

DRY EYE SYNDROME IN THE UAE

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Dry eye syndrome or keratoconjunctivitis sicca is becoming one of the leading eye diseases encountered on first examinations all over the world. Systemic diseases, eye diseases, increase in photorefractive operations, misuse of contact lenses, continuous use of eye drops containing preservatives, ecological disruption of the atmosphere and increase in PC users all lead to either decreased tear production or increased tear film evaporation.

The purpose of this study involving 54 patients of different ages (108 eyes) is to estimate the occurrence rate of the mentioned disease amongst ophthalmic patients in the UAE.

The results showed an alarming occurrence rate of dry eye syndrome even amongst children.

Conclusion: Dry eye syndrome is a very common but mostly under-diagnosed disease which is spreading all around the world and requires the attention of all ophthalmologists.

Introduction

Dry eye is a state of the eye evolving from decreased tear production, excessive tear evaporation, or abnormality in mucin or lipid components of the tear film 1.

The tear film is made up of 3 layers:

1. A superficial thin lipid layer is produced by the meibomian glands, and its major role is to retard tear evaporation of the underlying aqueous layer and to assist in uniform tear spreading, thus providing a smooth optical surface. It may also act as a barrier against foreign particles and have some antimicrobial properties. The secretions are subject to neuronal (parasympathetic, sympathetic, and sensory sources), hormonal (androgen and estrogen receptors), and vascular regulation.

2. A middle thick aqueous layer is produced by the lacrimal glands (reflex tearing), as well as the accessory lacrimal glands of Krause and Wolfring (basal tearing). This layer includes about 60 different proteins, electrolytes, and water. Lysozyme is the most abundant and the most alkaline protein present in tears. It is a glycolytic enzyme that is capable of breaking down bacterial cell walls. Lactoferrin has antibacterial and antioxidant functions, and the epidermal growth factor (EGF) plays a role in maintaining the normal ocular surface and in promoting corneal wound



healing. Albumin, transferrin, IgA, IgM, and IgG are also present. The secretion of the lacrimal gland is controlled by a neural reflex arc, with afferent nerves in the cornea and the conjunctiva passing to the pons and efferent sympathetic and parasympathetic nerves terminating in the lacrimal glands. Insufficient tear production is the most common cause of dry eye.

3. A deep hydrophilic mucin layer is produced by the goblet cells of the conjunctiva and the ocular surface

epithelium. It associates itself with the ocular surface via its loose attachments to the glycocalyx of the microvilli of the epithelium. The hydrophilic quality of the mucin allows the aqueous to spread over the corneal epithelium. Mucin deficiency, caused by damage to the goblet cells or the epithelial glycocalyx, leads to poor wetting of the corneal surface with subsequent desiccation and epithelial damage, even in the presence of adequate aqueous tear production. Taking into consideration the mentioned above, any disruption in the formation

or stability of these three layers might lead to dry eye 2. The National Eye Institute distinguishes 2 main categories of dry eye states, an aqueous deficiency state and an evaporative state, whereas The Madrid Triple Classification of Dry Eye includes 3 classes 3.

- The first class is based on the affected tissues, called the ALMEN classification (Aqueo-serous deficiency, Lipid deficiency, Mucin deficiency, Epithelial deficiency, and Non-dacryologic deficiencies).

- The second class is based on the etiopathogenesis (age related, hormonal, iatrogenic, immunopathic, hyponutritional, dysgenic, infectious, inflammatory, traumatic, neurologic, and tantalic).

- The third class is based on the clinical severity (grade 1, symptoms without signs; grade 2, symptoms with reversible signs; and grade 3, symptoms with permanent signs).

Frequency

The occurrence rate of such a disease is increasing daily throughout the world. Mild to severe cases of dry eye involve 40 to 60 million of the U.S. population 4. In other countries 5, the percentage is also reaching critical numbers.

Symptoms

Dry sensation, burning, itching, pain, foreign body sensation, photophobia, and blurred vision are common in patients with dry eye. These symptoms are often exacerbated in smoky or dry environments, by indoor heating, by excessive reading or computer use, or with exposure to extreme environmental conditions. Some patients with dry eye syndrome complain of too much tearing, which most probably originates from reflex tearing due to severe corneal surface disease from the dryness.

