

# Diagnostic Analysis of Dermoscopy on Nail Psoriasis

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**Abstract- Introduction:** Nail psoriasis is one of the clinical manifestations of psoriasis that found in the nail, usually affecting the nail plate, nail bed, hyponychium, and nail matrix. Histopathology examination is the gold standard for diagnosis of nail psoriasis. Recently, dermoscopy is reported to have good diagnostic value in dermatology, because it can assess the nail bed and nail plate. Dermoscopy can be done quickly and it is inexpensive.

**Objective:** To find out the diagnostic value of dermoscopy in nail psoriasis patients.

**Subjects and Methods:** This study is an analytical study with a diagnostic test design, which include 17 samples of nail lesions of patients with and without psoriasis lesions on the skin. Samples were chosen by non probability sampling with consecutive sampling technique. Dermoscopy and punch biopsy were performed on subjects's nail matrix. The collected data is tabulated and presented in a frequency distribution table. To assess the diagnostic capabilities of dermoscopy, calculations were performed using 2 x 2 tables, where sensitivity values, specificity, positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio (PLR), negative likelihood ratio (NLR) and accuracy were compared with gold standard, which histopathology examination.

**Results:** From 17 subjects, there were 76,47% nail psoriasis cases that were diagnosed using dermoscopy and 70,58% cases through histopathology examination. Dermoscopy have sensitivity of 75%, specificity of 40%, PPV of 75%, NPV of 40%, PLR of 0.8, NLR of 0.62, and accuracy of 64.70%.

**Conclusions:** Dermoscopy cannot be used as a diagnostic tool in nail psoriasis.

**Index Terms-** dermoscopy, histopathology, nail psoriasis

## I. INTRODUCTION

Nail psoriasis is one of the clinical manifestations of psoriasis in the nail, usually affecting the nail plate, nail bed, hyponychium, and nail matrix.<sup>1</sup> The clinical manifestations of nail psoriasis are pitting, nail discoloration (salmon patch, oil drop), onycholysis, subungual hyperkeratosis and splinter hemorrhage.<sup>2,3</sup> Nail psoriasis can cause discomfort in many patients and can cause significant functional disorders, pain, and psychological stress. This can affect patients in their activities and social life.<sup>3,4</sup>

The current study estimates that around 7.5 million people in the United States or around 2.2% of the population suffer from nail psoriasis. Psoriasis can occur at any age, but is rarely found at less than 10 years of age, is more common at the age of 15-30

years.<sup>5</sup> The number of clinical trials with a specific focus in nail psoriasis is currently still low.<sup>1</sup> Until now there is no prevalence data focused on nail psoriasis in Indonesia.

Pitting is a shallow curve or hole in the nail plate that varies in its morphology and distribution. Pitting shows damage to the uppermost layer of the nail plate, which arises from the proximal matrix. Psoriasis lesions in the nail matrix mainly consist of groups of parakeratosis cells in the stratum corneum, which interfere normal keratinization process. When the nail plate grows outward, the parakeratosis cells are exposed to the surrounding environment and the cells decay gradually, leaving different curves on the nail plate. As a result of the accumulation of parakeratosis cells in the nail plate causing the area to become brittle, less attached to each other then peeling off. Generally the diameter of the groove is less than 1 mm.<sup>6-8</sup>

Nail color change that specific for nail psoriasis is "oil drop" or "salmon patch". It is characterized by a reddish yellow color on the nail bed that looks like a drop of oil under the nail plate. This unique picture of lesions in the nail pads is caused by parakeratosis and tightly arranged acanthosis under the nail plate that looks like a yellowish color.<sup>2,9</sup> Onycholysis is an expansion of psoriasis in the hyponychium with manifestations of yellow scaly debris that lifts the nail plate. Psoriasis on the nail pads causes the separation of the nail plate from the nail pad. Nails are released in an irregular manner. The nail plate turns yellow, looks like a fungal infection. Apart from the nail plate starting from the distal groove or from the bottom of the nail plate, this onycholysis can affect several nails. Onycholysis can increase the risk of infection, because it allows pathogen to enter nail tissue.<sup>10,11</sup>

