

Therapeutic Potential of Atopy-camp: A pilot study

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Objective: This study investigated the therapeutic possibility of natural therapy in atopy-camp for children with atopic dermatitis.

Methods: 30 children (19 boys and 11 girls, median age 11.5 years, ranging from 9 to 15) participated in natural environment-based activities in a camp-village located in Geumsan-gun for five days. Assessment of symptom change was conducted by self-reporting numeric scale (NRS) for pruritus and sleeping difficulty, investigator global assessment (IGA), eczema area and severity index (EASI score), serum histamine and IgE concentration before and after the camp period. Statistical significance was analyzed by paired t-test.

Results: NRS for pruritus (4.7 ± 2.0 into 4.3 ± 2.1), sleeping difficulty (3.1 ± 2.1 into 2.9 ± 2.0), and serum histamine concentration (4.27 ± 7.39 mol / L into 3.21 ± 6.08 mol / L) showed positive changes but didn't reach statistical significance ($p > 0.05$). IGA (3.8 ± 0.9 into 4.13 ± 1.0), while EASI score (10.8 ± 9.7 into 9.1 ± 9.2) and IgE (408 ± 320 IU / mL into 385 ± 3.8 IU / mL) were significantly improved ($p < 0.01$).

Conclusions: In spite of the limitation of the clinical trial protocol, this study may provide the possibility of natural environment-based therapy for children with atopic dermatitis.

Key Words : Atopic dermatitis, atopy-camp, traditional Korean medicine

Introduction

Atopic dermatitis is a inflammatory, relapsing and pruritic skin disorder which seriously affects quality of life of patients and their families^{1,2}. This is the first manifestation of atopic disease, affecting approximately 20% of children and 1-3% of adults, although the prevalence differs depending on country and area within a country^{3,4}. The prevalence of atopic dermatitis among Korean elementary students about 20% at present⁵.

Atopic dermatitis is frequently a medical issue due to its symptoms causing disturbance of daily life but

lack of effective conventional therapies. In general, three classical managements are present: emollients reducing both the dryness and inflammation of the skin⁶, corticosteroids in severe cases⁷, and ultraviolet light exposure⁸. However, the limitation of these methods is well known, so alternative treatments are commonly used worldwide. Traditional herbal medicines for atopic dermatitis are very popular in Korea and China, and several clinical studies have shown beneficial effects such as reducing symptoms and topical corticosteroid use, as well as improving quality of life^{9,10}.

On the other hand, atopic dermatitis is considered

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a typical disease associated with environmental factors; therefore new attempts are being undertaken to achieve therapeutic effects using natural, clean environmental factors. Especially for pediatric atopic dermatitis, natural environment-based atopy-camp or atopy-free schools are conducted by regional governments^{11,12}. These strategies might be valuable novel treatments which should be scientifically investigated and developed.

In order to produce a basis of scientific data, we herein report observation of thirty children with atopic dermatitis before and after an atopy-camp held in Geumsan-gun.

Method

Subjects

Children previously diagnosed as atopic dermatitis were enrolled any children taking immunosuppressants, anti-histamines, or with complications of infectious dermatitis were excluded. Of those recruited, 30 children (19 boys and 11 girls) were included (median age 11.5, ranging from 9 to 15 years). Informed consent was obtained from parents of each child, and the ethical committee of Daejeon University Hospital approved the study protocol (authorisation number: DJOMC-52).

Study design and atopy-camp schedule

This trial was designed as a single arm clinical study without placebo or observation group. An Oriental paediatrician assessed the severity of dermatitis. Self-reporting numeric scale (NRS) for pruritus and sleeping difficulty as well as parent-reporting questionnaire was required. Peripheral blood samples were taken to determine serum concentration of histamine and IgE, including complete blood count under fasting state for 12 h.

The basic camp contents consisted of meals with only organic foods, forest walking for 1 hr, playing

time on grass and in a stream for 3 hrs, and taking a beneficial yeast bath for 30 min and red-ginseng bath for 20 min each day, repeated for five days.

Self-reported assessment of symptoms

Before and after camp schedule, pruritus and sleeping difficulty were ascertained using a 10-point numeric scale (1 represented no pruritus or sleeping difficulty vs. 10 represented impossibility of any activity or sleep due to pruritus). Children marked a score about their feeling for pruritus and sleeping difficulty over the five days before and five days during the camp program.

