

The Positive Skin Prick Test not Correlate with Disease Severity and Quality of Life in Atopic Dermatitis Patients

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ABSTRACT

Background: Atopic dermatitis (AD) is a skin disease which cause stress to the patients. The chronic process of AD can cause physical, social, and psychological impairments. The severity of AD can also be affected by allergen exposures, which in turn will affect the quality of life of the patient. Skin prick test (SPT) can be used to evaluate allergen sensitization. **Purpose:** To evaluate correlation between SPT positivity to severity and quality of life of AD patients. **Methods:** The study was an observational cross-sectional study. Twenty five AD patients were recruited based on inclusion and exclusion criteria. Questionnaire was used to measure the quality of life of patients, and Scoring of Atopic Dermatitis (SCORAD) to measure the disease severity. Most of participants were women (80%), with median of age 26.84 ± 13.71 . **Results:** Positive SPT was obtained in 68% of patients, most of them were caused by house dust mites (55.2%). Seventy six percent of patients experienced mild AD, 12% moderate AD, and also 12% patients experienced severe AD. Significant correlation was observed between the severity and quality of life ($p=0.001; r=0.617$), while the SPT positivity has no correlation with the severity ($p=0.912; r=-0.023$) and quality of life ($p=0.959; r=0.011$). **Conclusion:** This study revealed that the severity of the disease has a correlation with quality of life, but SPT positivity has no significant correlation with severity and quality of life.

Key words : atopic dermatitis, skin prick test, quality of life.

ABSTRAK

Latar belakang: Dermatitis atopik (DA) merupakan salah satu penyakit kulit yang dapat memicu stres pada pasien. Proses yang kronis pada DA dapat memengaruhi pasien secara fisik, sosial, dan psikologis. Derajat keparahan DA dapat juga dipengaruhi oleh pajanan terhadap alergen, yang kemudian akan memengaruhi kualitas hidup pasien. Sensitisasi alergen pada pasien dapat diperiksa dengan *skin prick test* (SPT). **Tujuan:** Mengevaluasi korelasi antara jumlah SPT positif dengan derajat keparahan dan kualitas hidup pasien DA. **Metode:** Penelitian observasional analitik *cross-sectional* pada 25 pasien DA yang memenuhi kriteria inklusi dan eksklusi. Penelitian ini menggunakan kuesioner untuk menilai kualitas hidup dan *Scoring of Atopic Dermatitis* (SCORAD) sebagai alat ukur untuk menilai derajat keparahan. Sebagian besar peserta penelitian ini adalah perempuan (80%), dengan median usia $26,84 \pm 13,71$. **Hasil:** SPT positif didapatkan pada 68% pasien, yang paling banyak disebabkan oleh tungau debu rumah (55,2%). Sebanyak 76% pasien mengalami DA ringan, 12% DA sedang, dan DA berat juga sebanyak 12%. Jumlah SPT positif dan derajat keparahan tidak memiliki korelasi bermakna dengan nilai $p=0,912$ dan $r=-0,023$. Korelasi yang bermakna ditemukan antara derajat keparahan dan kualitas hidup ($p=0,001; r=0,617$). Jumlah SPT positif tidak memiliki korelasi bermakna dengan kualitas hidup ($p=0,959; r=0,011$). **Simpulan:** Derajat keparahan DA memiliki korelasi yang bermakna dengan kualitas hidup pasien, tetapi SPT positif tidak memiliki korelasi dengan derajat keparahan dan kualitas hidup.

Kata kunci: dermatitis atopik, *skin prick test*, kualitas hidup.

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INTRODUCTION

Atopic dermatitis (AD) is a chronic, relapsing skin disease, characterized by vary manifestations and distributions of lesions.¹ Chronic process of AD can affect physical, social, and psychology life of patients.² AD will affect their clothing choice, bath time, continuous use of emollient, sports, study, and sleep. Significant psychology impairment often leads

to severe depression.³ Physically, patients can also be embarrassed by their skin appearance.⁴

Atopic dermatitis is a multifactorial disease, triggered by interplay of genetic, immunology, and environment factors.⁵ Several environment factors which can trigger AD are foods, aeroallergens, and infectious agents, 30-40% moderate-severe AD have significant correlation with food allergy.^{5,6} Some studies showed that improvement can be achieved by

avoiding certain foods.⁷ Celakovska et al. reported disease aggravation after patient had eaten certain foods. Beside foods, house dust mites (HDM) and other aeroallergens can also trigger and aggravate AD.^{5,8} Allergens involvement in AD pathogenesis had been proven by IgE-bearing antigen presenting cells (APC) presence in patient's skin.⁹

