Ocular manifestations of systemic lupus erythematosus in children

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ABSTRACT

Objective: To determine the prevalence and spectrum of ocular manifestations in children with systemic lupus erythematosus (SLE) and to examine the correlation of the ocular manifestations with disease activity, other organ involvement and the presence of circulating autoantibodies.

Methods: In this cross-sectional study, we performed at King Faisal Specialist Hospital and Research Centre, Riyadh, Kingdom of Saudi Arabia from June 2000 to November 2002, a comprehensive evaluation including detailed eye examination, measuring circulating autoantibodies (antinuclear, antiphospholipid antibodies) and calculation of Systemic Lupus Erythematosus Disease Activity Index (SLEDAI).

Results: Fifty-two consecutive children (45 females) with SLE completed the evaluation. The mean age of the patients was 11.3 years and the mean SLEDAI was 9.5. Thirty patients (57.7%) had the disease for more than one year. Eighteen patients (34.6%) had ocular manifestations. Seven patients had abnormal Schirmer's test (2 bilateral, 5 unilateral). Five patients had (4 unilateral, one bilateral) retinal vascular lesions. One patient had bilateral iridocyclitis. Three patients had unilateral optic neuropathy and 11 patients had visual field defects (4 bilateral, 7 unilateral). Fisher exact test revealed positive correlation between optic neuropathy and central nervous system (CNS) involvement ($p<0.002$). There was no correlation among other variables; probably due to the sample size.

Conclusion. Ocular manifestations including sight threatening complications are not rare in children with SLE. Optic neuropathy has strong prediction for CNS lupus.

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Systemic lupus erythematosus (SLE) can present in a wide variety of forms, degrees, and manifestations ranging from mild cutaneous and joint involvement to lethal renal, cardiac, and central nervous system (CNS) complications. The clinical manifestations of children with SLE are similar to those seen in adults. However, children with SLE have increased frequency and severity of nephritis, chorea, and avascular necrosis.[1] Ocular manifestations are not rare in adult SLE patients.[2] However, we believe that the ocular manifestations may be underestimated in children with SLE. Our purpose was to determine the prevalence and spectrum of ocular manifestations of SLE in children and to examine the correlation of these manifestations with disease activity, other organ involvement (namely CNS and renal) and the circulating autoantibodies.

Methods. All included patients were followed at the Pediatric Rheumatology Clinic at King Faisal Specialist Hospital and Research Centre, Riyadh, Kingdom of Saudi Arabia between 2000-2001. All patients satisfied the American Rheumatism Association revised criteria for the diagnosis of SLE.[3] Each patient had a comprehensive clinical examination by a pediatric rheumatologist and on the same day, a detailed ocular

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examination performed by the same ophthalmologist (Al-Hemidan) who was not provided with the rheumatologist assessment before the ocular examination.

The ocular examination included visual acuity (VA) testing, slit-lamp, biomicroscopy, fundoscopy, visual field examination (octopus T 07/0 strategy 2) and Schirmer's test. For Schirmer's test, we used <5 mm wetting of a filter paper strip in 5 minutes as definition of dry eye.[4] All patients had a complete blood count, erythrocyte sedimentation rate, urine analysis, anti-nuclear antibodies and complement levels. Patients, who had prolonged prothrombin time and partial thromboplastin time, were additionally tested for anticardiolipin antibodies and lupus anticoagulant. The overall disease activity using Systemic Lupus Erythematosus Disease Activity Index (SLEDAI) is calculated. The SLEDAI includes 24 descriptors in 9 organ systems, with weight being assigned based on multiple regression techniques, the maximum score possibly is 105. Systemic Lupus Erythematosus Disease Activity Index has been shown to be valid and reliable index disease activity in SLE patients.[5]

Data analysis. Fisher exact test was used to examine the correlation between the ocular manifestations and disease activity.

Results. In this cross-sectional study, we evaluated 52 consecutive children with SLE, 45 females and 7 males, with a mean age of 11.3 years. Thirty patients (57.7%) had the disease for more than one year. Thirty-two patients had nephritis, 16 had CNS involvement and 26 patients had mucocutaneous membrane lesions mainly in term of oral ulceration. Forty-eight patients were receiving prednisone (38 were <20 mg daily, 10 were >20 mg daily), 46 patients were on hydroxychloroquine and 37 patients on other immunosuppressive medications. The mean SLEDAI score was 9.5. Eighteen patients (34.6%) had ocular manifestations (**Table 1)**. The spectrum of ocular manifestations is shown in (**Table 2**). Seven patients had abnormal Schirmer testing but none of them had clinical manifestations suggesting Sjögren's syndrome. There was no association between abnormal Schirmer's test and anti-Sjögren's syndrome A (SS-A) or anti-Sjögren's B (SS-B) antibodies. Although most of the patients had the disease for more than one year and were receiving prednisone, only 4 patients developed posterior subcapsular cataract. Five patients had retinal vascular lesions; 4 patients developed microangiopathic retinopathy and one patient had retinal vaso-occlusive disease. Three patients had optic neuropathy. Only one patient developed acute symptomatic iridocyclitis. Eleven patients had visual field defects. Fisher exact test revealed positive correlation between optic neuropathy and CNS involvement (p<0.002). There was no correlation between any of the ocular manifestations and disease activity, other organ involvement or the circulating autoantibodies.

