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Ocular Complications of Atopic Dermatitis in Children

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Ocular complications of atopic dermatitis in adults are blepharitis, keratoconjunctivitis, keratoconus, uveitis, subcapsular cataract and retinal detachment. Their frequency varies from 25% to 50%. The aim of this study was to assess the frequency and type of ophthalmological complications in children with atopic dermatitis. The secondary objectives of the study were to determine whether there is a correlation between severity of atopic dermatitis, face involvement, external ocular signs and the presence of ocular complications, and to identify risk factors for ophthalmological complications. Thirty-seven boys and 22 girls, mean age 36.2 months, with atopic dermatitis were examined. Atopic dermatitis severity was mild according to the SCORAD index (31.6±17.0). Fifteen (25.4%) children had external ocular signs, one had a nuclear cataract, 11 had benign papillofollicular conjunctivitis, one had purulent bacterial conjunctivitis, one had chronic atopic blepharitis and one had amblyopia. Severity of atopic dermatitis, face involvement, and external ocular signs did not seem to influence the incidence of ocular involvement. This study suggests that severe ocular complications are rare in young children with mild atopic dermatitis.

Key words: atopic dermatitis; child; ocular; cataract.

Ocular complications during atopic dermatitis (AD) have been known for several years, mainly in adult patients. These complications are blepharitis, keratoconjunctivitis, keratoconus, uveitis, subcapsular cataract, retinal detachment and ocular herpes simplex (1). The frequency of these complications varies between series from 25% to 50% (1–5)

A prospective study was conducted in children with AD. The aim of the study was to assess the overall frequency and type of ophthalmological complications. The secondary objectives of the study were to determine whether there is a correlation between severity of AD, face involvement, external ocular signs and the presence of ocular complications and to identify risk factors for developing ophthalmological complications.

PATIENTS AND METHODS

All consecutive patients under the age of 15 years with AD, attending the Amiens University Hospital dermatology outpatient clinic between October 1999 and October 2001, were considered for inclusion in this study. The diagnosis of AD was based on the UK Working Party's Diagnostic Criteria for Atopic Dermatitis (6). All children were examined by the same paediatric dermatologist. Patients were evaluated using a standard protocol. Age, history and age at onset of disease, AD location and complications, and history of steroid use around the eyes were noted. AD severity was evaluated by the SCORAD Index (7). An appointment with an ophthalmologist was proposed for these children. A standard ophthalmological examination was performed by the same ophthalmologist. The presence or absence of Dennie-Morgan fold, peri-orbital darkening, papillofollicular conjunctivitis, ectropion, keratoconus, bilateral anterior subcapsular cataract, or other ophthalmological signs were noted. Papillofollicular conjunctivitis is the association of a variable number of conjunctival follicles and papillae. It is usually bilateral and asymptomatic. The course is usually benign without treatment. It can rarely deteriorate to symptomatic keratoconjunctivitis that may have a poor prognosis.

Statistical methods

Continuous variables were expressed as mean and standard deviation. Categorical variables were expressed as percentages. Descriptive characteristics of patients with and without ocular complications were compared using χ^2 tests with Yate's correction for continuity, Fisher's exact probability test for categorical variables and Mann-Whitney U test for continuous variables. All database management and statistical analyses were performed with SPSS software (10th version). The level of significance was set at 0.05. All probability values were two-sided.

RESULTS

Fifty-nine of the 100 children examined for AD attended the proposed ophthalmology appointment in another hospital. The mean age of these 59 patients was 36.2 months (range 2 months to 14.9 years). There were 37 males and 22 females (sex-ratio: 1.59).

Forty-one children had a family history of atopic diseases (69.5%) and 12 children (20.3%) had a personal history of atopy (6 with asthma and 6 with rhinitis or conjunctivitis). No children had a family history of ocular disease, but one child had a congenital glaucoma.

Dermatological results

AD started before the age of 3 months in 73.6% of the children and the mean duration of AD at the time of

examination was 30 months. AD severity was scored as mild according to the mean SCORAD score (31.6 ± 17.0 ; range 5–70) and the body surface area involved (mean: 22%). Location of AD was the face in only 6 children (10.2%), skin folds in 24 children (40.7%), face and skin folds in 29 children (49.1%).

All children had already been treated with topical steroids moderate or potent; no child had been treated with tacrolimus ointment. The exact amount of steroid used around the eye could not be determined, but no child appeared to have a history of excessive use of topical steroids around the eye.

Ophthalmological results

External ocular signs were observed in 15 children (25.4%): 11 had a Dennie-Morgan fold, one had only peri-orbital darkening and 3 had a Dennie-Morgan fold and peri-orbital darkening.

Ophthalmological diseases

Fifteen of the 59 children (25.4%) had an ophthalmological disease: eleven children (18%) presented with asymptomatic benign papillofollicular conjunctivitis related to AD. A 5-year-old girl had bilateral nuclear cataract responsible for decreased visual acuity, discovered at the systematic ophthalmological examination. One child had purulent bacterial conjunctivitis, one chronic atopic blepharoconjunctivitis, and one amblyopia. The characteristics of the patients with and without ocular complications are described in Table I.

The higher proportion of females in the group with ocular involvement was statistically significant, and a personal history of atopic disease and skin fold location of AD was reported statistically more frequently in this group.

No significant differences were observed between the two groups in terms of age at onset of disease, face involvement, external ocular signs and severity of AD (SCORAD index).

