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Original Article

The difference of histopathological profile of early onset and late onset psoriasis in tertiary hospital in Central Java, Indonesia

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Abstract

Backgound Psoriasis is classified into early-onset psoriasis (EOP) and late-onset psoriasis (LOP) based on its onset. Histopathological examination is the main diagnostic tool and the severity of psoriasis can be assessed quantitatively using the trozak scoring system.

Objective This study aimed to compare EOP and LOP based on histopathological grading of trozak scoring system psoriasis.

Methods 32 hematoxylin-eosin staining biopsy slides of psoriasis from the records of the dermatopathology laboratory at Moewardi hospital for 5 years between 2018 and 2022, were selected for the study and assessed the histopathological trozak grading system. Data was analyzed using the Fisher exact test.

Results 32 psoriatic patients were included in the study. Adult subjects were predominant (90.63%). Most subjects were males (53.12%). We found (59.37%) of subjects had LOP. Of the total subjects only 56.25% had a family history of psoriasis. There was a significant difference regarding the age of onset of psoriasis between EOP and LOP, in which the age of the onset was 26.38±3.13 and 41.34±6.46 respectively. Meanwhile, the histopathological score of subjects either in EOP or LOP did not differ significantly, as the scores were 10.54±3.13 and 9.58±4.49 respectively. Statistically, there was no significant difference between EOP and LOP regarding the histopathological features except for the absence of a granular layer in EOP. Histopathological examination revealed that perivascular mononuclear infiltrate in the papillary dermis was the most common finding in EOP (100%).

Conclusion Based on the Trozak scoring system there were no significant differences between EOP and LOP regarding their histopathological features.

Key words
Histopathology; Psoriasis; Trozak score system; EOP; LOP.

Introduction

Psoriasis, a chronic inflammatory cutaneous illness affects 2% of people in the world.[1] Psoriasis is classified into type I or early-onset psoriasis (EOP), occurring at the age of ≤40 years old, and type II or late-onset psoriasis (LOP), developing at the age of over 40.[2] Recognizing the difference between these two subtypes is essential as manifestions with varied

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disease activity, can be related to divergent patterns of disease.[3]

Histopathological findings in biopsy specimens can be useful to confirm the diagnosis of psoriasis.[4] Kim reported that the severity of psoriasis can be assessed quantitatively by histopathological features.[5] Histopathological grading of psoriasis as suggested by Trozak is a grading system that examines histological characteristics, but it has not been widely used in psoriasis research.

Trozak scoring system of psoriasis calculates regular elongation of rete ridges, club-shaped rete ridges, elongation as well as edema of the dermal papillae, perivascular mononuclear infiltrates in the upper dermis of papillae, absence of granular layer, parakeratosis, suprapapillary plate thinning, mitosis above basal cell layer, Munro's microabscesses, and spongiform pustule of kogoj.[1]

Methods

We conducted a cross-sectional study using the medical records of patients, taken from Pathology Anatomy Department of Dr. Moewardi hospital, Surakarta, Indonesia. We only included patients who were histopathologically diagnosed with psoriasis. The secondary data taken from medical records of patients were age, sex, family history of psoriasis, and the onset of psoriasis. Histopathological outcome were assessed based on trozak scoring system and subjected to microscopy under low power and high power lens with a final total score of 0-19. The study subjects were allocated into EOP and LOP based the onset of the disease. We defined EOP as psoriasis occurring at the age ≤40 years old, and when psoriasis presents at the age >40 years old, it was defined as LOP. Characteristic histopathological of the trozak scoring system divided into elongation of regular rete ridges, club-shape rete ridges, elongation & edema of the dermal papillae, absence of granular layer, parakeratosis, suprapapillary plate thinning, mitosis above the basal layer, Munro's microabscesses, spongioform pustule of kogoj. Ethical clearance was obtained from the Ethical Committee of Dr. Moewardi Hospital with the reference number: 574/IV/HREC/2021.

Statistical analysis

We used IBM statistical package for the social science (SPSS) version 20.0 software for analysing the data statistically. The significance level was determined with $p<0.05$. Fisher exact test was applied for comparison analysis.

Results

Thirty two psoriatic patients were included in the study. Adult subjects were predominant (90.63%). Most subjects were males (53.12%). We found (59.37%) subjects had LOP. Of the total subjects only 56.25% had family history of psoriasis (**Table 1**). There was a significant difference regarding the age of onset of psoriasis between EOP and LOP, in which the age of the onset were 26.38±3.13 and 41.34±6.46, respectively. Meanwhile the histopathological score of subjects either in EOP or LOP did not differ significantly, as the scores were 10.54±3.13 and 9.58±4.49 respectively **(Table 2)**.

Table 1 Demographic characteristics of the study subjects.

Characteristic	*N*	*(%)*
Age		
< 18 yrs.	3	(9.37)
≥ 18 yrs.	29	(90.63)
Sex		
Male	17	(53.12)
Female	15	(46.88)
The onset of psoriasis		
Early onset psoriasis	13	(40.63)
Late onset psoriasis	19	(59.37)
Family history of psoriasis	18	(56.25)

Table 2 The comparison of EOP with LOP in terms of subjects' characteristics.

