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PREVALENCE OF DRY EYE DISEASE IN POST MENOPAUSAL WOMEN

Ophthalmology

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ABSTRACT

Around the world, between 5% to 34% of people suffer from dry eye. Prevalence increases with age. Dry eye disease is defined as a "multifactorial" disease of the tears and ocular surface that results in symptoms of discomfort, visual disturbance and tear film instability with potential damage to the ocular surface. It is accompanied by increased osmolarity of the tear film and sub-acute inflammation of the ocular surface.1 This is the most neglected, mostly misdiagnosed condition of the eye, which gets severe if not managed early. Menopause causes oestrogen deficiency and a consequent change in the local hormonal mileu of the lacrimal gland. This is thought to decrease tear production and cause occurrence of dry eye in females.2 The aim of this study is to estimate the prevalence of dry eye in the post-menopausal females who attend the Department of Ophthalmology, GGH, Guntur and to know the importance of diagnosing dry eye in post-menopausal women. In this cross-sectional study, 200 patients between 50 & 70 years of age were screened for dry eye. A detailed history, Lissamine green test, Schirmer's test, Tear film break up time (TBUT), presence of MGD, strand and filaments in slit lamp were used to diagnose dry eye.

KEYWORDS

Dry eye, Lissamine green, Tear film break up time(TBUT), Schirmer's Test.

INTRODUCTION

Dry eye is a multifactorial disease of the tear and ocular surface that results in symptoms of discomfort, visual disturbance, and tear film instability with potential damage to ocular surface.[3]

Dry eye represents a disturbance of the lacrimal functional unit, an integrated system comprising the lacrimal glands, ocular surface and eyelids, as well as sensory and motor nerves connecting these components.[4]

Dry eye is one of the most common reasons for ophthalmic consultation. It becomes increasingly prevalent with age, affecting approximately 10% of the individuals aged 30-60years and 13% of adults aged more than 65years.[4] Around the world, between 5% and 34% of people suffer from dry eye.[1]

The tear film has 3 major components- the aqueous layer: secreted by lacrimal glands, the lipid layer secreted by meibomian glands, and mucin secreted by conjunctival goblet cells. Tear production, evaporation, drainage, health of corneal epithelial cells, corneal subnasal nerve plexus, corneal inflammatory and immune status interplay to maintain ocular surface homeostasis. By influencing the above mechanisms, sex hormones play a role in dry eye disease.

Sex steroid receptors are present on the meibomian glands, which are the sebaceous glands present on the eyelids that are responsible for producing the oil components of tears – which prevent evaporation. Androgen binding results in synthesis and secretion of lipids from these glands while oestrogens actually cause a decrease in lipid production.

During menopause, androgens decrease, affecting the meibomian and lacrimal glands in the eyelids. Many women after menopause suffer from dry eyes. During menopause, body produces less oestrogen, androgen and progesterone causing a variety of symptoms like hot flushes, sweating, insomnia and even depression.

Risk Factors

Age, female sex, postmenopausal oestrogen therapy, antihistamines, collagen vascular disease, corneal refractive surgery, irradiation, Vit A deficiency, Androgen Deficiency comprise the various risk factors for dry eye disease.[1]

Clinical Features

The subjective symptoms in dry eye disease are often non-specific. They include redness, burning sensation, stinging, foreign body sensation, pruritis, photophobia according to severity,

On examination, Low tear meniscus, temporal conjunctival folds parallel to the lid margins, and telangiectasia, superficial punctate keratitis may be found.

In late stages or in severe forms of the disease, conjunctival scarring or corneal complications can occur. In addition to filamentary keratitis, persistent epithelial defects, ulceration and even corneal perforation can complicate the course. But severe complications are rare.[1]

Examination

Every patient is checked for thorough ocular examination under slit lamp for any confounding factors like lid abnormalities, Meibomian gland dysfunction, Conjunctival surface irregularities. They are examined for signs of dry eye like height of tear film, conjunctival congestion, LIPCOFs, epithelial keratopathy, filament army keratopathy & corneal thinning- marginal or paracentral.

The tests performed are TBUT, Fluorescein stain, Lissamine green stain, Schirmer 1.

Diagnosis:

Practical Sequence Of Dry Eye Tests:[1]

1. Patient history
2. TBUT with fluorescein
3. Ocular surface staining with with lissamine green
4. Schirmer test with or without anaesthesia
5. Examination of eyelid margins for MGD.

Examination Of Eyelids

- Blink Rate:

A reduced interval between blinks, from about 6 seconds to 2.6 seconds and incomplete blinking are typical of patients with dry eye.

- Stare Test:

After a few blinks, patient is asked to look at a visual acuity chart, the time until the image blurs should be more than 8 seconds.[4]

- Lid Congruity And Lid Closure:

Entropion, ectropion, facial nerve palsy can disturb tear film integrity.

