features when considered alone may not be reliable, as they vary with both disease duration and treatment. On the contrary, histological material constitutes definite 'hard' evidence, which can be preserved and will continue to be available for future review, if necessary. However, at times, histopathology cannot resolve the issue and the picture is more typically 'compatible with' rather than 'diagnostic of' a clinical diagnosis.[14] This situation precludes effective clinical decision making and management of the patient. In these circumstances an attempt at clinicohistopathological correlation should serve as an ideal approach.

Of 61 patients clinically categorized as group A, 42 were histopathologically concordant for psoriasis and showed the earlier defined features, namely: dilated blood vessels, regular epidermal hyperplasia, and presence of Munro microabscess and/or Kogoj's abscess. Eight out of 61 fulfilled the criteria for psoriasiform dermatitis. The remaining 11 could not be categorized in either of the histological groups using these criteria. Similarly, from the 39 group B patients (psoriasis as one of the differential diagnosis), 16 fulfilled the histologic criteria for psoriasis, while 15 did so for psoriasiform dermatitis. The remaining 8 could not be classified into either of the two groups based on these criteria. Surprisingly, histopathology, the so-called "gold standard" of diagnosis, also has significant pitfalls and failed to give any conclusive evidence in 19/100 (19%), a sizable and significant proportion of patients. This has been recognized especially in papulosquamous conditions like psoriasis, where histopathology can effectively contribute by ruling out important diagnosis like mycosis fungoides, but may not be able to establish a specific diagnosis of psoriasis.[12] The possible reasons for this observation may include improper selection of the lesion to be biopsied (partial remission, incomplete evolution, on therapy) or the lack of a proper classification system, based on a uniform terminology, standardized documented criteria, defining boundaries between categories, and specifying the relative importance of each criteria. These findings further emphasize the importance of the present study.

This study revealed the sensitivity and specificity

of clinical diagnosis for psoriasis and psoriasiform dermatitis to be 84% and 48.3%, respectively, while that of histological diagnosis is 72.4% and 65.2%, respectively. These observations substantiate and validate the usually followed sequence of histopathological examination preceded by a clinical impression, whereas a more sensitive method or procedure is used for the initial screening and a more specific one for the subsequent confirmation.

Finally, an effort was further made to determine the key determinants, which could influence this clinicohistopathological concordance, by statistically comparing the two concordant groups (group F and group G) with respect to important individual clinical and histopathological features. Diagnostically concordant psoriasis is strongly associated, clinically, with typical scale ($P = 0.0001$), Auspitz's sign ($P = 0.0001$), and Koebner's phenomena ($P = 0.05$) and histopathogically with suprapapillary thinning ($P < 0.0001$) and absent granular cell layer ($P < 0.0001$).

On the contrary, diagnostically concordant psoriasiform dermatitis is strongly associated with lymphocytic exocytosis ($P = 0.003$) and vertical orientation of collagen bundles ($P = 0.0001$).

These findings reconfirm diagnostic accuracy of the 'pathognomonic' clinical signs in patients with suspected psoriasis and their presence may even obviate the need for a histopathological examination in resource limited settings. However, their absence warrants a detailed histological examination in a clinical setting suggestive of psoriasis. Suprapapillary thinning and the absence of granular cell layer, could be added to the list of essential histopathological criteria for psoriasis, in addition to Munro micorabscess and Kogoj's abscess. On the other hand, presence of vertical orientation of collagen bundles and lymphocytic exocytosis, in combination with spongiosis and irregular epidermal hyperplasia point toward a diagnosis of psoriasiform dermatitis.

REFERENCES

1. Krueger GG, Duvic M. Epidemiology of psoriasis: Clinical issues. J Invest Dermatol 1994;102:14-8.
2. Camp RD. Psoriasis. In: Champion RH, Burton JL, Burns DA, Breathnach SM, editors. Rooks textbook of dermatology. 6th ed. Oxford: Blackwell Publication; 1998. p. 1589-651.
3. Christofers E, Mroweitz U. Psoriaisis. In: Freedberg IM, Eisen AZ, Wolff K, Goldsmith LA, Austen KF, Fitzpatrick TB, *et al*. editors. Fitzpatrick's Dermatology in General Medicine. 5th ed. New York: McGraw Hill; 1999. p. 495-521.
4. Altman E, Kamino H. Diagnosis: Psoriasis or not? What are the clues? Semin Cutan Med Surg 1999;18:25-35.
5. Barr RJ, Young EM Jr. Psoriasiform and related papulo-squamous disorders. J Cutan Pathol 1985;12:412-25.
6. Toussaint S, Hideko K. Non infectious erythematous papular and squamous diseases of the skin. In: Elder D, Elenitsas R, Jaworsky C, Johnson B, editors. Lever's Histopathology of the skin. 8th ed. Philadelphia: Lippincott-Raven publishers; 1997. p. 156-63.
7. Pinkus H, Mehregan AH. Psoriasiform tissue reation. In: Pinkus H, Mehregan AH, editors. A Guide to Dermatohistopathology. 3rd ed. New York: Appleton-Century-Crofts; 1981. p. 97-108.
8. Ackerman B, Chongchitnant N, Sanchez J. Inflammatory disease. In: Ackerman B, Chongchitnant N, Sanchez J, Guo Y, Bennin B, Reichel M, *et al*. editors. Histologic diagnosis of inflammatory skin conditions: An algorithmic method based on pattern analysis. 2nd ed. Philadelphia: Williams and Wilkins; 1997. p. 663-73.
9. Porichha D, Misra AK, Dhariwal AC, Samal RC, Reddy BN. Ambiguities in Leprosy Histopathology. Int J Lepr other Mycobact Dis 1993;61:428-32.
10. Bhatia AS, Katoch K, Narayanan RB, Ramu G, Mukherjee K, Lavania RK. Clinical and histopathological correlation in the classification of leprosy. Int J Lepr Other Mycobact Dis 1993;61:433-8.
11. Betti R, Inselvini E, Cardocci M, Crosti C. Age and site prevalence of histological subtypes of BCC. Int J Dermatol 1995;34:174-6.
12. Horn TD, Zahurak ML. Lichen planus- like histopathological characterstics in cutaneous graft Vs host reaction: Prognostic significance independent of time course after allogenic bone marrow transplantation. Arch Dermatol 1997;133:1033-6.
13. Hellgren L. The prevelance in sex, age and occupational groups in total population in Sweden. In: Hellgren L, editors. Psoriasis. 1st ed. Stockholm: Almqvist and Wiksell; 1967. p. 134-45.
14. Elder D. Introduction. In: Elder D, Elenitsas R, Jaworsky C, Johnson B, editors. Lever's Histopathology of the skin. 8th ed. Philadelphia: Lippincott -Raven publishers; 1997. p. 1-2.