Characteristic	EOP	LOP	p-value
Age of onset			
Mean ±SD	26.38±3.13	41.34±6.46	0.000*
Sex			
Male	8 (61.5)	7 (36.8%)	0.169
Female	5 (38.5%)	12 (63.2%)	
Family history of psoriasis	12 (66.67)	6(33.33)	0.420
Histopathological score	10.54±3.13	9.58±4.49	0.510

Statistically, there was no significant difference between EOP and LOP regarding the histopathological features except for the absence of a granular layer, in EOP (**Figure 1**). Histopathological examination revealed that perivascular mononuclear infiltrate in the papillary dermis was the most common finding in EOP (100%), followed by parakeratosis (92.3%) and elongation as well as edema of the dermal papillae (84.61%). The most common features in LOP were perivascular mononuclear infiltrate in the papillary dermis (89.4%), followed by parakeratosis (84.21%) and absence of granular layer (73.68%) (**Figure 1**).

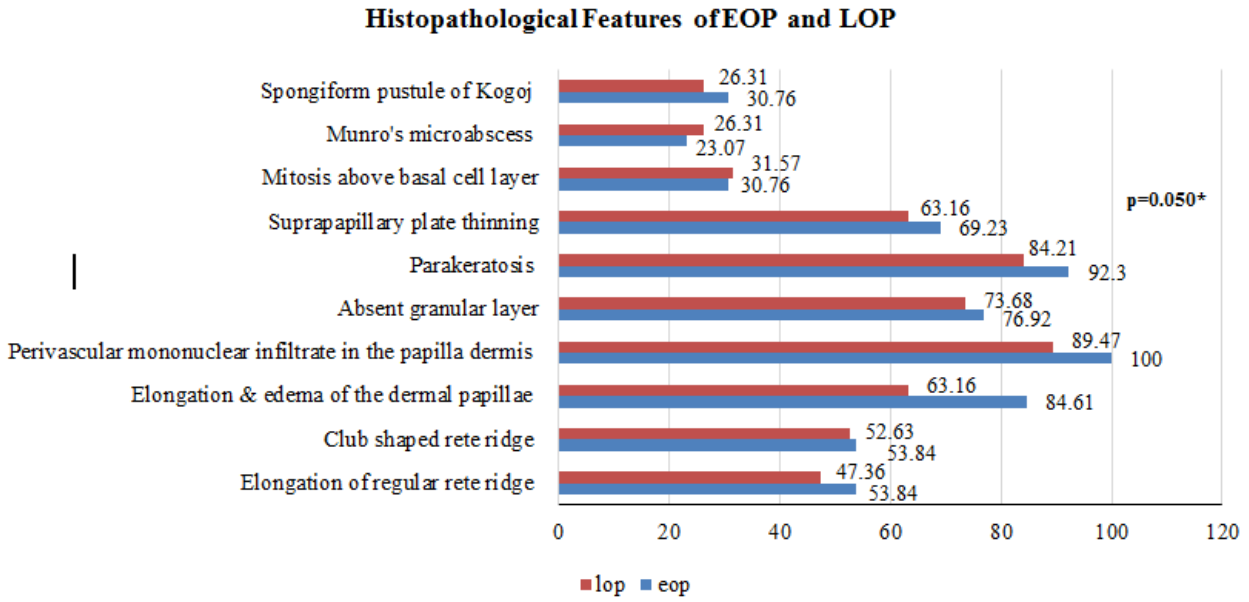

Figure 1 Difference of histopathological feature of early onset psoriasis and late onset psoriasis.

Discussion

Psoriasis is an immune-mediated long-lasting cutaneous inflammatory disease. Studies reporting the severity of EOP and LOP as well as comparing these two subtypes are few and conflicting.[6] Henseler *et al.* reported two peaks of the age of onset, one occurring at the age of 16-22 years old defined as early and the age of 57-60 years, categorized as late.[7] In our study, the mean age of subjects with EOP and LOP were 26.38 and 41.34 years old, respectively. This is similar to that of Chularojanamontri and Fatema *et al.* study which obtained the mean age of EOP as well as LOP was 24.8 and 51.6 years old, respectively.[8,9] Psoriasis affects people regardless sex. However some studies report that male was predominant in EOP.[6] This study also revealed that EOP was more common in men than women. This is possibly due to ignorance.[10]

Early-onset psoriasis patients reported more severe psoriasis, require systemic treatment and have a family history of the disease than LOP.[8,11,12] Occurrence of psoriasis between families have been reported to vary from

