

CLINICO-DERMOSCOPIC STUDY OF INFLAMMATORY DERMATOSES: A HOSPITAL BASED CROSS SECTIONAL STUDY

Deeptara Pathak Thapa,¹ Sushmita Pradhan,² Harihar Adhikari,³ Sajana Bhandari,⁴ and Prabhat Paudel¹

¹Department of Dermatology, Nepal Medical College Teaching Hospital, Attarkhel, Gokarneshwor-8, Kathmandu, ²Karnali Province Hospital, Birendranagar, Surkhet, ³Karnali Academy of Health Sciences, Karnali, ⁴Gandaki Medical College, Pokhara, Nepal

ABSTRACT

Dermoscopy is a noninvasive, fast, and reliable diagnostic technique used to magnify and visualize structures on and beneath the skin surface which is difficult to observe by naked eyes, creating a link between macroscopic clinical dermatology and microscopic dermatopathology. The purpose of this study is to evaluate and compare the dermoscopic features of common inflammatory dermatological conditions of skin sharing similar clinical presentation according to the available literature data. All dermoscopic findings were studied using a handheld pocket dermoscopy (Dermlite DL1) with high magnification. Variables used for dermoscopic evaluation were divided into vascular and nonvascular features and specific clues. Descriptive analysis and Chi square test were used where appropriate and $p < 0.05$ was considered statistically significant. There were a total of 205 patients enrolled in the study. The most common clinical diagnosis was psoriasis seen in 42.0%, lichen planus in 13.0%, contact dermatitis in 12.0%, polymorphic light eruption 7.0%, seborrheic dermatitis 4.0%, discoid lupus erythematosus 5.0%, pityriasis Rosea 5.0%, urticaria 5.0% and others 7.0%. Dermoscopic vascular changes were seen as regular in 52.0% and irregular in 46.0%. The most common type of vessels observed were dotted in 70.0%, linear in 7.0%, and coiled in 2.0%. Non-vascular changes were seen in 61.0%. The commonest type of scales were whitish scales seen in 63.0%. Pigmentary changes were seen in 19.0%. The commonest type of vessels observed were dotted vessels (p value 0.000) in most inflammatory diseases. Features like wickham striae were characteristic of lichen planus (p value 0.000). The characteristic dermoscopic features of various inflammatory disorders with the help of a dermoscope is easy to perform in outpatient without any invasive method and also helpful in guiding management of the patients with follow-up.

KEYWORDS

Dermoscopy, inflammatory dermatoses, lichen planus

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CORRESPONDING AUTHOR

Dr. Deeptara Pathak Thapa
Associate Professor,
Department of Dermatology,
Nepal Medical College Teaching Hospital,
Attarkhel, Gokarneshwor-8, Kathmandu, Nepal
Email: drdeeptarapathak@yahoo.com
Orcid No: <https://orcid.org/0000-0002-1602-415X>
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INTRODUCTION

Dermoscopy is a noninvasive, fast, and reliable diagnostic technique used to magnify and visualize structures on and beneath the skin surface which is difficult to observe by naked eyes, creating a link between macroscopic clinical dermatology and microscopic dermatopathology. Multiple studies have shown that dermoscopy increases diagnostic accuracy when analyzing skin growths.^{1,2} Initially, it was introduced to diagnose only pigmented disorders, however recently, dermoscopy has gained popularity in wider application in the field of general dermatology.²

Diagnosis in dermatology is usually established based on the clinical morphology and distribution of the skin eruption. Sometimes, the clinical manifestations do not allow the establishment of a definite diagnosis as more than one diseases are included in the differential diagnosis. Applying dermoscopy and interpreting dermoscopic findings makes sense only within this specific differential diagnosis established clinically. The study aims to evaluate and compare the dermoscopic features of common inflammatory dermatological conditions of skin sharing the similar clinical presentation according to the available literature data. Moreover, there are no study done in the literature of Nepal about dermoscopy of inflammatory disorders.