Materials and Methods

54 patients (108 eyes) with a mean age average of 29 years (7-60 years) without any connective tissue diseases or Sjogren syndrome were examined for dry eye. These patients were divided into 2 groups depending on the age, where the first group included 11 minors (22 eyes – 20%) whose ages ranged between 7 and 16 years, and the second group included 43 patients (86 eyes – 80%)

Group 1. N=22 eyes				
Aqueous production in mm	5	10	15	20
Quantity of eyes	6	15	1	0

Table 1. Aqueous production measurement in group 1 – patients with age under 16.

Group 2. N=86 eyes				
Aqueous production in mm	5	10	15	20
Quantity of eyes	8	55	17	6

Table 2. Aqueous production measurement in group 2 – patients with age over 16.

over that age.

After obtaining a thorough history, each patient underwent an ophthalmic examination that included visometry, tonometry (when needed), biomicroscopy and direct ophthalmoscopy. Additionally, tear film breakup time measurement, and the Schirmer test for aqueous tear production were conducted.

Tear break-up test (TBUT) was determined by measuring the time lapse between instillation of fluorescein and appearance of the first dry spots on the cornea. A fluorescein strip was moistened with saline and applied to the inferior cul-de-sac. After several blinks, the tear film was examined using a broad-beam of slit lamp with a blue filter for the appearance of the first dry spots on the cornea. Decreased TBUT of less than 10 seconds was considered abnormal, indicative of tear instability. The Schirmer test was performed by placing a thin strip of filter paper in the inferior cul-de-sac (image 1); then, the eyes were closed for 5 minutes, and the amount of wetting of the paper strip was measured. Measurement of less than 5 mm determined an acute state of dryness, 10 mm was categorized as moderate, 15 mm was considered mild, whereas 20 mm and more was recognized as normal.

Results

14 eyes – 13% of patients from both groups had an acute state of dryness with aqueous deficiency down to 5mm and a TBUT of less than 10 seconds. What

was more alarming that amongst those patients were 2 patients that belonged to the first group with ages 7 and 10 years and had such a state in both eyes and two patients from the same group with such a state in one eye.

70 eyes – 65% had a moderate condition of dryness with aqueous deficiency down to 10 mm and a normal TBUT, 15 of them belonged to patients from the first group.

18 – 17% eyes had a mild case of dryness with aqueous deficiency down to 15 mm and a normal TBUT. One eye belonged to a minor from the first group.

Only six eyes – 5% had a normal state of aqueous production of 20 mm and a normal TBUT. None belonged to patients from the first group.

Results of aqueous production measurement are presented in tables 1 and 2.

Discussion

The significance of any disease increases depending on the occurrence rate amongst patients. Considering that dry eye syndrome or keratoconjunctivitis sicca can now be related to such a group of diseases, due to its rising prevalence, it must be given the appropriate attention from all ophthalmologists around the world 6. In the U.S., medical centers that specialize in treating only this disease are becoming more available to the patients that suffer from such a state of the eye and its complications.

Besides congenital or acquired diseases 7 that lead to such a state of the eye,

technology and progression is also afflicting people. The entity of cars and factories are leading to pollution and exacerbating the atmosphere disturbance, which in its turn is playing its role in inducing dryness of eyes. Although computers have now become man's best friend, they also increase the percentage of dry eyes, most probably because users tend to blink less which in its turn leads to faster tear evaporation 8.

Doctors are also playing a major role in increasing the occurrence rate of this disease amongst their patients. Therapists recommending different medications rarely take into consideration the side effects of many drugs on the tear film consistency. Antihistamines, beta-

blockers, phenothiazines, atropine, oral contraceptives, anxiolytics, antiparkinsonian agents, diuretics, anticholinergics, antiarrhythmics all lead to the disturbance of the tear system.

Last but not least, ophthalmologists are also playing a great role in the progression of this disease. The continuous use of eye drops containing preservatives will induce the state of dryness in the eyes 9.

The misuse of contact lenses plays a huge role in achieving dysfunction of the tear system. Keratoplasty, laser refractive and/or cataract surgery also lead to dry eye syndrome in a more complicated form 10.

Despite its prevalence, dry eye continues to be an underdiagnosed disease. While it appears that close to 40% of patients

visiting ophthalmologists complain of symptoms associated with dry eye disease, it has been estimated that the prevalence of diagnosed dry eye in the general population is only 5% based on diagnostic coding in a large managed care population and the percentage of dry eye treated with therapeutic agents is 0,4 – 0,5 % 11.

Conclusion

Dry eye is a wide spreading under-diagnosed disease that is obtaining an early onset with minors under the age of 16. It requires the attention of all ophthalmologists whether surgeons or therapists.

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