Original Article

Frequency of Dry Eyes in Patients of Hyperthyroidism

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Purpose: To determine the frequency of dry eye disorder in patients of hyperthyroidism.

Study Design: Cross sectional study.

Place and Duration of Study: Department of ophthalmology, The University of Lahore teaching hospital Lahore, from February to May 2017.

Material and Methods: There were 44 patients included in the study. Tear film breakup time was measured by schirmer test on slit lamp. Patients involved in the study were between 20 years to 65 years of age. Data was analyzed using SPSS version 20.

Results: Out of 44 patients, 26 (59.0%) were females and 18 (40.9%) were males. 8 (18.1%) patients had age 20 to 35 years and 19 (43.1%) had age 36 to 50 years and remaining 17 (38.6%) had age 51 to 65 years. On studying the right eyes, 6 (13.6%) eyes had normal tear breakup time, 9 (20.4%) had moderate tear breakup time and remaining 29 (65.9) had severely reduced tear breakup time. Analysis of left eye showed that 6 eyes (13.6%) had normal tear breakup time, 9 (20.4%) had moderate tear breakup time and remaining 29 (65.9) had severely reduced tear breakup time. Result of Chi Square test showed that there is risk of dry eye in hyperthyroidism patients in this study. P-value of 0.0002 shows significant result which is less than 0.005.

Conclusion: There is a direct relationship of dry eyes in patients with hyperthyroidism.

Keywords: Dry eye, Hyperthyroidism, Schirmer test

Tear film is a layer that nourishes, lubricates and protects the interior surface of the eye. Tears are continuously absorbed and evaporated from the ocular surface. Normal function of the tear film is to avoid dry eye symptoms. The structure of ocular tear film is complex. While its detailed structure is not completely clear some properties are well known. As the tear film is composed of following three layers, a Mucin layer which is produced by specialized conjunctival cells and epithelial cells of the eye.[1]. It is immediately attached to the corneal epithelium. Secondly, an aqueous layer which is produced by the main lacrimal gland and its accessories; and an outer layer that is composed of polar and non-polar lipids which are derived mainly from the Meibomian glands. The intact outer lipid layer is held to stabilize the tear film and prevents the aqueous layer from evaporation. The most interior layer of the tear film is lipid layer and is important for stability[2].

Time in which tear film returns to its stable position is measured by its tear film breakup time before and after blink. It was observed there is strong relation between tear spread times, which has a direct relation with hyperthyroidism. It was concluded that thickness and timing of tear film depends upon the hyperthyroidism.[3] The fully developed range of

thyroid gland is 10 to 20 g in weight and receive blood from thyroid arteries and a minute artery called the thyroid ima. There are two hormones secreted from thyroid gland. First one is Thyroxine, T_4 is the major portion of secretion of thyroid. It makes ninety percent hormone secretions. The second one is triiodothyronine T_3, forms the remaining ten percent. Tangential tissues renovate Thyroxine to triiodothyronine, and most of triiodothyronine is derivative from Thyroxine. The thyroid gland oozing is synchronized by the thyroid axis of hypothalamus pituitary gland throughout stimulatory proceedings of TSH and TRH[4]. The Thyroid hormones are elated in serum bound to carrier proteins (0.03%-0.04%0 of T_4) and (0.3%-0.4% of T_3) are gratis hormone. The (TBG) thyroid hormone binding globulin is the major hauler, secretarial intended for seventy-five percent of bound T_4 and approximately remaining are bound to T_3[5]. The pre-albumin and albumin are bound with thyroxine. Hyperthyroidism mostly occurs in females, it increases with age and it runs in families. The incidence of clinical hyperthyroidism is 0.5-1.9% in women and less than 1% in men and of subclinical 3 -13.6% in women and 7-5.7% in men. The normal T_3 values 75-200 ng/DI, TSH 3-5.0 U/ML and T_4 normal values 9-2.8ng/DI[6].

Hyperthyroidism is a disorder in which thyroid gland yields too much of the hormone thyroxine. Hyperthyroidism can speed up body's metabolism meaningfully, producing rapid weight loss, increase the heartbeat, sweating, and anxiety or petulance[7]. Dry eye is very common in those patients having different systemic diseases. Ocular changes and related symptoms like irritation, pain and burning sensation are common[8]. These symptoms are not generally related with the specific components but these are important in relation to it. The dysfunction of thyroid gland also affect the normal mechanism of the eye. Due to the increasing level of thyroid hormone , the condition is known as hyperthyroidism[14]. In recent study it was concluded that hyperthyroidism initially affects the eyes and causes severe dryness due to decrease of normal tear breakup time. Thyroxine production is linked with (TAO) i.e. Thyroid associated orbitopathy which is normally observed in disease known as Graves' thyrotoxicosis. The sign and symptoms of graves' disease are mostly seen in the early detection of hyperthyroidism[9]. Autoimmune disorders most likely Myasthenia gravis have connection with autoimmune thyroid disorders. The clinical features of orbitopathy i.e. TAO and eye disorder of myasthenia gravis have noteworthy extend beyond and in the unusual illustration of their co-existence.[10] The purpose of the study was to determine the frequency of dry eye disorder in patients of hyperthyroidism.