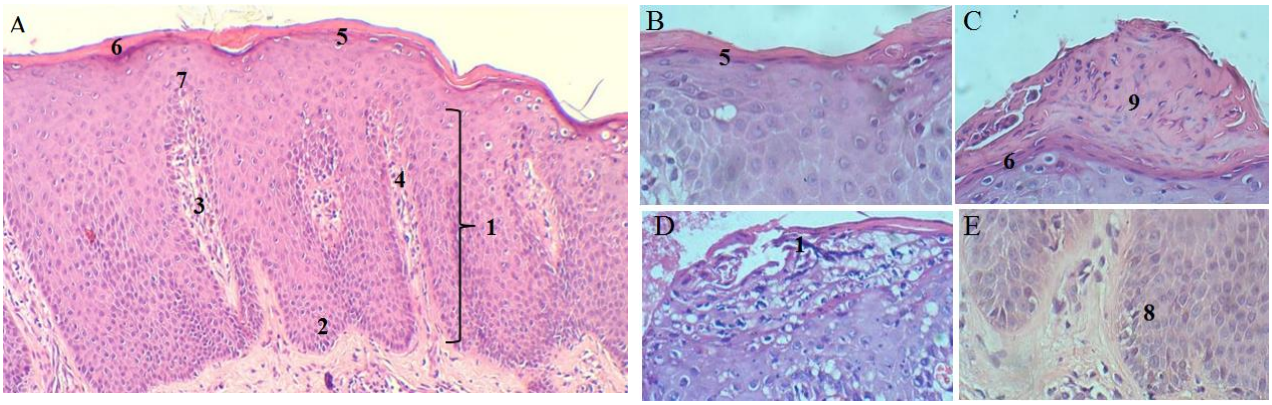

Figure 2 Histopathological features of psoriasis. A-E. Histopathological feature of psoriasis consist elongation of rete ridge (1), club shape rete ridges (2), elongation and edema of the dermal papillae (3), perivascular mononuclear infiltrate in the upper dermis of papillae (4), absent granular layer (5), Parakeratosis (6), suprapapillary plate thinning (7), mitosis above basal cell layer (8), munro microabcesses (9), spongiform pustule of kogoj (10) (HE-40x&100x).(HE-400x)

23-64% in Asian people with EOP. Singh reported that EOP is a familial form of psoriasis, 62% of EOP patients had a family history of psoriasis versus 35.6% of LOP subjects.[3] This study revealed that family history of psoriasis was most frequent in EOP 66.67%, although there were no statistically significant respectively similar to Ejaz *et al*.[8,13]

Previous studies have demonstrated that patients with EOP have more severe psoriasis, more families with history of psoriasis, and more systemic therapy needed than those with LOP. The psoriasis incidence among families ranges from 23 to 64% in Asian individuals with EOP. Singh suggested that EOP is hereditary type of psoriasis as 62% of EOP subjects had a history of psoriasis in their families, contrary to LOP ones in which family history of psoriasis was found in 35.6% subjects. This is relatively similar to our findings that 66.67% of the EOP subjects had family history of psoriasis.

A histopathological trozak score is an assessment tool for obtaining semi-quantitative data from tissue.[2,14,15] This study revealed that based on histopathological examination of the trozak scoring system, the mean score of EOP was 10.54±3.13 which was higher than of LOP. Eysteinsdottir *et al.* also reported the mean histopathological score of 10.[1] Although the histopathological score of EOP and LOP did not differ significantly.

The histopathological features in the present study showed the consistent characteristic of psoriasis. Among the 10 criteria of histopathological features, only the absence of granular layer which differed significantly between EOP and LOP.[10] Hypogranulation or absence of granular layer results from an increase in cell turn over. This study revealed that the absence of a granular layer was different significantly between EOP and LOP in which the absence was more common in EOP than LOP.[10]

Histopathologically the cardinal characteristics of psoriasis include are a combination of the parakeratosis, elongation of regular rete ridge, mitosis of basal layer, dilatation and tortuosity of dermal capillaries, and perivascular infiltration with lymphocytes. These distinct features may not exist in a single section. This study revealed that there were no statistically significant in nine out of ten histopathological characteristics of psoriasis in Trozak scoring system. This may be due to the consequence of

the course of remissions and exacerbations of the psoriatic lesion. The histopathologic finding in psoriasis varies with the age of the lesions, treatment effect, and due to resolution of the psoriatic lesion.[16]

Munro microabscess and spongiform pustules of Kogoj which is highly specific and can be pathognomonic for psoriasis, althrough relatively less frequent.[5,17,18] This study revealed that only a few of the specimens showed spongiform pustule of kogoj (28,12%) and Munro's microabscess (25%). These finding are similar to those reported by Vashist *et al.* in which Munro's microabscess and spongiform pustule of kogoj were minor features.[2,10] This is likely because these characteristics are not always present in the histopathological examination of psoriasis.[2,5]

This study was limited by several factors, such as its retrospective design, no healthy control, and lack of clinical examination. The evolution of psoriasis was different between onset age and histopathological findings. This study did not compare the clinical findings in healthy controls with the psoriatic subjects. In the study the different onset of psoriasis was partly attributed to the diverse periods of evolution of histopathological findings of psoriasis. Treatments received before the visit to the clinic also influenced accurate assessment of the psoriasis state.

Conclusion

In conclusion, based on Trozak sustem scoring for psoriasis there were no significant differences between EOP and LOP regarding their histopathological features. However, the absence of granular layer was more common in EOP than in LOP.

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