Quantitative assessment of symptoms

Before and after the camp schedule, an Oriental paediatrician scored the severity of dermatitis according to the investigator global assessment (IGA)¹³ and eczema area and severity index (EASI score)¹⁴. IGA scored the symptoms by six grades 1 represented “very severe” to 6 represented “just mild scar”. EASI scored the symptoms as calculation of total points based on the regional severity and amount of lesions.

Determination of serum histamine

Histamine quantification assay was performed using a histamine ELISA kit (IBL-America, MN, USA) according to the manufacturer's protocol. Briefly, 20uL of sera were mixed into 100uL of histamine antiserum and incubated for 15-20 hours at 2-8°C. After incubation with 100uL of enzyme conjugate for 1 hour and 100uL of substrate for 20-30min, the absorbances were read at 450nm using a microplate reader. Histamine was represented as n mol/L.

Determination of serum IgE

Quantitative determination of IgE followed the manual protocol from Abnova Human IgE ELISA

Kit (Cat # KA0216 V.02, Taipei, Taiwan). Briefly, 20uL of standard and the serum samples were dispensed into capture antibody coated micro-plate. After incubation with 100uL of zero buffer for 30 minutes and washing the plate 5 times, 150uL of enzyme conjugate reagent was incubated for 30 minutes at room temperature. After rinsing 5 times, the plate was incubated 100uL of TMB solution for 20 minutes in darkness at room temperature. After adding 100 uL of stop solution (1N HCl) into each well, the absorbance was read at 450nm within 15 minutes. Total IgE was represented as IU/mL.

Statistical analysis

The data between before and after camp were analyzed with paired t-test using PASW Statistics 17 program. Statistical significance was considered when p value was less than 0.05.

Results

1. Change of subjective symptoms for pruritus severity and sleeping difficulty

The changes of itching severity and sleeping difficulty were measured by NRS scoring method. The itching severity decreased from 4.73 ± 2.0 to 4.3 ± 2.1 , and sleeping difficulty also slightly improved from 3.1 ± 2.1 to 2.9 ± 2.0 (Fig 1). However, these results were statistically non-significant ($p > 0.05$).

2. Change of objective symptoms by IGA and EASI score

An Oriental paediatrician objectively observed the change of lesions. IGA score improved from 4.3 ± 2.1 to 4.7 ± 2.0 , and EASI score improved from 10.8 ± 9.7 to 9.1 ± 9.2 (Fig 2). These changes showed statistical significance ($p < 0.01$).

3. Change of serum histamine and IgE concentration

Serum histamine slightly decreased to 3.21 ± 6.08 mol / L from 4.27 ± 7.39 mol / L, but it was not statistically significant ($p > 0.05$). On the other hand, serum IgE concentration significantly decreased from 408 ± 320 IU / mL to 385 ± 3.8 IU / mL ($p < 0.01$).

Discussion and conclusion

The overall prevalence of atopic dermatitis in Korea is reported to be 6.16~11.2 % while prevalence rate among children is much higher, by 18.8 to 24.9 %^{15,16}. Although no classical curative treatment is present in western medicine, herbal medicine or many alternative therapies are reported to provide beneficial effects on that disease^{17,18}.

This study observed a therapeutic effect of natural environment-based activities in atopy-camp. Nineteen boys and eleven girls (ages ranged from 9 to 15 years) were included. Children suffering from atopic dermatitis were recruited through public advertisement. Their symptoms was very severe, such as average EASI score 10.8 ± 9.7 compared to 3.52 ± 3.05 among elementary school students in Suwon¹⁶. The reason might be that children non-responding to conventional atopic treatments enrolled in the camp program. The most common age of onset was 2.2 ± 1.9 years.

The camp program was designed based on three aspects: chemical-free meals, stress-free pleasant activity, and detoxification. This camp had been operated since 2009, and this was the 15th session at Sutong-ri in Geumsan-gun. Even though the camp program had developed a good reputation for beneficial results for atopic dermatitis, noscientific evaluation of the effects had yet been conducted. This study aimed to observe the changes of subjective atopic-associated complains and objectively measured the severity of atopic dermatitis with two major allergic biomarkers, histamine and IgE.

Pruritus and sleeping alteration are two main complains of atopic dermatitis¹⁹. To evaluate

symptomatic change, the severity of two symptoms was measured by self reporting questionnaire. The subjective scores for itching and sleeping difficulty showed a positive pattern, but real improvement was doubtful because the change didn't reach statistical significance (Fig. 1). Objective assessment of atopic dermatitis was conducted using IGA and EASI score, classical instruments for atopic eczema. In general, IGA assesses the severity by focusing on inflammation symptoms of local lesions while EASI quantitatively estimates symptoms by calculation of lesion area and inflammation^{20,21}. The results showed

significant improvements in both EASI and IGA scores (Fig. 2). The statistical difference between data from the IGA and EASI score and results from pruritus and sleeping might be due to a gap between objective and subjective measurement.