Subungual hyperkeratosis is derived from deposition and collection of cells under the nail plate that have not undergone desquamation. The height of the nail plate raised from the nail bed depends on the level of psoriasis activity in certain structures, such as hyponychium. Hyponychium undergoes some minor vasodilation and a weak inflammatory reaction that consists of lymphocyte cells. A strong inflammatory reaction will excrete protein exudate in the dermis or glycoprotein serum. Although arising from the dermal layer, glycoproteins migrate through the epidermis and accumulate intracellularly in the stratum corneum. Serum deposition is most likely responsible for the appearance of yellow lesions under the nail plate.<sup>7,9</sup>

Splinter hemorrhage can be seen as small line with length of 3 mm in distal of nail plate.<sup>7,9</sup> This condition often caused by trauma.<sup>11</sup> There are other nail lesion that can be seen. Lesion on nail matrix on short period of time usually caused by intermittent inflammation on nail fold, causing horizontal line and elevation on nail plate, generally known as Beau's line. On the other hand,

lesion on nail matrix in long period of time can cause onychorrhexis.

The gold standard examination to diagnose nail psoriasis is through histopathological examination. Other additional examination that can be used is dermoscopy.<sup>9</sup> Dermoscopy is a non-invasive procedure using a magnifying tools called a dermatoscope.<sup>12</sup> The use of dermoscopy in nail psoriasis is to detect abnormalities in nail bed and nail plates. This examination is also thought to substitute for histopathological examination in diagnosis of nail psoriasis. Dermoscopy can be quickly done and it is inexpensive. Also, it can help to diagnose nail psoriasis in clinically atypical cases.<sup>6,9</sup> Dermoscopy has recently been known as an effective tool in diagnosing nail diseases.<sup>42</sup> This can be seen from several studies using dermoscopy in viewing images and enforcing nail psoriasis using dermoscopy.<sup>13,14</sup>

## II. METHODS

This study is an analytical study with a diagnostic test design with 17 samples of nail lesions with psoriasis lesions on the skin and without psoriasis lesions on the skin. Samples were chosen by non probability sampling with consecutive sampling technique. Dermoscopy and punch biopsy were performed on the nail matrix of the sample. The collected data is tabulated and presented in the form of a frequency distribution table. To assess the diagnostic capabilities of drmoscopy, calculations were performed using 2 x 2 tables, where sensitivity values, specificity, positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio (PLR), negative likelihood ratio (NLR) and accuracy compared with gold standard, which is histopathological examination.

## III. RESULTS

In this study, an examination of patients with nail disorders was performed in patients with nail lesions, in psoriasis and non-psoriasis patients with total of 17 subjects. All research subjects undergone history taking, physical examination, dermatology, dermoscopy and histopathology. The collected datas were then tabulated and analyzed statistically.

The most common clinical features of nails in 17 subjects was onycholysis (46.6%), while the least was splinter hemorrhage (20%) (table 1). From dermoscopic examination, the most frequent findings was pitting (58.8%), while the least was subungual. hyperkeratosis (33.3%) (table 2)

**TABLE 1. THE FREQUENCY DISTRIBUTION OF THE STUDY SUBJECTS (N = 17) NAIL LESIONS WITH PSORIASIS LESIONS ON THE SKIN AND WITHOUT**

PSORIASIS LESIONS ON THE SKIN BASED ON CLINICAL MANIFESTATION.		
Clinical manifestation	n	Percentage
Onycholysis	7	46,6 %
Pitting	6	40 %
Beau`s lines	5	33,3%
Subungual hyperkeratosis	5	33,3%
Salmon patch	4	26,6%
Splinter hemorrhage	3	20%

**TABLE 2. FREQUENCY DISTRIBUTION OF RESEARCH SUBJECTS WITH NAIL LESIONS BASED ON DERMOSCOPY RESULT**

Clinical manifestation	n	Percentage
Pitting	10	58,8 %
Onycholysis	7	46,6 %
Beau`s line	7	46,6 %
Splinter hemorrhage	7	46,6 %
Salmon patch	5	33,3%
Subungual hyperkeratosis	5	33,3%

