Basic Tear Secretion Measurement in Pterygium

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Abstract

Purpose : To evaluate the correlation between dry eye and pterygium.

Material and Method : A prospective study of basic tear secretion in 30 patients who had unilateral pterygium was performed. Schirmer's test with anesthesia was assessed in both eyes of patients with unilateral pterygium.

Results : Mean Schirmer's test value in the eye with pterygium was 11.6 ± 0.4 mm and 12.4 ± 0.4 mm, without pterygium. The Schirmer's test value was decreased significantly in the eye with pterygium.

Conclusion : This study revealed that the Schirmer's test value with anesthesia was decreased significantly in the eye with unilateral pterygium when compared with a healthy eye.

Key word : Pterygium, Schirmer's Test, Dry Eye

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A pterygium is the appearance of a fibrovascular neo-formation, which arises in the conjunctiva and grows towards and infiltrates the surface of the cornea[1]. The abnormality was described as early as 1,000 B.C. by Susruta, an Indian physician[2].

Although the etiological theories of what causes pterygia are not fully understood, radiation damage by ultraviolet energy is the most widely accepted theory for pterygium formation[3-5]. However, there is no complete explanation as to why unilateral pterygium often occurs. Both eyes are exposed equally to ultraviolet energy, so there may be other etiologic factors besides ultraviolet exposure. Quantitative alteration of the lacrimal tear resulting from ultraviolet exposure can be a risk factor for pterygium.

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In this prospective study, the authors hypothesized that decreased tear production was related to the pterygium formation. To investigate this hypothesis, Schirmer's test with anesthesia was performed in patients with unilateral pterygium and the eyes with pterygium were compared to those without pterygium in the same patient.

MATERIAL AND METHOD

Thirty patients with unilateral pterygium, who visited the Department of Ophthalmology, Faculty of Medicine, Chiang Mai University, Thailand between October 2001 and April 2002, were enrolled in the study. Hospital review board approval was obtained. All patients provided written informed consent.

Patients who had had previous ocular surgery, previous ocular disease, systemic diseases likely to affect tear production (e.g. systemic lupus erythematosus, rheumatoid arthritis), use of any medication that had an effect on tear production, or a history of dry eye symptom were excluded.

Schirmer's test

Schirmer's test with anesthetic eyedrops (Schirmer's test II) was performed (Fig. 1) in each eye using a standard Schirmer's tear test strip. After one drop of 0.4 per cent benoxinate hydrochloride was administered to prevent reflex tearing, excess moisture on the eyelid margin was wiped away using a sterile cotton-tip applicator. The bent 5-mm portion of the paper strip was then placed over the junction of the temporal and medial third of the lower eyelid margin. The patient was asked to look slightly upward throughout the test if possible, and normal blinking was allowed during the procedure. Each individual