However, patients with ocular complications tended to be older and more frequently presented peri-orbital

signs, although the difference was not statistically significant.

DISCUSSION

Our study revealed ocular lesions in 15 of the 59 children with AD examined by an ophthalmologist. The main ocular lesion was asymptomatic benign follicular conjunctivitis. Cataract was observed in one child. Ocular lesions appeared to be less severe in children in this study than in adult studies (1, 2, 4, 5). As the case of amblyopia was not related to AD but to a strabismus, the frequency of ophthalmological lesions associated with AD was 23%, which appears to be less frequent than in the adult population (25–50%) (1, 4). The severity of AD and face involvement did not appear to influence the incidence of ocular involvement in our study.

Only 4 of the 59 children presented peri-orbital darkening. This characteristic sign of AD is one of the diagnostic criteria defined by Hanifin & Rajka in 1980 (2). However, it is a non-specific marker of AD and has also been reported in patients with atopic respiratory disease (5, 8). Dennie-Morgan double inferior palpebral fold, another marker of atopic disease, was present in 15 children (25.4%) (5). No correlation was found between these external ocular signs and ophthalmological lesions.

Follicular conjunctivitis was diagnosed in 11 children (18%). Follicular conjunctivitis appeared to be more frequent in the group of children with Dennie-Morgan fold (5 out of 15 children). However, this association was not statistically significant. Lesions of follicular conjunctivitis are usually bilateral and asymptomatic with variable numbers of follicles. None of the children in this series required treatment.

One child had purulent bacterial conjunctivitis. Another child had chronic blepharitis complicated by blepharoconjunctivitis. Secondary infection of chronic blepharitis by *Staphylococcus aureus* may occur in AD, as this bacteria is present in eyelash follicles. Other infectious agents, such as herpes virus or *Candida albicans* can also be involved (9, 10, 11). Our results in children contrast with those reported by Nacano et al. (3) in adult patients with AD, in whom chronic blepharitis was observed in 52% of patients.

We observed bilateral nuclear cataract in a 5-year-old girl, who also suffered from asthma. She had decreased visual acuity, discovered at the ophthalmological examination. She had mild AD with no face involvement. We did not find any other aetiology, such as trauma, infection, metabolic disease or excessive use of topical or systemic corticosteroids. She rapidly required surgical management. Cataract is rare in the normal population. Atopic cataract is a serious complication of AD. It was first described in 1886 by Vidal (12). The incidence of cataract in adult patients with AD ranges from 0% to 20% depending on the country, with

Table I. Characteristics of atopic dermatitis (AD) patients with and without ocular complications

	With ocular complications (n = 15)	Without ocular complications (n = 44)	p-value
Gender (%) male/female	40/60	71/29	0.03
Age (months \pm SD)	47.5 \pm 41.3	32.3 \pm 38.0	0.19
Age at onset of disease (months \pm SD)	5.3 \pm 8.9	5.2 \pm 8.4	0.99
Personal history of atopic disease (%)	47	11	0.007
Skin fold location of AD (%)	93	66	0.05
Face involvement (%)	60	66	0.45
Peri-orbital signs (%)	33	20	0.31
SCORAD index (mean \pm SD)	33.1 \pm 20.3	31.1 \pm 16.0	0.69

a higher incidence in Japanese studies (13–16). Social factors, ethnic differences, age, duration and severity of AD and the use of corticosteroids could be responsible for these differences. The type of cataract is anterior or posterior subcapsular. It is usually bilateral. Atopic cataract is observed mainly in adolescents and young adults between the ages of 20 and 40 years (5, 15). A link between the severity of AD and atopic cataract has not been established (1, 4, 17–19). In a study of 41 patients, Nagaki et al. (20) showed that cataract progression was statistically significantly related to facial skin lesions. Taniguchi et al. (21), who studied 79 inpatients with severe AD, also suggested that patients who habitually tap or rub their faces tend to develop cataract or retinal detachment at a significantly higher frequency. A possible relationship between the development of atopic cataract and some factors such as asthma, ichthyosis vulgaris, and high serum immunoglobulin E level has also been suggested (5).

The role of systemic or topical corticosteroids in the pathogenesis of atopic cataract has not been elucidated. Corticosteroids cannot be the only factor responsible for the development of atopic cataract, as it was first described in 1950, before the commercialization of corticosteroids. However, chronic use of corticosteroids may lead to posterior subcapsular cataract (22). An ophthalmological examination, including slit-lamp examination, must be performed in all patients with a history of long-term use of corticosteroids in peri-orbital zones.

No cases of keratoconus or retinal detachment were observed in our study. Keratoconus is bilateral non-inflammatory axial ectasia of the cornea. It usually occurs at puberty and is responsible for visual disturbances (1). The incidence of retinal detachment varies between studies from 0.5% to 8% in adult patients. It has been reported mainly in Japanese patients with facial involvement. It mainly occurs during the second or third decades and its pathogenesis is controversial. One hypothesis involves trauma inflicted to the eye while rubbing (21, 23). The young age of our patients may explain the absence of these two complications, which tend to be observed in older patients.

It is also possible that more serious ocular complications were not observed in this series because of the mild severity of AD in these relatively young patients.

Our study suggests that severe ocular complications are rare in young children with moderately severe AD. Benign lesions may be observed, mostly asymptomatic follicular conjunctivitis. Rarely, an atopic keratoconjunctivitis may present as an inflammatory disorders of the ocular surface, possibly leading to irreversible visual impairment by complications such as ulcers.

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