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Original Research Article

Clinical profile of patients with aqueous deficient dry eye

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ABSTRACT

Aim: The main objective of our study is to assess aqueous deficient dry eye in the study population consisting of various age and gender distribution and to identify the factors which are responsible for aqueous deficient dry eye.

Materials and Methods: All patients with dry eye presented to the eye care center in Telangana, in South India were examined in detail to know the demographics and risk factors responsible for dry eye. Patients who presented with dry eye were examined with detailed histories such as occupational history, family history, and drug and systemic history. These patients were also subjected to visual acuity, slit-lamp examination, Schirmer's test, fluorescein stain, and tear film breakup time. A prospective observational study was carried out on 200 patients over 12 months from July 2021 to June 2022.

Results: Demographics such as age, gender, occupation, patient symptoms, signs, associated systemic diseases, and investigations results were all evaluated.

Conclusions: Dry eye is one of the health problems which is more prevalent in the current digital world. Though it may appear as a minor issue it leads to a lot of discomforts to the patient eyes such as itching. Patients observed in our study were categorized into primary Sjogren syndrome, secondary Sjogren syndrome, and non-Sjogren syndrome. These patients were carefully evaluated and treated according to ocular signs and severity.

1. Introduction

The term dry eye is also known by various names such as dry eye syndrome, dry eye disease, chronic dry eye diseases, keratoconjunctivitis sicca, and aqueous deficient dry eye syndrome or evaporative dry eye disease. Dry eye is a multifactorial disorder that is usually associated with systemic diseases and medications. Dry eyes can be broadly classified into two categories such as aqueous deficient and evaporative. Severe dry eye leads to vision-threatening corneal complications such as punctate keratitis, filamentary keratitis, corneal thinning, corneal opacities, and superficial vascularisation. In our study, we are mainly going to focus on the aqueous deficient type. The purpose of this study is to assess aqueous-deficient dry eye in the study population of 200 patients at Government General Hospital, Suryapet in Telangana, South India consisting of various ages, gender, and demographic distribution. Our study also focuses on identifying factors that are responsible for aqueous-deficient dry eye.

2. Materials and Methods

A prospective observational study was conducted on 200 out-patients presenting with complaints of dry eye in the Ophthalmology department at Government General Hospital, Suryapet from July 2021 to June 2022. Patients

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diagnosed with aqueous deficient dry eye are included in our study, while patients with lid abnormalities, meibomian gland diseases, non-compliant patients, contact lens wearers, postoperative patients, and patients using systemic medications like anti-histamines, and antidepressants are excluded. Written informed consent was obtained from all patients for the detailed eye examination. A detailed history of the patient was taken including complaints, occupational history, family history, ocular history, drug history, and systemic history. Best corrected visual acuity using Snellen's chart or E chart, slit-lamp examination, Schirmer test, fluorescein stain, and tear film breakup time was done. Basic investigations like blood sugars, blood pressure, and x-ray joints to find out risk factors such as hypertension, diabetes mellitus, rheumatoid arthritis, and Sjogren syndrome were done.

Table 1: Clinical profile

S.No.	Clinical profile (study sample 200 patients)		Number of patients (%)
1.	**Age**	20-29	30 (15%)
		30-39	48 (24%)
		40-49	60 (30%)
		50-59	38 (19%)
		60-69	24 (12%)
2.	**Gender**	Male	54 (27%)
		Female	146 (73%)
3.	**Place**	Urban	114 (57%)
		Rural	86 (43%)
4.	**Occupation**	Daily labourer	24 (12%)
		Farmer	54 (27%)
		Housewives	50 (25%)
		Office worker	50 (25%)
		Student	22 (11%)

3. Results

A total of 200 aqueous deficient dry eye patients who are fulfilling the inclusion and exclusion criteria were examined and analyzed. Out of 200 patients, 146 (73%) were female, and 54 (27%) were male. The age group included in our study was between 20 and 70years, the mean age being 44 years. Most of them belonged to the age group of 40 to 49 years. The age group 60-70 years was least affected. Most of the patients were from urban areas 114 cases (57%) while the patients from rural areas were 86 (43%). In our study, we have categorized patients based on occupations, among them farmers 54 (27%) were most affected followed by office workers and housewives. The clinical profile, demographics, and various systemic risks are in Table 1.