MATERIALS AND METHODS

All patients visiting the Dermatology outpatient department of Nepal Medical College and Teaching Hospital clinically diagnosed as inflammatory dermatoses were enrolled in the study during the study period between November 2020 till April 2022. Ethical approval was taken prior to study from Nepal Medical College Institutional Review Committee. All patients of both genders of all ages with inflammatory dermatoses were included in our study. Patients other than inflammatory dermatoses, under treatment for last 1 month were excluded from the study. All those willing to participate were explained the procedure and the reason for photography before taking their written informed consent. Demographic and detailed clinical data, including patient's age, sex, cutaneous examination including whole body, scalp, palms and soles, mucous membranes and systemic examination were carried out, and findings were filled in a preset proforma. All dermoscopic findings was studied using a handheld pocket dermoscope (Dermlite DL1) with high magnification, with both polarizing and non-polarizing lens used for the

dermoscopic examination. It features a 25 mm four-element lens, 28 high-powered LEDs and the all-new pigment boost illumination. If a patient has multiple lesions, only a single active lesion was selected for dermoscopy. Smart phone was used with the dermoscope to take photographs and documentation was recorded.

Variables used for dermoscopic evaluation was divided into vascular and nonvascular features, which were further subcategorized into vascular morphology and its arrangement, background color, type of the scales and its pattern, follicular abnormalities, and any specific clues. This categorization is mainly helpful in differentiating inflammatory conditions. The characteristics were noted as present or absent. Statistical data were analyzed using SPSS-16, descriptive analysis and Chi square test were used where appropriate, and $p < 0.05$ was considered statistically significant.

RESULTS

There were a total of 205 patients enrolled in the study. Patients under 15 years were 14.0%, between 16-30 years were 37.0%, and above 31 years were 49.0%. The minimum age of presentation was 9 years and the maximum 67 years, with a mean age of 30.05± years. Males were 43.0% and females 57.0%. Majority of the occupation of the patients were employed 32.0%, followed by homemakers 28.0%, students 26.0%, and unemployed 14.0%. The site of involvement were extremities, trunk, face, scalp and multiple site involvement. More than 1 site of involvement was present in 52.0%, followed by extremities in 16.0%, in face 12.0%, and scalp and trunk 10.0% each. Duration of the disease was less than 6 months in 52.0%, followed by 38.0% in more than 1 year and 10.0% in between 6months to 1 year. Itching was the commonest symptom seen in 71.0%, followed by pain in 3.0%. Plaques were present in 50.0%, in 26.0% papules/nodules, scales in 17.0%, vesicles and pustules in 5.0% and macules in 2.0% (Table 1). Oral mucosa was involved in 4.4%. Nail involvement was present in 21.0%. The nail changes were observed as pitting, discoloration, onycholysis, and subungual hyperkeratosis, respectively. The most common clinical diagnosis was psoriasis seen in 42.0%, lichen planus in 13.0%, eczema (contact dermatitis, lichen simplex chronicus, atopic dermatitis, nummular dermatitis) in 12.0%, polymorphic light eruption (PMLE) 7.0%, seborrheic dermatitis 4.0%, discoid lupus erythematosus 5.0%, pityriasis rosea 5.0%, urticaria 5.0% and others 7.0% (lichen striatus, erythromelanosus follicularis faciei et colli, pityriasis rubra pilaris, morphea, rosacea)

Table 1: Demographic and clinical profile of the patients

	Psoriasis n (%)	Lichen planus n (%)	Pityriasis rosea n (%)	Dermatitis n (%)	DLE n (%)	PMLE n (%)	others n (%)
A) Sex Frequency (%)	86 (42%)	27 (13%)	11 (5%)	33 (16%)	11 (5%)	14 (7%)	23 (12%)
a. Male	30 (34%)	13 (48%)	5 (45%)	19 (9%)	2 (18%)	6 (42%)	15 (65%)
b. Female	56 (66%)	14 (52%)	6 (55%)	14 (7%)	9 (82%)	8 (58%)	8 (35%)
B) Age (range in years)	23-55yrs	9-49yrs	15-38yrs	12-67yrs	29-42yrs	31-50yrs	17-59yrs
C) Characteristic of lesions							
a. Site of lesion	Scalp, nails, trunk, extremities	Trunk, face, oral mucosa, extremities	Trunk. Extremities	Face, trunk, extremities	Face, trunk	Face, extrmities	Face, trunk
b. Type of lesions	Plaques, papules, scales	Plaques , papules and nodules, scales	Plaque, macules, scales	Plaques, nodules, vesicles and, scales	Plaque, scales	Plaques, macules, papules	Plaques, papules les

