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Prevalence of *Chlamydia Trachomatis* Pooled Serotypes BDE and FGK in Children with Chronic Follicular Conjunctivitis

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Purpose: To evaluate type-specific antichlamydial antibody IgG in children with chronic follicular conjunctivitis.

Methods: A total of 90 serum samples from juvenile patients with chronic follicular conjunctivitis were collected in the Southeastern Anatolian region of Turkey where trachoma is still endemic. These samples were investigated regarding *Chlamydia trachomatis* pooled serotype-specific IgG by using the micro-immunofluorescence test. A titer of 1/32 or higher was considered positive.

Results: Specific IgG seropositivity to *Chlamydia trachomatis* titer was found in 33 (36.1%) of the 90 subjects. A higher titer was observed frequently in the serotypes pooled in BDE (21 subjects), CHIJ (10 subjects), and FGK (2 subjects), respectively.

Conclusions: The presence of antichlamydial antibodies in blood should always be interpreted in accordance with the history of the patient, the clinical picture, and the course of the disease. In the diagnosis of *Chlamydia trachomatis* infections in a patient with chronic follicular conjunctivitis, not only genus-specific antibodies but also the presence of the subspeciespecific antibodies should be investigated. **Jpn J Ophthalmol 2000;44:467–469**

Key Words: *Chlamydia trachomatis*, trachoma, type-specific antichlamydial antibody IgG.

Introduction

Chlamydia trachomatis continues to be the leading infectious cause of blindness worldwide, with a predicted increase from 12 million to 99 million cases within the next 30 years.[1] Trachoma still constitutes a major public health problem in certain developing countries.[2,3] Previous studies conducted by West et al[2,3] report that more than 60% of children in endemic areas showed evidence of active disease, and of this group 10% had chronic severe disease. This category of disease severity is important because it may be associated with the later development of conjunctival scarring.[3] Ocular forms of *Chlamydia trachomatis* have been observed as an endemic disease in the Southeastern Anatolian region of Turkey[4] because of such factors as lack of water sources, rapidly increasing population, low social and economical life standards, and environmental and climatic conditions.

The presence of specific antichlamydial IgG antibodies only indicates past contact with chlamydiae. However, tear-specific antichlamydial IgA antibodies may play some role in the diagnosis of trachoma.[5] Some chlamydia serotypes cause neonatal inclusion conjunctivitis and adult paratrachoma. Possibly, chronic follicular conjunctivitis may be caused by various subspecies of chlamydia.

We conducted the current study to evaluate type-specific antichlamydial antibodies in children with chronic follicular conjunctivitis who have lived in the above-mentioned region. Due to lack of financial support, only IgG was investigated in the present

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study. However, it has been shown in previous studies that antichlamydial IgG was present in the sera of over 80% of patients with ocular chlamydial infection,[5,6] and that the micro-immunofluorescence test was sensitive for the detection of type-specific antichlamydial antibodies.[6,7]

Materials and Methods

A total of 90 serum samples from juvenile patients with chronic follicular conjunctivitis were collected in November 1998. Subjects were selected by the ophthalmologist (H.O.) in the endemic area (Suburbs of Sanliurfa city in the Southeastern Anatolian region of Turkey). Eyes with chronic follicular conjunctivitis were examined by the ophthalmologist, and then blood samples were taken. These samples were investigated regarding *Chlamydia trachomatis* serotype-specific IgG by using the micro-immunofluorescence test. Serotyping was performed by using the micro-immunofluorescence commercial kit (Orgenium, CTR 1042G; Research and Diagnostics, Lefkosa, Turkish Republic of Northern Cyprus). The test was performed according to the instructions in the commercial kit. The serum samples of 33 seropositive patients were titrated for the specific antichlamydial IgG level in screening dilutions from 1/32 to 1/512. A titer of ≥1/32 was considered positive. The *Chlamydia trachomatis* specific antibody IgG was investigated for pooled antigen serotypes BDE, CHIJ, FGK, and L1-3. No other ocular infectious agents such as bacteria, fungi, and adenovirus were investigated in the present study, and no control group was enrolled because the study was limited to children clinically suspected of having trachoma.

This research protocol complied with the Declaration of Helsinki of the World Medical Association, and signed informed consent forms were obtained from the parents of the study subjects.

Results

The average age (±SD) of the juvenile patients was 8.1 ± 2.4 years (range, 6–12 years).