- Lid Margin:

MGD is associated with evaporative dry eye.

Examination Of The Conjunctiva

Temporal lid-parallel conjunctival folds (LIPCOFs) in straight eye are

a result of increased friction between the lids and conjunctiva. They are important indicators of dry eye with sensitivity of 84.9% and specificity of 90%.[1]

Examination Of The Ocular Surface

Epithelial keratopathy which can be fine and granular, coarse or confluent is best demonstrated following instillation of lissamine green, rose bengal or fluorescein dye. Rose Bengal and lissamine green are more sensitive because they stain devitalised epithelium. Lissamine green causes less irritation. The staining may be seen at the nasal and temporal limbus and/or inferior paracentral cornea (exposure staining).

Mucus discharge is common in moderate to severe ATD. In severe ATD, filaments (strands of degenerating epithelial cells attached to the corneal surface over a core of mucus) and mucus plaques may be seen. Filamentary keratopathy is quite painful. Marginal or paracentral corneal thinning and even perforation can occur in severe dry eye.[4]

Examination Of The Tear Film

Tear film turnover is a function of the rate of tear secretion.[5]

1. Tear Film Meniscus:

Can be measured by OCT. In healthy eyes, tear film height is 0.5+/-0.02 mm. Below 0.2mm is pathological.[1]

2. Tear Film Break Up Time:

After a complete blink, the time to the first break up of the tear film is measured. The normal range is 20 to 30 second. Below 10 seconds is pathological.[1]

3. Tear Secretion Tests

The Schirmer test measures the secretion of the lacrimal gland. Calibrated filter paper (35*5 mm) placed in the temporal third of conjunctival sac and eyes are closed. Less than 5 mm wetting is pathological. The Jones basal secretion test is performed like the Schirmer 1 test, but after instillation of topical anaesthetic.

Other Additional Investigations:

Tear Film Osmolarity/ Mmp-9 Test:

A portable osmometer suitable is still under clinical trials. A quick test to determine matrix metalloproteinases (MMP-9) is also under clinical trials.[1]

Differentiating Between Aqueous Deficient And Hyper Evaporative Dry Eye: Indications of tear deficiency include a reduced tear meniscus, LIPCOFs, and a low Schirmer 1. Patients with hyper evaporative dry eye usually show pathological changes to the lid margins, obstructed Meibomian gland orifices, and thickened Meibomian gland secretion. Tear film breakup time is reduced.
Ocular surface damage and elevated tear film osmolarity can occur with both forms.[1]

Treatment Of Dry Eye Disease:

Treatment for dry eye disease involves a step ladder approach corresponding to disease severity and must take into account associated meibomian gland dysfunction, inflammation at ocular surface, and/or associated systemic disease.

The avoidance of aggravating factors like smoking, dry heating air, air conditioning, etc is a fundamental part of the treatment.

Treatment includes – Artificial tears, lid hygiene, anti-inflammatory treatment, topical steroids, topical cyclosporin A.

In severe dry eyes, Tacrolimus, Tetracyclines, Macrolides, Omega 3 fatty acids are used.

Novel hormonal replacement treatments both systemic and topical are also evolving.

A study by National Institute of Health found that 30% of dry eye patients testosterone eye drops became asymptomatic.[6]

This is a cross sectional study of 200 post-menopausal females attending the out-patient Department of Ophthalmology.

Inclusion Criteria

All the post-menopausal women between 50 years and 65 years of age are taken for the study.

Exclusion Criteria

1. Patients suffering from eyelid burns, lid abnormalities.
2. Patients suffering from HIV
3. Patients with serious systemic illnesses
4. Patients with pterygium

Investigations

The tests done are Stare test, Slit lamp examination for conjunctival and corneal staining(fluorescein), TBUT, Schirmer test.

Ethical Issues

Patients will be having only slight discomfort with the lissamine green, fluorescein stain. They will be benefited if diagnosed early.

Purpose

To study the prevalence of dry eye in postmenopausal women in a hospital-based population.

METHODOLOGY

After taking informed consent, the age of the patient is recorded. A detailed history was taken.

Examination

Every patient is checked for thorough ocular examination under slit lamp for any confounding factors like lid abnormalities, Meibomian gland dysfunction, Conjunctival surface irregularities. They are examined for signs of dry eye like height of tear film, conjunctival congestion, LIPCOFs, epithelial keratopathy, filament army keratopathy & corneal thinning- marginal or paracentral.

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OBSERVATION AND RESULTS

200 post-menopausal females in the age group of 50 to 70 years were enrolled in the study from OPD, GGH Guntur over a period of 2 months.