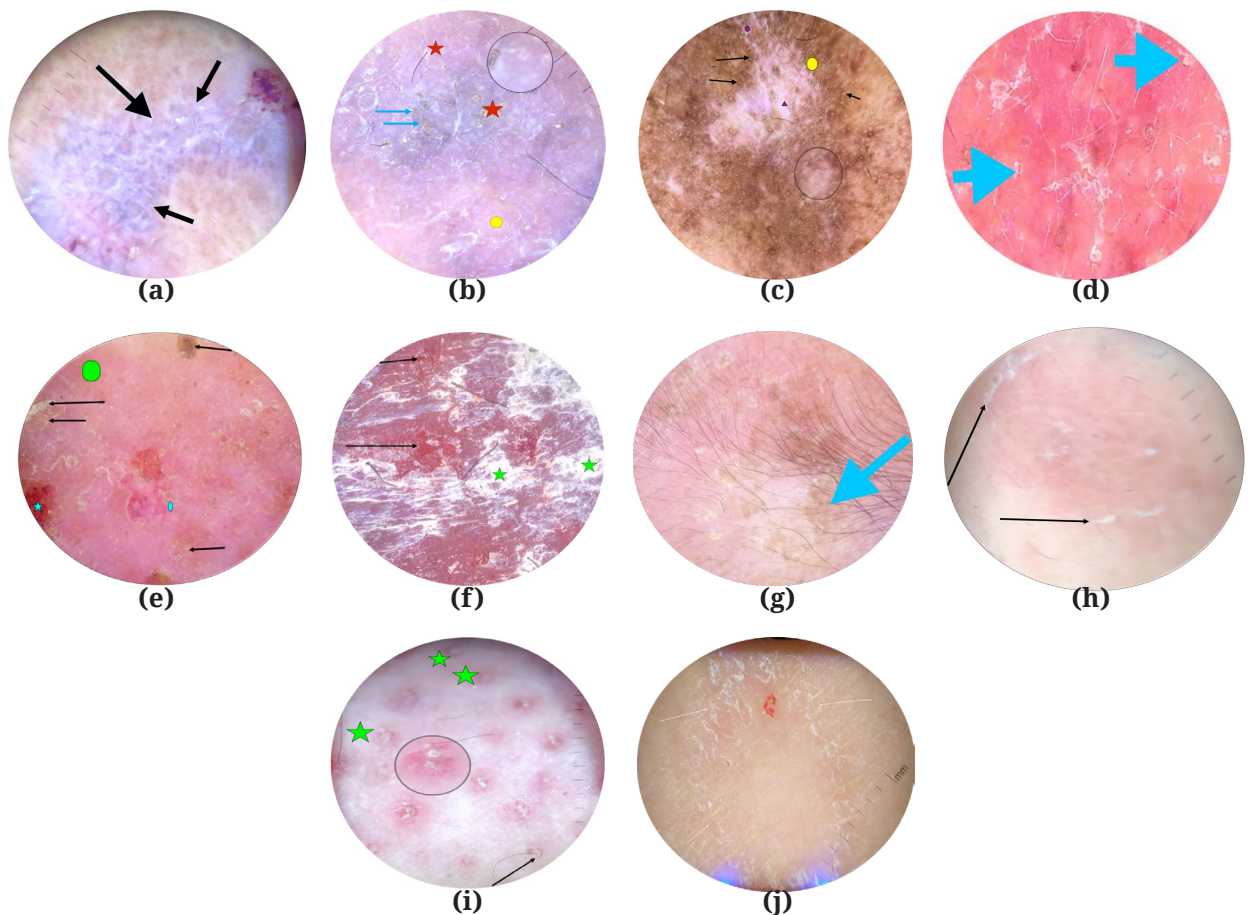


Fig.1: (a) Shows white reticulate pattern of Wickham's striae on violaceous background (black arrows) in lichen planus, (b) showing follicular keratotic plug shown by red star, blue arrow showing comedo like opening, yellow dot showing yellowish areas, black circle showing rosettes, (c) showing perifollicular hypopigmentation shown by black arrows, whitish structure less area (purple triangle), arborizing vessels (purple dot) and rosettes inside the black circle, (d) Demodex tail in follicular opening as shown by blue arrows in Rosacea, (e) Black arrows shows whitish to brownish coloured scales, dotted vessels (blue dot), erosion (blue star), pinkish background (green dot), (f) Dermoscopic picture of psoriasis showing red dotted vessels (black arrow), silvery white scales (green stars), (g) Yellowish greasy scales (blue arrow) in Seborrheic capitis, (h) Collarette scales (black arrow) in P. rosea, (i) Perifollicular keratotic plug with central hair (black arrow), perifollicular yellowish halo (green stars), dotted vessels (black circle), (j) Peripheral collarette scales (white arrows) in P.rosea