The EASI and IGA scores were partially in accordance with the changes of serum IgE levels. IgE is a critical mediator of atopic dermatitis, and the positive correlation between atopic dermatitis and serum IgE level has been very well recognized^{22,23}. Twenty-five patients (83 %) had levels of IgE concentration higher than the cut off value (87 IU /

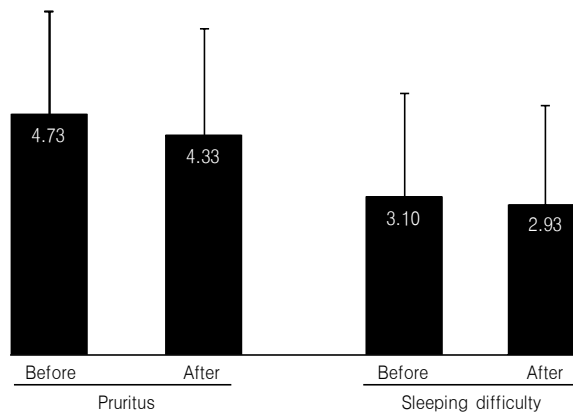


Fig. 1. NRS score change for pruritus and sleeping difficulty

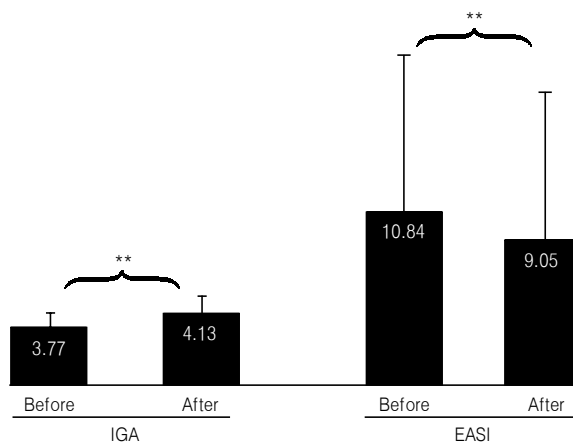


Fig. 2. Score change of IGA and EASI

ml), and IgE level was significantly lower after the camp period (Fig. 3). Superinfection in children with atopic eczema is a very important issue in prevention of progress or treatment of the disease. Recently, one report showed a close association between IgE level and *Staphylococcus aureus* superinfection in children with atopic dermatitis²⁴). On the other hand, histamine level also was measured as an important itching mediator²⁵). Slight decrease of serum histamine concentration was observed without statistical significance.

This study has limitations such as single-arm design, too short camp schedule as well as no long-term evaluation, small number of participants and lack of strictly controlled protocol of camp schedule and contents. Nevertheless this study might be a meaningful pilot trial as a new non-pharmacological approach for atopic dermatitis, especially in a child population. To our knowledge, this is the first study that scientifically examined a camp-based therapeutic approach for atopic dermatitis. Atopic dermatitis is abundant in industrialized countries. Extra- or intra-stress such as environmental pollutions or mental pressure are causative factors, while avoiding those stresses or providing emotional support is thought to

give benefits to atopic dermatitis patients^{26,27}).

Taken together, we observed a partial effect of atopy-camp, and this study produced preliminary data for the possibility of a novel non-pharmacological approach for atopic dermatitis.

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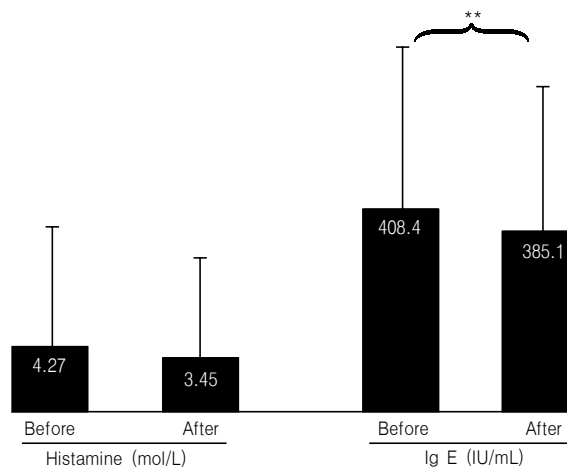


Fig. 3. Change of serum histamine and IgE concentration

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