Skin prick test (SPT) is a modality which can use to detect IgE-mediated hypersensitivity, with 80-97% sensitivity and 70-95% specificity.^{7,10} This examination can be used to detect allergy to certain foods and aeroallergens.¹⁰ Beattie et al. reported quality of life impairment in skin disease, such as AD, is equal to other chronic diseases. Identifying the offending allergens is crucial, because it may have a significant effect to patient's quality of life.^{11,12}

The severity of AD is closely linked to a reduced quality of life of patients.⁷ Torrelo et al. and Alanne et al. reported life quality improvement of AD patients after therapy.^{2,13} Knowledge about correlation between physical and psychological health allow us to give holistic approach to our patients.¹¹ The aim of this study was to evaluate correlation between SPT positivity with disease severity and quality of life in AD patients.

METHODS

This study was approved by the Health Research Ethics Committee, Faculty of Medicine, Padjadjaran University/Hasan Sadikin General Hospital, Bandung, West Java, Indonesia. Oral explanation about the study was done and subsequent written informed consent was obtained from each participant.

Twenty five subjects were recruited from Allergy and Immunology Division of Dermatology and Venereology Department, Hasan Sadikin Hospital, Bandung, West Java, Indonesia, using consecutive sampling technique. AD was diagnosed using Hanifin-Rajka criteria. Subjects were not allowed to consume certain drugs which can affect SPT results. Subjects must not be pregnant, less than two-year-old, or history of dermatographism and anaphylaxis.

This study used 11 allergens, including house dust mite, dog hair, quill, shrimp, peanut, cashews, crab, milk, squid, shellfish, and snapper. Tests were applied on forearm, 5 cm from wrist and 3 cm from antecubital fossae. The location for each allergen was marked and should be at least 2 cm apart to avoid false positive result, and to properly identify the test result. A drop of allergen was applied to the marked location and pricked with a lancet at an angle of 30-40 degrees to avoid bleeding. A new lancet must be used

for every allergen, and the test area can be dried with a paper towel or tissue paper. The result was read after 15-20 minutes. Positive (histamine solution) and negative (saline) controls should be measured first, to ensure the validity of the test. The wheal produced by positive control must be at least 3 mm, to rule out interfering factors, and negative control should be negative. Any reaction measuring ≥ 3 mm is considered positive.

Scoring of Atopic Dermatitis (SCORAD) was used to measure disease severity. This measurement use combination of lesion extent, intensity, and subjective symptoms. Those variabls were then calculated, 0-24 defines as mild AD, 25-50 as moderate AD, and 51-103 as severe AD.

Quality of life was assessed by several questionnaires, Dermatology Life Quality Index (DLQI) for >16-year-old patients, Children's Dermatology Life Quality Index (CDLQI) for 4-16-year-old patients, and Infants' Dermatitis Quality of Life Index for <4-year-old patients. All of these questionnaires had been validated. These questionnaires consist of ten questions, scored 0-3, giving a maximum score of 30. Higher score means worse quality of life. Results were expressed as r and p value, statistically significant differences were defined as p value less than 0.05.

RESULTS

A total of 25 patients were reviewed, including 5 males and 20 females, with range of age was 8-62 year old, and mean age 26.84 ± 13.71 (Table 1). The most prevalent allergens were house dust mite (55.2%), crab (13.8%), squid (6.9%), quill (6.9%), dog hair (3.4%), and cashews (3.4%) (Table 2). Most of patients were positive to at least one allergen (68%). Positive to one allergen was 40%, to two allergens was 20%, and to at least three allergens was 8%. Nineteen of them had mild AD, 3 patients had moderate AD, and 3 patients had severe AD. Correlation between positive SPT and disease severity had p value 0.912 and r value -0.023, which means there is no statistically significant correlation (Table 3). Most of patients had quality of life score range 0-10 (80%), and no patient had score more than 20. Correlation between disease severity and quality of life had p value 0.001 and r value 0.617, which showed statistically significant correlation (Table 4). Statistical analysis showed there is no correlation between positive SPT and quality of live, with p value 0.959 and r value 0.011 (Table 5).

