

BRIEF COMMUNICATION

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The Relationship between Infantile Atopic Dermatitis and Urinary Tract Infection

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ABSTRACT

Atopic dermatitis (AD) is one of the most common infantile diseases. Immunological dysfunctions in AD patients may predispose them to infections. The aim of this study was to evaluate the relationship between infantile AD and urinary tract infection (UTI).

In this cross sectional study, we enrolled 57 patients with AD aged 1 to 24 months that referred to dermatology clinic, and 57 healthy controls who were referred to pediatric clinic. The groups were matched according to age and gender.

Urine samples were collected by clean-voided bag method. If a single organism was cultured at concentration of $\geq 10^5$ organisms per millimeter and the existence of white blood cells more than 10 per microscopic field was seen the patients underwent suprapubic aspiration.

The presence of one organism in suprapubic aspiration sample was regarded as positive culture. Data were analyzed using SPSS version 15 software. P value < 0.05 was considered as the level of significance. Twelve (21.1%) of AD patients and 1 (1.8%) of normal controls had positive urine culture tests. The difference between two groups was statistically significant ($p = 0.001$). The most common bacteria was E-coli.

Infants with AD showed a higher frequency of UTI in this study. So, we suggest screening all AD infants for urinary tract infection.

Key words: Atopic dermatitis; Infant; Urinary tract infection

INTRODUCTION

Atopic dermatitis (AD) is amongst the most common

infantile diseases. Immunological dysfunction in AD patients predispose them to certain infections such as herpes simplex virus,¹⁻³ staphylococcus aureus,⁴⁻⁹ and pitrosporium ovale.^{10,11}

The relationship between urinary tract infection (UTI) and AD as a risk factor is not clear. In 1994, Oggero et al. showed that infants with AD might be at a

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greater risk of developing UTI. In this study the UTI was present in 27.5% of AD patients versus 3% of normal controls. Oggero et al. also showed that treatment of AD could decrease the frequency of UTI from 27.5% to 8.3 %.¹² In an earlier study that was conducted by Gerrard et al. in 1971, the rate of UTI in AD patients was higher.¹³

Various studies demonstrated that AD patients have a variety of immunological dysfunction such as transitory deficiency of IgA, a quantitative and qualitative deficit of T-lymphocytes and a reduced natural killer function.¹⁴⁻¹⁶ These immunological disorders can lead to an increased rate of skin infection in patients with AD. As the effects of these immunological disorders may not be limited to skin, the possibility that they can also result in the increased prevalence of UTI in infants with AD may be proposed. So we conducted this study to evaluate the relationship between AD and UTI.

PATIENTS AND METHODS

Study Population

In this cross sectional study, 57 patients with AD aged 1 to 24 months that were referred to dermatology clinic of Kerman city entered to the study. The control group consisted of 57 healthy infants without atopic dermatitis and other atopic diseases aged 1 to 24 months who were referred to pediatric clinic of Kerman city. The study was conducted from 2007 to 2009. The age and gender in these two groups were matched.

Subjects with anatomical defects of urinary tract, urinary stones, neurogenic bladder, simultaneous consumption of antibiotics, and infants without circumcision were excluded. Diagnosis of AD was based on UK Party criteria.¹⁷

Laboratory Technique and Data Collection

Urine samples were collected by clean-voided bag method. Bag urine cultures were obtained by the application of a self-adhesive plastic bag after perineum being cleaned by antiseptic solution and thorough rinsing with water.

The bag was replaced every 30 minutes if the child had not voided. If a single organism was cultured at concentration of $\geq 10^5$ organisms per millimeter and the existence of white blood cell more than 10 per microscopic field was seen, the patients underwent suprapubic aspiration. The presence of one organism

in suprapubic aspiration sample was regarded as positive culture. Ultrasound was done for all infants with positive urine culture to rule out congenital urinary tract anomalies. Informed consent was obtained from parents of all infants.