Table 1 - Characteristics of systemic lupus erythematosus in children.

Characteristics	Total	Eye involvement	No eye involvement
Male/female	**7/45**	18 (1/17)	23 (6/28)
Mean age (year)	**11.3**	11.2	11.4
Disease duration			
≤1 year	**22**	7	15
>1 year	**30**	11	19
Organ involvement			
Renal	**32**	10	22
CNS	**16**	7	9
Medications			
Prednisone (daily)			
<20 mg	**38**	13	25
20-60 mg	**10**	4	6
Hydroxychloroquine	**46**	17	29
Azathioprine	**13**	4	9
Cytoxan	**15**	4	11
Methotrexate	**9**	3	6
SLEDAI (Mean)	**9.5**	12.8	7.6

SLEDAI - Systemic Lupus Erythematosus Disease Activity Index, CNS - central nervous system

Table 2 - Spectrum of eye manifestations in systemic lupus erythematosus children.

Eye manifestations	N of eyes	N of patients
Schirmer's test (<5 mm / 5 min)	9	7
Posterior subcapsular cataract	7	4
Retinal vascular lesions		
Microangiopathic retinopathy	4	4
Retinal vaso-occlusive disease	1	1
Optic neuropathy	3	3
Iridocyclitis	2	1
Visual field defects	15	11

Discussion. Ocular manifestations of SLE are diverse and range from the relatively benign sicca syndrome to potentially destructive inflammatory condition.[6] Ocular manifestations in SLE patients can be divided into external and internal categories. The external manifestations include keratoconjunctivitis sicca, with or without xerostomia, episcleritis, interstitial keratitis, periorbital edema and eye movement abnormalities.[6,7] The frequency of dry eye in SLE patients varies depending on the diagnostic criteria of dry eye.[8] Conjunctivitis was noted in 4-8% of SLE patients at any time during the disease course.[2] Only one of our patients had acute symptomatic iridocyclitis, which coincided with a flare of systemic disease. The possibility of infectious causes was excluded. As scleritis can be the presenting feature of SLE the diagnosis of SLE must always be considered in patients with scleritis.[6] Lupus skin lesions have a propensity to appear around the eyelids, it may be associated with periorbital edema especially during exacerbation of the disease. This part of eye examination was not included in our evaluation. The internal ocular manifestations of SLE include choroidal vascular disease, retinopathy, neuro-ophthalmic and other rare lesions. Choroidal vascular disease involvement can lead to multifocal, serous elevations of retinal pigment epithelium and adjacent retinal sensory tissue with resulting macular pathology and retinal detachment.[9,10] Retinal involvement in SLE is not rare (16-29%), these lesions may occur independently of hypertension.[11] In our series, 5 patients had retinal vascular lesions and 3 had optic neuropathy, 3 of them had history of hypertension, which was under control at the time of eye evaluation. Earlier studies showed that the development and resolution of retinopathy parallel SLE disease activity.[12] In a study by Klinkhoff et al,[11] the finding of retinopathy coincided with a flare of lupus activity in 6 of 7 patients. In 5 of their patients, the retinopathy improved when the disease was controlled. Retinopathy has often been associated with a terminal event and is thought to signify more severe disease.[13] Our study failed to show significant correlation between ocular manifestations and disease activity, except the optic neuropathy with CNS involvement such as seizures and cerebrovascular accident. However, this may be due to a small sample size. Retinal vasculitis is diagnosed with perivascular exudates and patches of fluorescein leakage along vessels. It may antedate the diagnosis of SLE and visual loss may be the initial presentation of the disease. Jabs et al[14] reported 11 patients with SLE and severe retinal vaso-occlusive disease. In their patients, visual outcome was poor, with 55% of the involved eyes suffering visual loss. Some authors believe that the development of scleritis and retinal vasculitis in a patient with SLE is an indication of increased systemic disease activity. Thus, they suggest that such patients should closely be monitored.[6] None of the 46 patients received hydroxychloroquine had retinopathy probably since they were receiving the recommended doses.

Our study illustrates the spectrum of ocular manifestations in children with SLE. However, it fails to show correlation between ocular manifestations and disease activity. A prospective study of a larger number of patients and a longer follow-up period is needed to determine if there is a correlation between ocular manifestations and disease activity.

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