Table 1. Dermographic details

Variable	N= 25
Age	
Mean±Standart deviation (STD)	26.84±13.71
Median	30.00
Range (min-max)	8.00-62.00
Sex	
Male	5 (20.0%)
Female	20 (80.0%)

Table 2. Skin prick test result

Variable	N= 29
House dust mite	16 (55.2%)
Crab	4 (13.8%)
Shrimp	3 (10.3%)
Squid	2 (6.9%)
Quill	2 (6.9%)
Dog hair	1 (3.4%)
Cashews	1 (3.4%)

Table 3. Correlation between positive SPT and disease severity

Disease severity	Skin Prick Test			
	Negative 8 (32.0%)	1 positive 10 (40.0%)	2 positive 5 (20.0%)	≥ 3 positive 2 (8.0%)
Mild 19 (76.0%)	4	10	4	1
Moderate 3 (12.0%)	3	0	0	0
Severe 3 (12.0%)	1	0	1	1
p	0.912			
r	-0.023			

*p and r value based on Spearman test, *SPT= Skin prick test

Table 4. Correlation between disease severity and quality of life

Quality of Life Score	Disease Severity		
	Mild 19 (76.0%)	Moderate 3 (12.0%)	Severe 3 (12.0%)
0-10 20 (80.0%)	19	0	1
11-20 5 (20.0%)	0	3	2
21-30 0	0	0	0
p	0.001		
r	0.617		

* p and r value based on Spearman test

Table 5. Correlation between positive SPT and quality of life

Quality of Life Score	Skin Prick Test			
	Negative 8 (32.0%)	1 positive 10 (40.0%)	2 positive 5 (20.0%)	≥3 positive 2 (8.0%)
0-10 20 (80.0%)	5	10	4	1
11-20 5 (20.0%)	3	0	1	1
21-30 0	0	0	0	0
p	0.959			
r	0.011			

* p and r value based on Spearman test, *SPT= Skin Prick Test

DISCUSSION

Most subjects in this study were female, which is similar to other studies by Ben-Gashir et al. and Brenninkmeijer et al. AD is mostly found in pediatric population, which usually improves during adulthood, but 50-60% of patients will have chronic and relapsing disease.^{14,15,16} Subjects in this study had mean age 26.84 ± 13.707 , with range 8-62 year old. Similar result was reported by Saleh et al. with mean age 32.56 ± 9.82 , with range 8-64 year old. Mechanism of this persistent AD is unknown, but genetic predisposition is suspected.^{17,18}

Milk, egg, and peanuts are kinds of food which frequently cause sensitization.¹⁹ More than 90% patients have sensitization to milk, egg, fish, peanut, soy, and wheat.⁸ Kim et al. reported most patients had sensitization to house dust mite (46.3%), which was similar to this study (55.2%).²⁰ Most subjects in this study had positive SPT result to at least one allergen (68%). Other allergens which showed positive result in SPT were crab (13.8%), squid (6.9%), quill (6.9%), dog hair (3.4%), and cashews (3.4%). Hosseini et al. who also studied sensitization pattern in AD patients reported positive SPT to tree mix (26%), *Alternaria alternata* (26%), weed mix (23.6%), *Dermatophagoides farinae* (22.9%), *Dermatophagoides pteronyssinus* (22.9%), grass mix (21.7%), milk (21.7%), egg (20%), wheat (18.3%), walnut (17.1%), candlenut (14.9%), and peanut (14.3%). This allergen pattern variation depends on environment factor, allergen exposure, social habits, and geographic.²¹

Statistical analysis in this study showed there is no correlation between positive SPT and disease severity, with p value 0.912 and r value -0.023. Different results were reported by Kim et al. and Rennick et al. The multifactorial etiology of AD may play a role in this difference.^{6,17,20} Based on allergen involvement, AD can be divided into intrinsic and extrinsic AD. Intrinsic AD is marked by normal IgE and negative SPT, which can also affect the result of this study.²² This is also the limitation of this study, as the intrinsic and extrinsic AD are not differentiated.

Brenninkmeijer et al. and Maksimovic et al. study showed significant correlation between AD severity and patient's quality of life.^{15,23} Similar result was found in this study, with p value 0.001. In contrast to disease severity, positive SPT have no significant correlation with quality of life, with p value 0.959.

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