MATERIAL AND METHODS

A cross sectional study was conducted on 44 patients having history of hyperthyroidism with age range of 20 – 65 years. All patients were diagnosed with hyperthyroidism by medicine ward university of Lahore teaching hospital.

Patients of all other ages or having any other systemic disorders were excluded from the study. The purpose of the study was to find the relationship of hyperthyroidism with dry eye. Therefore, all patients underwent measurement of tear production by Schimer test using slit lamp. The instruments used in testing were fluorescein strips, slit lamp and pen torch. Convenient sampling techniques were used from the prevalence of hyperthyroidism in Pakistan to find out the sample size of study.

RESULTS

Table 1: Gender distribution of patients.

		Frequency	Percent
Valid	Female	26	59.1
	Male	18	40.9
	Total	44	100.0

Table 2: Age distribution of patients.

		Frequency	Percent
Valid	20-35	8	18.1
	36-50	19	43.1
	51-65	17	38.6
	Total	44	100.0

Out of 44 patients 26 (59.1%) were females and 18 (40.9%) were males (table 1). Moreover there were 8 (18.1%) people having age between 20 to 35 years, 19 (43.1%) having age between 36 to 50 years and 17 (38.6%) having age between 51 to 65 years (table 2).

Out of 44 patients in right eye 6 (13.6%) patients had normal tear film breakup time in right eye and 9 (20.4%) had moderate tear breakup time and

remaining 29 (65.9%) had severely decreased tear breakup time (table 3).

Table 3: Frequency of Dry Eyes in Rt. eye.

		Frequency	Percent
Valid	Normal	6	13.6
	Moderate	9	20.4
	Severe	29	65.9
	Total	44	100.0

Table 4: Frequency of Dry Eyes in Lt eye.

		Frequency	Percent
Valid	Normal	6	13.6
	Moderate	9	20.4
	Severe	29	65.9
	Total	44	100.0

Out of 44 patients in left eye 6 (13.6) patients had normal tear breakup time in left eye and 9 (20.4%) had moderate tear breakup time and remaining 29 (65.9) had severely reduced tear breakup time (table 4).

DISCUSSION

Recent researches have evaluated the compromised functions of the tear film in hyperthyroidism patients. Hyperthyroidism patients tends to have less tear breakup time and results in severe deficiency. Schirmer value of less than 6 mm and dry eyes disorder is present in hyperthyrodisiom[11]. Bulging of the eyes is an additional hazardous feature with enlarged width of palpebral fissure resulting in evaporation of the tear film and increase the osmolarity of tear film[12].

Therefore, it may be concluded that the decrease of tear break up time is due to hyperosmolarity caused by bulging of eyes[13]. In patient having lesser tear breakup time and severe dry eye disorder, thyroxine hormone is proved better for the normalization of tear break up time in hyperthyroidism patients.[14] Additionally artificial tears and modifications of environment is recommended to these patients.[15] Another similar study proved that in hyperthyroidism the TBUT decrease and due to this the dryness of the eyes increased. After the biopsy of conjunctival tissues of the patients of hyperthyroidism, it was seen that most of the Hyperthyroidism patients had orbitopathy.[16,17]. Another similar study indicated that the incidence of decreased tear breakup time is observed in ptosis patients with myasthenia graves' and this is autoimmune condition. Therefore, the dry eye in hyperthyroidism is not only the effect of bulging of eyes.[18].

Another study showed that thyroid eye disorder affects 400,000 people in the United Kingdom.[19]. The Graves' disease is of about 2% (estimate value from 1% to 2.8%), and incidence of thyroid eye disorder in Graves' disorder with reduced tear breakup time and dry eye disorder is about of 37.5%[20]. Thyroid eye disorder is an extremely obnoxious, excruciating, cosmetically stressful, dryness with lower tear breakup time and sporadically vision menacing state. Medicinal management has progressed in the precedent 20 years. New advances designate that a discriminatory dealing for thyroid eye disorder should be a practical purpose[21,22].

CONCLUSION

It is determined that hyperthyroidism is the factor which promote dry eye disorder. The results shows significant relationship of dry eye with hyperthyroidism and this value is 0.002. Therefore it is concluded that hyperthyroidism causes severe dry eye disorder mostly seen as keratoconjunctivitis (KCS) and Sjogren syndrome.

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