Table 2: Dermoscopic findings of inflammatory dermatoses

Dermoscopic findings	Psoriasis (n=86)	Lichen planus (n=27)	Dermatitis (n=33)	PMLE (n=14)	Pityriasis rosea (n=11)	DLE (n=10)	Urticaria (n=10)	P value
A). Vascular								
a. Arrangement of lesions								
1. Regular	86 (100%)	12 (44%)	3 (9%)	0	4 (36%)	1 (10%)	8 (80%)	0.025
2. Irregular	0	14 (52%)	29 (88%)	14 (100%)	6 (54%)	8 (80%)	2 (20%)	0.000
b)Morphology of the vessels								
1. Dotted	84 (98%)	20 (74%)	25 (76%)	6 (43%)	11 (100%)	3 (30%)	3 (30%)	0.000
2. Coiled	1 (1%)	0	3 (9%)	0	0	0	0	0.000
3. Linear	1 (1%)	7 (26%)	0	0	0	7 (70%)	0	0.00
B) Non Vascular								
a) Scales								
i. White	80 (93%)	22 (81%)	6 (18%)	10 (71%)	10 (90%)	8 (80%)	0	0.000
ii. Yellow	0	2(8%)	5 (15%)	0	1 (9%)	0	0	0.000
iii. None	6	3 (11%)	22 (67%)	2 (14%)	0	2 (20%)	0	
b) Background								
i. Red	74 (86%)	5 (18%)	16 (48%)	3 (21%)	1 (9%)	5 (50%)	2 (20%)	0.007
ii. Pink	10 (11%)	4 (15%)	13 (39%)	9 (64%)	10 (90%)	3 (30%)	8 (80%)	0.000
iii. Brown	2 (2%)	2 (8%)	4 (12%)	2 (14%)	0	0	0	
iv. Violaceous	0	16 (59%)	0	0	0	2 (20%)	0	0.000
c. Erosion	0	1 (4%)	4 (12%)	1 (7%)	0	0	0	0.00
d. Wickham striae	0	17 (63%)	0	0	0	0	0	0.000
e. Pigmentary changes								
i. Brownish globules	5 (6%)	3 (11%)	2 (6%)	0	0	0	0	0.00
ii. Dots	2 (2%)	1 (4%)	0	0	0	7 (70%)	0	0.000
iii. Reticular	0	1 (4%)	0	0	0	0	0	
iv. Clods	1 (1%)	0	0	0	0	0	0	
v. Others	0	4 (15%)	0	0	0	0	0	

Fig. 1 (a-j). Dermoscopic vascular changes were seen as regular in 52.0% and irregular in 46.0%. The commonest type of vessels seen were dotted in 70.0%, linear in 7.0%, and coiled in 2.0%. The background color was pink in 39.0%, red in 38.0%, violaceous in 9.0%, brown in 8.0%, grey in 5.0%, and yellow/orange in 1.0%. Non-vascular changes were seen in 61.0%. Whitish scales were seen in 63.0%, yellowish in 6.0%, and mixed type in 2.0%. Pigmentary changes were seen in 19.0% (globules 6.0%, dots 9.5%, reticular 2.0%, clods 1.5%, and others 2.0% (comedo-like openings, hem like structures and demodex tail specially in rosacea). The

most common type of vessels observed were dotted vessels (p value 0.000) in most of the inflammatory diseases. Non vascular changes like whitish scales (p value 0.000) were mostly seen. Features like Wickham striae were characteristic of lichen planus (p value 0.000) (Table 2).