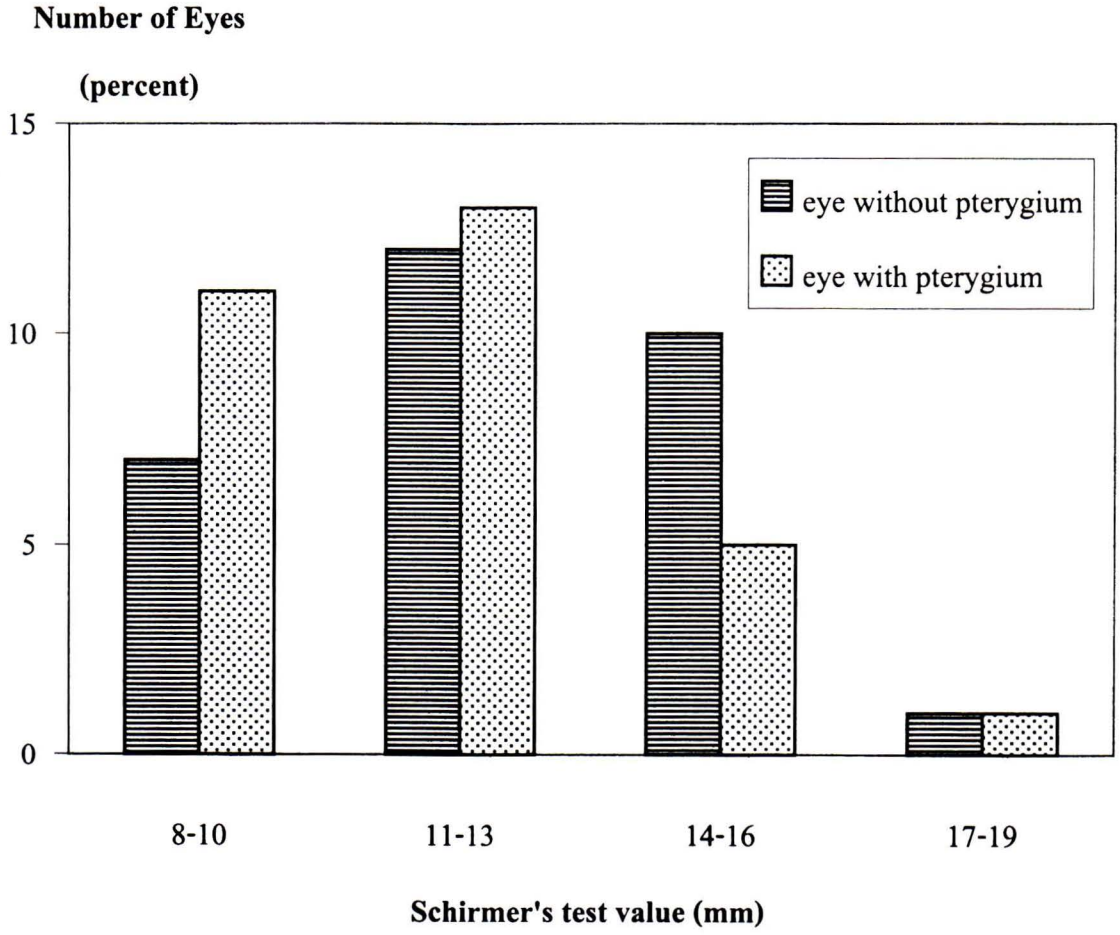

Fig. 1. Schirmer's test.

Table 1. Comparison of Schirmer's test value (mm) between eye with and without pterygium in each patient.

Age (years)	Schirmer's test value (mm)	
	Without pterygium	With pterygium
22	12	12
24	17	18
26	15	14
29	15	14
29	15	14
30	14	14
31	13	13
31	12	10
33	11	11
34	14	13
34	8	9
36	14	12
36	15	13
37	12	11
38	10	10
39	10	10
41	12	11
42	14	13
42	10	11
42	9	9
44	13	13
45	15	14
45	15	10
46	12	10
46	10	8
47	10	9
49	11	8
49	12	12
51	13	12
57	11	10

was instructed to sit quietly for 5 minutes before the strips were removed from the eyes.

The Schirmer's test value was evaluated by measuring the moistened length on a millimeter scale.

All tests were conducted in a quiet room of relatively constant temperature and humidity, with no ventilation currents. Only one examiner (NP) performed all measurements.

Statistical analysis

The paired Student *t*-test using the Statistical Package for Social Science (SPSS version 10.0) was used for a significantly statistical analysis.

RESULTS

The mean age ± SD was 38.5 years ± 9.3 (range 26 to 57 years). Of the patients, 16 (53.3%) were male and 14 (46.7%) female. Comparison of

Fig. 2. Distribution of Schirmer's test value in the eyes with/without petrygium.

Schirmer's test value (mm) between the eye with and without pterygium in each patient is demonstrated in Table 1.

Mean Schirmer's test value in the eye with pterygium was 11.6 ± 0.4 mm, and 12.4 ± 0.4 mm, without pterygium. Fig. 2 demonstrates the distribution of Schirmer's test value in the eye with and without pterygium. The Schirmer's test value was decreased significantly in the eye with pterygium (0.0001).

DISCUSSION

Many diverse theories have been put forward to explain the pathogenesis of pterygium testify to the point that its etiology has not been adequately understood. Although prolonged exposure to ultraviolet light has been implicated in the pathogenesis of pterygium[3-6], unilateral pterygium has not been completely explained by this theory alone. Detels et al performed their study in British Columbia, northern India, Taiwan, and Thailand and revealed that the age-adjusted prevalence rate of pterygium among indoor sawmill workers was 25.3 per cent compared to 7.1 per cent in controls[7]. This study provided evidence that the cause of pterygium may be multifactorial. Although ultraviolet light and environmental factors play a significant role, the development of pterygium in only some patients living under the same conditions and not in all suggests the role of other factors in the pathogenesis.

Coroneo[8] proposed that tear function abnormalities were also an etiologic factor of ptery-

gium. The levation of pterygium, dryness, and dellen were seen to exacerbate the pterygium[8]. Unilateral pterygium is the ideal study design to compare the effects of dry eye in pterygium. Dry eye can be diagnosed with the Schirmer's test, Rose Bengal stain, tear breakup time, tear film osmolarity, lysozyme assays, and lactoferrin assays[9]. Although the tear film osmolarity measurement is currently the most sensitive and specific diagnostic test for dry eye[10], Schirmer's test remains the mainstay among these investigations in the clinical diagnosis of dry eye[11]. In the present study, the authors demonstrated that the mean Schirmer's test value in the eye with pterygium was decreased significantly when compared with the eye without pterygium. Biedner et al reported unilateral pterygium and found no difference of tear secretion between the pterygium and control eye[12]. Other previous report also showed that there was no significant difference in Schirmer's test value between an eye with pterygium and a control eye[13]. However, Schirmer's test without anesthesia was used for the evaluation. Recently, a strong association of dry eye and pterygium was shown by the study of Ishioka et al[14]. They demonstrated that the test value of Schirmer's test with anesthesia was decreased significantly in the eye with unilateral pterygium.