According to several literatures, there are patterns that can be found in accordance with the clinical manifestations of nail psoriasis. Dermoscopy can be useful in evaluating the shape of lesions in nail psoriasis patients in cases without typical nail lesions and its findings can be varied depending on the nail unit involved. Dermoscopy can be useful to differentiate onycholysis caused by onychomycosis, nail psoriasis and trauma onycholysis<sup>15,16</sup> (Table 3). Onycholysis in onychomycosis can appear as multiple longitudinal striae of the same or different colors (can be yellow, white, brown, etc.) in nail plate. This is caused by reflection, invasion of the fungal colonies and subungual debris.<sup>17</sup> Onycholysis caused by trauma can be seen in the proximal part there is no limit either in the form of lines or erythematous areas. In nail psoriasis, on the proximal edge appears an area with erythematous lines surrounding the onycholysis.<sup>15</sup>

**TABLE 3. FREQUENCY DISTRIBUTION OF CLINICAL MANIFESTATION AND DERMOSCOPY IN NAIL LESIONS WITH PSORIASIS ON THE SKIN AND WITHOUT PSORIASIS ON THE SKIN.**

Dermoscopy	n	percentage
Nail psoriasis	13	76,47%
Onychomycosis	3	17,64%
Trauma onycholysis	1	5,88%

TABEL 4. FREQUENCY DISTRIBUTION OF HISTOPATHOLOGICAL EXEMINATION.										
No	Hype r-keratosis and parakeratosis	Dilation of blood vessels	Munro abscess (polymorphonuclear exocytosis)	Hype r-granulosis	Ach an-tosis	Infiltrates of inflammatory cells	Spon-giosis	Sero us exudate	Perivas-cular lymphocyte/neutro-phil infiltrates	Confir m diagnostic psoriasis
P1	+	-	-	+	+	+	-	-	+	Yes
P2	-	-	-	-	-	+	-	-	+	-
P3	+	-	-	-	+	+	-	-	+	Yes
P4	+	-	-	-	+	+	+	-	+	Yes
P5	+	-	-	-	-	-	-	-	-	-
P6	+	-	-	+	-	-	-	-	-	-
P7	+	-	-	-	+	+	+	-	+	Yes
P8	+	-	-	+	+	-	-	-	-	-
P9	+	-	+	+	+	-	+	-	+	Yes
P10	+	-	-	+	+	+	-	-	+	Yes
P11	+	-	-	+	+	+	+	-	+	Yes
P12	+	-	-	+	+	+	-	-	+	Yes
P13	+	-	-	+	+	+	-	-	+	Yes
P14	+	-	-	-	+	+	+	-	+	Yes
P15	+	-	-	+	+	+	-	-	+	Yes
P16	-	-	-	+	+	-	-	-	-	-
P17	+	-	-	+	+	-	-	-	+	Yes
<b>n</b>	15	0	1	11	14	11	5	0	13	12
<b>%</b>	88,23 %	0%	5,88%	64,70 %	82,3 5%	64,70%	29,4 1%	0%	76,47%	70,58%

In this study, the most common histopathological features were hyperkeratosis with parakeratosis of 88.23% and the least was munro abscess 5.88%.

Dermoscopy examination to detect nail psoriasis compared with histopathological examination as the gold standard has a diagnostic test sensitivity of 75%, which means the ability of the dermoscopy device to determine that a positive lesion of nail psoriasis is 75%. Specificity value was 40%, positive predictive value was 75%, negative predictive value was 40%, positive likelihood ratio was 0.8, negative likelihood ratio 0.62 and the accuracy of dermoscopy for nail psoriasis was 64.70%.

IV. CONCLUSIONS

Through this study, we found that sensitivity, specificity, PPV, NPV, PLR, NLR and accuracy values of dermoscopy were low. Therefore, we concluded that dermoscopy could not be used as a diagnostic tool to replace histopathological examination. We suggest to perform similar study in multicenter setting.

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