DISCUSSION

Dermoscopy is a very simple tool which aids diagnostic accuracy of various inflammatory disorders which sometime is difficult to diagnose clinically. Dotted vessels are very

characteristic of Inflammatory disorders ($p < 0.05$). In our study it was commonly seen in Psoriasis, Lichen planus, Dermatitis and Pityriasis.rosea. White scales, red to pink background were also found to be statistically significant ($p < 0.05$) in various inflammatory dermatoses in our study.

Psoriasis is a chronic inflammatory skin condition of the skin, characterized by erythematous scales present commonly over extensor surfaces and the scalp. Dermoscopic features of dotted vessels can be seen in other inflammatory dermatosis, the uniformity and homogenous distribution is characteristic of psoriasis.³ A study by Lallas *et al.*⁴ found characteristic dermoscopic features of psoriasis as dotted or coiled (glomerular) vessels arranged regularly. Uniformly distributed dotted vessels (histologically corresponding to dilated capillaries in regularly elongated dermal papillae) over a light or dull red background along with diffuse white scales (histologically corresponding to parakeratosis).⁵

Patients with psoriatic arthritis sometimes have subtle or minimal skin disease. Dermoscopy might support a diagnosis of psoriasis instead of a different inflammatory condition.²

A characteristic feature for diagnosing psoriasis is the sign of red globular rings was described by Vazquez-Lopez *et al.*⁶ If present, the red globules are arranged in irregular circles or rings, though highly specific, this sign is only seen in a few of psoriatic lesions. Other types of vessel distribution are usually rare in psoriasis. Presence of light red background color and white superficial scales are two common dermoscopic criteria of plaque psoriasis. Differentiating erythematous dermatoses, color of scale is important, as yellow scales are more a characteristic of dermatitis.⁴

In a study, the most common features of the lesions were light red background (43.9%), red dotted vessels (64.2%), regular vessels (46.6%), white scales (77.0%), patchy scale distribution (55.4%), and pigmentary changes (56.8%).⁷ In contrast our study showed 98.0% dotted, 1.0% coiled and 1.0% linear vessels with 93.0% whitish scales, 86.0% red background, and 6.0% brownish globules in psoriatic patients.

The presence of light red background with regularly distributed dotted vessels and white diffuse scales aid in diagnosing psoriasis with 80.0%–88.0% specificity and 84.9%–87.8% sensitivity as studied in Caucasian patients.⁷ In a study, the same features were present, although in lower percentages of 43.9%. Regular vessels were seen in 46.6% compared to 63.0%–100.0%, white scale in 77.0% vs. 64.7%–87.5%, and diffuse scale in 25.0% vs. 44.6%–60%.

The red background and vessels in darker skin are not easily visible compared to patients with a lighter skin type.^{4,8-11} In another study, dotted vessels were seen in 88.0%, white scales in 94.0%, and the background color was red in 68% of cases.¹²

The most important dermoscopic features of eczematous dermatitis include 76% dotted vessels in a patchy distribution and yellow serocrusts/scaling (15.0%) (Fig. 1b) in this study. Focal whitish scales are sometimes visible. Still, they are always associated with the aforementioned “yellowish findings”.^{8,13,14} Dermoscopic features of seborrheic dermatitis include dotted vessels in a patchy distribution and fine yellowish scales; follicular plugs, orange-yellowish areas, whitish structureless areas, and linear branching vessels are less common features. In our study too we found dotted vessels and yellowish crusts.

According to the disease stage, eczematous dermatitis may display some differences, with acute exudative lesions mainly showing yellow scale/crusts (“yellow clod sign”) and chronic and lichenified lesions predominantly displaying dotted vessels in a patchy distribution and scaling.¹⁵⁻¹⁸

The diagnostic dermoscopic feature of lichen planus is Wickham striae histologically which corresponds to hypergranulosis. Additional dermoscopic features include linear, “radial streaming,” annular, round, leaf venation and starry sky. In active lesions, features like dotted, globular, and/or linear vessels, mainly detectable at the periphery of the lesion and less commonly showing a perifollicular or diffuse arrangement, white/yellow dots; and pigmented structures (dots, globules, and/or reticular or cloud-like areas). Wickham striae is a characteristic feature of Lichen planus ($P < 0.05$) is seen in 63% in our study. Several dermatoses, including discoid lupus erythematosus, nodular scabies, and prurigo nodularis, can cause network-like white structures that resemble Wickham striae. These structures can be distinguished from Wickham striae by their vascular pattern, which typically displays vessels that are noticeably more dilated than those seen in Wickham striae.^{15,18}