Although Schirmer's test values with anesthesia in the present report were normal, their values were almost all low. Moreover, a difference between eyes with and without pterygium could be seen.

In summary, the present study revealed that Schirmer's test value with anesthesia was decreased significantly in the eye with unilateral pterygium when compared with a healthy eye. It is difficult to assess whether decreased Schirmer's test values are the initiating factor causing pterygium or the result of pterygium. However, artificial tears without preservative may be recommended to all patients who have pterygium.

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REFERENCES

1. Wong WW. A hypothesis on the pathogenesis of pterygium. Ann Ophthalmol 1978; 10: 303-8.
2. Jaros PA, DeLuise VP. Pinqueculae and pterygia. Surv Ophthalmol 1988; 32: 41-9.
3. Taylor HR. Aetiology of climatic droplet keratopathy and pterygium. Br J Ophthalmol 1980; 64: 154-63.
4. Moran DJ, Hollows FC. Pterygium and ultraviolet radiation: A positive correlation. Br J Ophthalmol 1984; 68: 343-6.
5. Taylor HR, West SK, Rosenthal FS, Munoz B, Newland HS, Emmett EA. Corneal changes associated with chronic UV irradiation. Arch Ophthalomol 1989; 107: 1481-4.
6. Adamis AP, Starck T, Kenyon KR. The management of pterygium. Ophthalmol Clin North America 1990; 3: 611-23.
7. Detels R, Dhir SP. Pterygium: A geographical study. Arch Ophthalmol 1967; 78: 485-91.
8. Coroneo MT. Pterygium as an early indicator of ultraviolet isolation: A hypothesis. Br J Ophthalmol 1993; 77: 734-9.
9. Arffa RC. Grayson's disease of the cornea. 3rd ed. St Louis: Mosby, 1991: 310-23.
10. Lucca JA, Nunez JN, Farris RL. A comparison of diagnostic tests for keratoconjunctivitis sicca: lactoplate, Schirmer, and tear osmolarity. CLAO 1990; 16: 109-12.
11. Lamberts DW. Physiology of the tear film. In: Smolin G, Thoft RA, editors. The Cornea: Scientific foundations and clinical practice. 3rd ed. Boston: Little Brown, 1994: 449.
12. Biedner B, Biger Y, Rothkoff L, Sach U. Pterygium and basic tear secretion. Ann Ophthalmol 1979; 11: 1235-6.
13. Kadayifcilar SC, Orhan M, Irkec M. Tear functions in patients with pterygium. Acta Ophthalmol 1998; 76: 176-9.
14. Ishioka M, Shimmura S, Yagi Y, Tsubota K. Pterygium and dry eye. Ophthalmologica 2001; 215: 209-11.

การวัดปริมาณน้ำตาพื้นฐานในผู้ป่วยต้อเนื้อ

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จุดมุ่งหมาย : เพื่อประเมินความสัมพันธ์ระหว่างตาแห้งและต้อเนื้อ

วิธีการ : ทำการศึกษาน้ำตาพื้นฐานแบบไปข้างหน้าในผู้ป่วยที่เป็นต้อเนื้อเพียงข้างเดียวจำนวน 30 ราย โดยการทดสอบเซอมเมอร์ที่ใส่ยาชากับตาผู้ป่วยทั้งสองข้างโดยที่ข้างหนึ่งเป็นต้อเนื้อและอีกข้างหนึ่งไม่เป็นต้อเนื้อ

ผลการศึกษา : ค่าเฉลี่ยของการทดสอบเซอมเมอร์ในตาข้างที่เป็นต้อเนื้อเท่ากับ 11.6 ± 0.4 มิลลิเมตรและเท่ากับ 12.4 ± 0.4 มิลลิเมตรในตาข้างไม่เป็นต้อเนื้อ ค่าเฉลี่ยของการทดสอบเซอมเมอร์ในตาข้างที่เป็นต้อเนื้อลดลงอย่างมีนัยสำคัญ

สรุป : การศึกษานี้แสดงให้เห็นว่าค่าเฉลี่ยของการทดสอบเซอมเมอร์ที่ใส่ยาชาในตาข้างที่เป็นต้อเนื้อลดลงอย่างมีนัยสำคัญเมื่อเทียบกับตาปกติในผู้ป่วยที่เป็นต้อเนื้อข้างเดียว

คำสำคัญ : ต้อเนื้อ, การทดสอบเซอมเมอร์, ตาแห้ง

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