Other variables including age, gender, type of microorganisms, family history of asthma, allergic rhinitis and AD, the history of asthma, allergic rhinitis and food allergy in all subjects were also recorded. Ethical approval was obtained from the Medical Ethical Committee of Kerman University of Medical Sciences and the Project was recorded under project number K/88/67.

Statistical Analysis

Data were analyzed using SPSS version 15 software. Categorical and numerical data were analyzed with Chi square and independent sample t-tests respectively. P value <0.05 was considered as the level of significance.

RESULTS

The mean age of infants with AD was 13.44 ± 8.42 months and in controls was 12.05 ± 8.44 months, the difference was not statistically significant. Twenty four (44.4%) of infants with AD and 23 (40.4%) of healthy infants were male, whereas 30 (55.6%) of AD infants and 34 (48.7%) of normal infants (59.6%) were female. This difference was not significant.

The frequency of positive history of asthma, allergic rhinitis and food allergy in AD infants was 2 (3.5%), 6 (10.5%), 5 (8.5%) and in control group was 0 (0%), 0 (0%) and 1 (1.8%) respectively. A significant difference was only seen in the history of rhinitis between two groups. The family history of asthma, allergic rhinitis and atopic dermatitis was positive in 17 (29.8%), 25 (43.9%), 26 (45.6%) of AD patients respectively whereas in control group positive family history of above mentioned diseases was 1 (1.8%), 1 (1.8%), 4 (7%) respectively. There was a significant relationship between having AD and positive family history of other atopic diseases.

Twelve (21.1%) of AD patients and 1 (1.8%) of normal controls had positive urine culture test. The difference between two groups was statistically significant ($p = 0.001$). The most common bacteria was E-coli (63%).

DISCUSSION

According to our results, AD patients are more susceptible to urinary tract infections than controls. The increased susceptibility to UTI in AD patients is most probably related to immune system dysfunction.

Kaufman et al. in their study found the immunological deficiencies especially deficiency of IgA, in 43(%) of 641 patients with atopy, some thirty five times higher than expected.¹⁸ Moreover, Schuster et al. in their research demonstrated that circulating T gamma cells were reduced in active AD patients with elevated IgE level.¹⁹ Furthermore, Bulter et al. in 1982 showed that AD patients had improper regulation of T cells. They revealed that in AD patients the ratio of T helper/T suppressor cells was significantly higher than controls. According to their studies, AD patients have both quantitative and qualitative defect of T lymphocytes.²⁰

Other studies indicate that T cell deficiency in AD is probably related to a very high level of IgE.²¹ All of these immune dysfunctions make prone the AD patients to other infections such as UTI. Rysted et al. in 1986 found that patients who had previously been hospitalized in childhood because of severe AD had a significantly higher incidence of recurrent cold sores and upper respiratory tract infections as well as a higher incidence of herpes zoster than non atopic controls.²

Horesh in 1976 found that recurring urinary tract infection ceased or was distinctly alleviated by treatment of presenting allergic condition.²¹ Oggero et al. in 1994 demonstrated that UTI was present in 27.5% of AD patients versus 3% of healthy controls. This result is in concordance with our study in which 21.1% of AD patients vs. 1.8% of normal controls showed UTI. They also showed that treatment of AD can decrease the frequency of UTI from 27.5% to 8.3 %, ¹² we did not evaluate the effect of AD treatment on subsequent controls of UTI. Like Oggero's study,¹² the most common bacteria was E-coli in our study.

Limitations

Whether controlling AD has any effect on the frequency of UTI has not been evaluated in our research. It was the main limitation of this study. In addition, a small sample size is another limitation of our study.

CONCLUSION

Infants with AD showed a higher frequency of UTI in comparison to controls in this study. On the other hand, as UTI may produce non compensative damage to urinary tract system, it is very important to do early screening for UTI in all of the AD infants.

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