1. Age Distribution:

50 to 60 years: 133 (66.5%)
60 to 70 years: 67 (33.5%)

2. Symptoms:

A. Discomfort:
- Mild environmental stress: 140 (70%)
- Moderate, episodic or chronic: 40 (20%)
- Severe, frequent, constant: 19 (9.5%)
- Disabling: 1 (0.5%)

B. Visual Symptoms:
- None, mild fatigue: 150 (75%)
- Activity limiting: 30 (15%)
- Constant: 19 (9.5%)
- Disabling: 1 (0.5%)

3. SIGNS:

A. Conjunctival Injection:
- None to mild: 180 (90%)
- Present/Absent: 19 (9.5%)
- Mild/Moderate: 1 (0.5%)

B. Corneal/tear Signs:
- None to mild: 154 (77%)
- Mild debris, decreased meniscus: 36 (18%)
- Filamentary keratitis, Mucus clumps, Increased debris: 9 (4.5%)
- Filamentary keratitis, ulcer: 1 (0.5%)

C. Lid/meibomian Glands:
- Meibomian gland dysfunction variability present: 165 (82.5%)
- Meibomian gland dysfunction frequent: 30 (15%)
- Trichiasis, Keratinization: 5 (2.5%)

4. Tests:

A. Conjunctival Staining:
- None to mild: 100 (50%)
- Variable: 72 (36%)
- Moderate to marked: 24 (12%)
- Marked: 4 (2%)

B. Corneal Staining:
- None to mild: 104 (52%)
- Variable: 68 (34%)
- Moderate to marked: 26 (13%)
- Severe punctate erosions: 2 (1%)

C. Tbut:

- Variable: 112 (56%)
- <= 10 seconds: 64 (32%)
- <= 5 seconds: 20 (10%)
- Immediate: 4 (2%)

D. Schirmer Test:

- Variable: 36 (18%)
- <= 10 seconds: 88 (44%)
- <= 5 seconds: 74 (37%)
- <= 2 seconds: 2 (1%)

DISCUSSION

Dry eye if neglected, can progress from mild fatigue/ activity limiting stage to severely disabling stage. Timely diagnosis and prevention are very much essential in all people and especially in post-menopausal women. Allergic conjunctivitis is a confounding factor. In most of the cases, the symptoms will be mild and hence will be neglected. Symptoms and signs of dry eye may not correlate. Hence, studying the prevalence of dry eye in post-menopausal women, and alerting them accordingly is always a better option.

In our study, out of 200 post-menopausal females, 82 were positive for dry eye, i.e. prevalence of 41%. This result is almost similar to Jaishree Singh et al's study which showed a prevalence of 44%[7], and Mohana Majumdar et al's study[8], which showed a prevalence of 43.44%. In our study, prevalence in rural areas was 51.77% , while in urban areas it was 48.23%. In a USA based study, residential area did not affect the prevalence. In our study, we relied upon "Dry eye disease severity grading system"- which includes all symptoms and signs.[9] In our study, out of 200 post-menopausal females, discomfort and visual symptoms were Mild- Level 1- in around 70%-75%, Moderate and activity limiting- Level 2- in around 15%-20% Frequent symptoms- Level 3- in around 9.5% Disabling symptoms in 0.5%.

According to this, 30% of the post-menopausal females, are having moderate to severe level symptoms. But 41% are found to have dry eye. This difference between symptoms and signs will be there in dry eye, due to the presence of many confounding factors. In Jaishree Singh and Ashok Kumar et al study[10], 49% were reported with symptoms of dry eye. But in our study, many of them have mild symptoms. Conjunctival injection and corneal/tear signs were present from mild to severe level in 20-23% of post-menopausal females.

Conjunctival and corneal staining were positive in 14% i.e. moderate to marked in severity (Level 3). This value is slightly higher than Jaishree et al study[7]. Ocular surface staining is very important in ocular surface integrity. In our study, we used Van Bijsterveld system with lissamine green for conjunctival staining and fluorescein for corneal staining. TBUT was <10 seconds (i.e Level 2,3,4) in 44% of Post-menopausal women, which is slightly higher than Jaishree et al study[7]. TBUT describes the stability of tear film. So, it has a critical role in diagnosis of dry eye. In our study, Schirmer 1 was <0.5sec(Level 3, 4) in 38% of post-menopausal women which is also slightly higher than Jaishree et al study[7]. This test is critical in the diagnosis of dry eye. MGD is frequently present in 15% of post-menopausal females, in our study(Level 3). Trichiasis and keratinization were present in 5% (level 4). This correlates with literature in Jaishree et al study[7].

CONCLUSION

Dry eye is mostly mis-diagnosed or under-diagnosed. Post-menopausal women, commonly land in dry eye due to alteration in sex hormones.

An incorrect diagnosis if made, and anti-allergics if prescribed, it may worsen.

In mild cases, lubricating drops may provide relief. In more severe cases, anti-inflammatory, immunomodulatory, and rarely, surgical interventions are required. So, early diagnosis and treatment is the key. Thus, having awareness about the prevalence of dry eye in post menopausal women is essential.

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