Dermoscopic findings observed in LPH patients included white structures (90.0%), bluish-black pigmentation (80.0%), comedo-like openings (50.0%), corn pearls (20.0%), brown pigmentation (20.0%), red dots (20.0%) and red globules (10.0%).¹⁹⁻²¹ Our studies demonstrated white structures (81.0%), brownish globules pigmentation (11.0%), dotted vessels (74.0%), Wickham striate (63.0%), and violaceous background (9.0%) suggesting dermoscopic features of lichen planus.

Both the herald patch and secondary lesions of pityriasis rosea typically show a characteristic of peripheral whitish scaling (“collarette” sign) as well as dotted vessels, which, unlike psoriasis, are distributed in an irregular or focal pattern diffuse or localized yellowish orange structureless areas may be visible as well. Interestingly, an eczematous reaction may occur on the background of pityriasis rosea, especially in atopic patients, with yellow serocrusts/scaling and clustered dotted vessels visible on dermoscopy along with the peripheral collarette scaling.⁵ In addition, our study also suggested dotted vessels (100.0%) with white scales (90.0%).

The two major dermoscopic features of pityriasis rosea are yellowish background color and peripheral whitish scales. Besides, dotted vessels may be detected in dermoscopy of most pityriasis rosea lesions, as seen in psoriasis and dermatitis. However, the vascular pattern lacks the characteristic feature of regular distribution of psoriasis.²²⁻²⁶

Rosacea is characterized by a unique dermoscopic vascular pattern of polygonal vessels sensitive feature for the diagnosis of rosacea. Other dermoscopic findings of rosacea include follicular plugs, rosettes, white scales, dilated follicles, features related to demodex (“demodex tails”), and whitish amorphous follicular material. In papulopustular rosacea, clinically non-visible pustules provide a useful dermoscopic clue for discrimination from lupus erythematosus, which requires further investigation.²⁷⁻³⁰ In our study also we found characteristic features of polygonal vessels with demodex tails in all the patients of Rosacea which constituted less than 1.0% of the total patients.

Urticaria is dermoscopically characterized by a red, reticular network of linear vessels, which may be surrounded by an area devoid of vessels, corresponding to dermal edema while urticarial vasculitis dermoscopically exhibits purpuric dots or globules on an orange-brown background. There are no specific criteria, but the presence of purpuric dots suggests an underlying vasculitis.³⁰⁻³¹ Our study demonstrated dotted vessels (30.0%).

Discoid lupus erythematosus reveals different features according to the disease stage. There are presence of early lesions typified by whitish scales and follicular findings, namely follicular red dots surrounded by whitish halos (“inverse strawberry” pattern) or follicular whitish-yellowish keratotic plugs (visible as white rosettes on polarized-light dermoscopy) over a more or less erythematous background (“strawberry” pattern) are the features seen in early lesions. Vessels depicts different

morphology (dotted, linear-irregular, and/or branching) especially at the periphery of the lesions. In late lesions features like white structureless areas, pigmentary structures, hair loss, and telangiectatic linear-irregular, branching vessels and/or dotted/glomerular vessels are observed. Thin arborizing vessels emerging from the yellow dots (“red spider in a yellow dot”) are considered peculiar of late, pre-fibrotic lesions on scalp.³⁴ Intermediate-stage lesions shows mixture of all the aforementioned features. Less commonly seen are diffuse hyperkeratosis (hypertrophic discoid lupus erythematosus), dilated follicles, and yellowish scales.^{14,32,33} Our study showed dotted vessels (30.0%), white scales (70.0%) with red background (50.0%).

Among the photodermatoses, polymorphous light eruption (PMLE) is a common type of photodermatitis. Malakar *et al*,³⁵ described dermoscopic feature of white circular scales as a characteristic finding of PMLE. In our study also we found similar finding.

In conclusion, the characteristic dermoscopic features of various inflammatory disorders are helpful to differentiate between various inflammatory conditions with the help of dermoscopy, which is hassle free, easy to perform in outpatient without any invasive method and also helpful in guiding management of the patients with follow-up. Future prospective studies with follow-up patients will give more promising results.

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