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Professional paper

Ultraviolet Light and Pterygium

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A B S T R A C T

The purpose of this study was to evaluate the contribution of ultraviolet light (UV) as a causal factor of primary and pterygium recurrence. A conjuctival autograft transplantation was a surgical method of pterygium treatment. In the first group (38 eyes) were patients with primary and recurrent pterygium exposed to sun (worked outdoors), evaluating geodemographic status, and in the second group (20 eyes) were patients who were not. During 6–12 months of follow up recurrence rate after surgical removal was 27% in the first group and 10% in the second one. UV light seems to have an important role in cause of primary and recurrent pterygium.

***Key words**: ultraviolet rays, light, pterygium, transplantation autologus, conjunctiva, recurrence*

Introduction

Normal ocular surface is covered by corneal and conjuctival epithelium. Pterygium refers to conjuctival or fibrovascular growth onto the cornea. Ultraviolet light exposure appears to be the most significant factor in the development of pterygium. This may explain why the incidence is vastly greater in populations near the equator and outdoor work in situation with high light reflectivity, including use of hats and sunglasses as protective[1]. Both blue and unltraviolet light have been implicated in its causation, as demonstrated in waterman. Other agents that may contribute to the formation of pterygium include allergens, noxious chemicals and irritants (e.g., wind, dirt, dust, air pollution). Heredity and trauma may also be a factor[2,3].

It is proposed that the initial biological event in pterygium pathogenesis is an alternation of limbal stem cells due to chronic ultraviolet light exposure. The concomitatnt breakdown of the limbal barrier and subsequent conjuctivalization of the cornea explain the shape and formation of pterygium[4]. New theories include the possibility of damage activation of matrix metalloproteinases, some interleukins and growth factors[5,6,7]. Pathologically, pterygium is characterised by elastoid degeneration of subepithelial tissue and destruction of Bowman's membrane.

Several techniques are available for the excision of pterygium,which include bare sclera technique, autograft, antimetabolites, radiation and amniotic membranes. Number of techniques indicates the excistance of unsatisfing postoperative results. The most successfull results are with autograft surgery (conjuctival/limbal conjuctival) with only 5–25% of pterygium recurrence, depending whether it was primary or reccurent pterygium[8–12].

Evaluating datas, some authors report that 40–70% of the primary pterygium disease burden is attributable to UV exposure[13]. Therfore, we wanted to investigate whether UV light is a an causative factor for primary and recurrent pterygium.

Patients and Methods

In period from March 2004 till September 2005, 58 eyes were operated due to pterygium. Patients were divided in two groups depending of their exposure to the

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sun. A lifetime history of residence, sun exposure patterns, and use of hats, spectacles, and sunglasses was obtained at interview. Measures of potential sun exposure included latitude and daily working sunshine hours. The first group contained patients who spent minimum 5 hours working outdoors for at least 5 years (e.g. farmers, watermen, construction worker, etc.) and included 37 patients (38 eyes). 27 patients (28 eyes) had primary pterygium, 9 reccurent (operated by any surgical technique). The patients were 42 to 64 years old (mean 55). There were 28 men and 10 women. The second group (control group) included indoor working patiens (20 patients, 20 eyes); 17 had primary and 3 recurrent pterygium. Patients were between 52 and 73 years old (mean 63); 13 were men and 7 women.

All the patients were operated by the same surgeon.

A subconjuctival anesthesia with 2% lidocaine was used. The pterygium was completely resected from the cornea and the body of pterygium was dissected and excised with conjuctival scissors. Bleeding control was achived with minimal cautherisation. Autograft was taken from supertemporal layer of conjuctiva dissected with scissors. Autograft was suttured to the recepient bed with 8.0. Vicryl and the limbal part of the graft with 10.0. nylon sutures to secure it. Postoperative therapy included antbiotics (tobramycin) four times a day during the first postoperative week adn corticosteroid antibiotic drops (dexamethason –neomycin) three times a day four weeks in all eyes. Patients were examined at 0, 3 7, 14, 28 postoperative day and every month thereafter. The sutures were removed two weeks postoperatively. Follow up ranged from 6 to 12 months (mean 10 months).

At least, one month after operation patient continued with his work (as before). Pterygium recurrence rate was measured and recurrence was defined by overgrowth onto the cornea for 2 mm.

TABLE 1
PREOPERATIVE AND POSTOPERATIVE BCVA IN PATIENTS OPERATED BY CONJUCTIVAL AUTOGRAFT TRANSPLANTATION DUE TO PTERYGIUM.