The IgG seropositivity to *Chlamydia trachomatis* titer was determined as 1/32 and higher in 33 (36.1%) of the 90 children. In the remaining 57 patients the IgG level was <1/32. The *Chlamydia trachomatis*-specific antibody IgG was observed in pooled serotypes BDE in 21 (63.6%), CHIJ in 10 (33.3%), and FGK in 2 (6.6%) of 33 patients, respectively. Serotypes L 1, 2, and 3 were not found in any samples. Positivity to all pooled serotypes (BDE, CHIJ, and FGK) was found in only one sample. Serotypes BDE plus CHIJ were found in 2 patients and CHIJ plus FGK in 1 patient. Positive titers were found as follows: higher titers (1/512) in 11 patients (9 BDE, 2 CHIJ); median titers (1/256) in 10 patients (8 BDE, 1 CHIJ); and lower titers (1/128 and 1/64) in 7 patients (2 BDE, 1 FGK), respectively.

Discussion

Serotypes A–C are generally the cause of ocular *Chlamydia trachomatis* infections. They are responsible for hyperendemic trachoma of eye-to-eye transmission. Antichlamydial IgG at a level of ≥1/32 in the blood correlates well with clinically active paratrachoma.[6] Ocular trachoma may also be paratrachoma, and may be caused by other serotypes (D-K), and may be of sexually transmitted origin (at birth from mother to child). The micro-immunofluorescence test can be successfully used for the diagnosis of chlamydial ocular infections of sexually transmitted origin (pooled D-K antigens).[7]

The possibility of chlamydial infection must be borne in mind in neonatal conjunctivitis, acute conjunctivitis of sexually active adults and chronic follicular conjunctivitis. Since chlamydial conjunctivitis is often indistinguishable from other forms of conjunctivitis on clinical grounds, accurate differentiation must be based on laboratory tests. On the other hand, ocular and genital chlamydial infections may elicit both protective and damaging immune responses.[8]

In the present study, serum IgG antibody responses to *Chlamydia trachomatis* were determined by the micro-immunofluorescence test, using purified elementary bodies of *Chlamydia trachomatis* pooled serovars, BDE, CHIJ, FGK, and L1, 2, 3. It is reported in chlamydia taxonomy that chlamydia are of four species, including *Chlamydia trachomatis*, *Chlamydia psittaci*, *Chlamydia pneumonia*, and *Chlamydia pecorum*, and that several kinds of antigens are used in *Chlamydia trachomatis* serology. Extensive interrelationships between the serovars were described and placed into three groups that were B complex, including B (Ba, D, E, F, G, L1, L2) serotypes, and C complex including C (A, C, H, I, J, K, and L3) serotypes, and intermediate complex (G, F, K, and L3).[9] Our findings indicated that the most frequent *Chlamydia trachomatis* serotypes with specific IgG seropositivity were BDE (63.6%) and CHIJ (33.3%). In our work, *Chlamydia trachomatis* seropositivity for specific IgG was found in 36.1% of children clinically suspected of having trachoma. Bekir et al[10] reported active trachoma in 12.1% and chronic

trachoma in 47.7% of the patients in one of the villages in the Southeastern Anatolian region of Turkey.

The primary reservoir for trachoma in endemic areas is children with ocular infection. In its initial stages, trachoma presents as a chronic follicular conjunctivitis with papillary hypertropy and inflammation. Subjects in the present study had chronic follicular conjunctivitis, and were clinically diagnosed as suspected of having trachoma by the ophthalmologist in the region.

The results of our current study indicated that seropositivity was found in 36.1% of all subjects. Also, we observed that children with intermittent or sporadic infection experienced a much lower level of initial chlamydial infection dose than children with persistent infection.[11] Hygienic factors seem to be particularly important in the control of this disease, and include facial cleanliness and reduction of household fly density. There may be a strong historical link between the improvement of socioeconomic conditions and the disappearance of endemic trachoma.[12] This will be important to determine in future immunogenetic studies of trachoma, including epidemiological factors that have been shown to have an impact on disease. It is generally agreed that chlamydial serology has little place in the management of ocular infection because of the longevity of the serum antichlamydial IgG response.

In conclusion, the presence of antichlamydial antibodies in blood should always be interpreted in accordance with the history of the patient, the clinical picture, and the course of the disease. In the diagnosis of *Chlamydia trachomatis* infection in a patient with chronic follicular conjunctivitis, not only genus-specific antibodies but also the presence of the subspecie-specific antibodies should be investigated. The true incidence of this infection in symptomatic and asymptomatic cases in endemic regions such as the Southeastern Anatolian region of Turkey still remains uncertain. Further studies are needed to determine the incidence and the outcomes of infection caused by this agent.

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