BCVA	Number of patients (preoperative)	Number of patients (postoperative)
0.05	3	0
0.1	6	3
0.2	6	8
0.3	8	5
0.4	7	9
0.5	7	6
0.6	8	11
0.7	7	8
0.8	2	3
0.9	2	3
1.0	2	2

BCVA – best corrected visual acuty.

Results

There were no intraoperative complications. In the first 10 days patients had mild symptoms as photophobia, lacrimation and foreign body sensation. All eyes achieved normal eye movement and no loss of visual acuity (Table 1).

One patient (one eye) from first group was exluded from the study because of long term of sickleave (more than a month).

Number of patients that have been expossed to UV light versus non-exposed ones is shown in Table 2.

Patients were prospectively followed–up for the reccurence of ptergium. The pterygium recurrence rate in both groups is presented in Table 3.

In the first group, pterygium reccured in 10 eyes (27.03%); 4 eyes from recurrent pterygium (44.44%) and 6 eyes form primary pterygium (16.21%).

The second, control group, recurrence rate was 10% (2 eyes); 2 at primary pterygium (11.76%) and none at recurrent pterygium patients.

TABLE 2
NUMBER OF PATIENTS, WITH PRIMARY AND RECCURENT PTERYGIUM DIVIDED BY THE LENGTH OF EXPOSURE TO UV LIGHT

	UV light exposure (minimum 5 working daily hours for 5 years)	No UV light exposure
Primary pterygium	28 (27 EYES)	17
Reccurent pterygium	9	3
Total	37 (38 EYES)	20

UV light: ultraviolet light

TABLE 3
NUMBER OF PATIENTS WITH PTERYGIUM RECURRENCE EXPOSED TO UV LIGHT AFTER CONJUCTIVAL AUTOGRAFT TRANSPLANTATION DIVIDED BY POSTOPERATIVE EXPOSURE

	UV light exposure (minimum 5 working daily hours for 5 years)	No UV light exposure
Primary pterygium	6	2
Reccurent pterygium	4	0
Total	10	2

UV light – ultraviolet light

Discussion

The UV spectrum is subdivided into three ranges: short (UVC, 200 to 280 nm), mid-range (UVB, 280 to 320 nm), and long (UVA, 320 to 400 nm). UVC is absorbed by the atmosphere before reaching the earth's surface and therefore is not likely to cause pathological changes. However, exposure to UVA and UVB is associated with

disorders of the eye, which is not surprising because eye is continuously exposed to the phototoxic effects of this agent. Many studies have shown variable results regarding UV influence on pterygium. The most important data which must considered are geodemographic status and cumulative effect of UV light[13,14].

We found that in the group od 58 eyes, 65.62% (38 eyes) will develop pterygium if timely exposed to UV light. Other studies have reported pterygium rate between 40–70%[13].

Recurrence of pterygium is most of the time defined as postoperative complication[15–17]. Reason for recurrence is not well known, as intraoperative care almost always pass without complications. The mechanism by which UV light induces this disease reamins elusive. Our study has shown there is significantly higher incidence of pterygium reccurence in patients who are longer exposed to sunlight (27% comparing to 10% in control group).

However, further research efforts are needed to enable us to better understand the relative contribution of the different risk factors. In addition, the underlying mechanism of the effects of UV radiation needs to be further evaluated. By readdressing these unresolved issues in a newly proposed epidemiological study, new measures might be taken to reduce incidences and improve clinical managements of diseases, in addition to preventing UV exposure by eliminating other contributory factors. Meanwhile, preventive measures such as protection of the eyes by the wearing of sunglasses with UV B protective lenses and brimmed hats outdoors are recommended.

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ULTRALJUBIČASTO ZRAČENJE I PTERIGIJ

SAŽETAK

Cilj rada bio je ustanoviti učinak ultravioletnog zračenja kao uzročni faktor primarnog i recidivirajućeg ptergija. Transplantacija autografta spojnice bila je kirurška metoda liječenja pterigija. U prvoj grupi (38 očiju) bili su bolesnici sa primarnim i recidivirajućim pterigijem koji su bili eksponirani suncu (rad na otvorenom), uzimajući u obzir geodemografski status, a u drugoj grupi (20 očiju) bolesnici koji nisu bili eksponirani suncu. U postoperativnom periodu praćenja od 6 do 12 mjeseci recidiv ptergija nakon kirurškog liječenja bio je 27% u prvoj grupi, odnosno 10% u drugoj grupi. Ultravioletno zračenje čini se igra važnu ulogu u uzročnosti primarnog i recidivirajućeg ptergija.