Table 2: Systemic associations

S.No	Systemic associations		Number of Patients (%)
1.	**Syndromes**	Sjogren syndrome	
		Primary	20 (10%)
		Secondary	38 (19%)
		Non-sjogren syndrome	142 (71%)
2.	**Dry Mouth**	Present	68(34%)
		Absent	132 (66%)
3.	**Systemic Diseases (n=140) (70%)**	Diabetes mellitus	38 (19%)
		Hypertension	34 (17%)
		RA	22 (11%)
		Sjogren Syndrome	20 (10%)
		SJS/TEN	14 (7%)
		SLE	6 (3%)
		TED	6 (3%)

Table 3: Ocular manifestations

S.No	Manifestations		Number of patients (%)
1.	**Ocular surface symptoms**	Foreign body sensation	43 (21.5%)
		Itching	52 (26%)
		Dryness	34 (17%)
		Redness	33 (16.5%)
		Ocular pain	22 (11%)
		Photophobia	16 (8%)
2.	**Ocular Surface Complications (n=118) (59%)**	SPK	58 (29%)
		Corneal opacities	35 (17.5%)
		Filamentary keratitis	11 (5.5%)
		Superficial vascularisation	14(7%)

Table 4: Investigations

S.No	Investigations		Number of patients (%)
1.	Schirmer (MM)	0-5 mm	58 (29%)
		6-10 mm	142 (71%)
2.	Fluorescein staining	Positive	86 (43%)
		Negative	114(57%)
3.	Tear film break up time (TBUT)	<10 SEC (abnormal)	73 (36.5%)
		>10 SEC (Normal)	127 (63.5%)

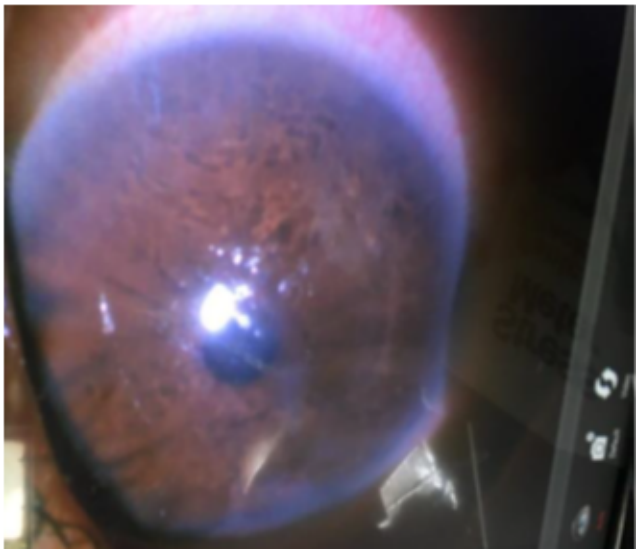

Fig. 1: Dry eye

Fig. 2: Patient with RA

Fig. 3: Schirmer test strips

Fig. 4: Schirmer test

4. Discussions

Dry eye is defined as a disorder of tear film due to tear deficiency or excessive tear evaporation which causes damage to the interpalpebral ocular surface and is associated with symptoms of ocular discomforts.[1] In our study, itching was found to be more followed by foreign body sensation and dryness. These symptoms are more severe and persistent in Sjogren syndrome than in Non-Sjogren syndrome. Aqueous deficient dry eye can be further classified into Sjogren syndrome dry eye (primary and secondary) and Non-Sjogren syndrome dry eye.[2] In our study, 58 patients were found to have SS (out of which 20 were primary and 38 were secondary) and 142 patients were found to have Non-SS. (Figure 1)

The problem of dry eye and dry mouth increases with age and in systemic diseases such as hypertension, diabetes mellitus, and connective tissue diseases.[3] Most of the drugs used in these systemic diseases affect the hydration of ocular and oral surfaces. These are influenced by immunological processes that lead to an inflammatory reaction in the oral mucosa.[4] In our study, a total of 68 dry eyes patients were found to have evidence of associated dry mouth.

In our study, diabetes mellitus was present in 38 patients (19%) followed by hypertension in 34 patients (17%). The

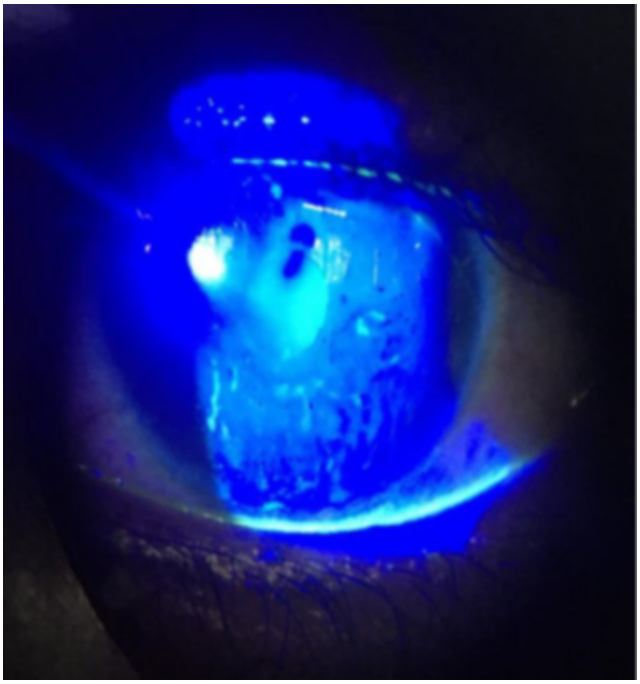

Fig. 5: Fluorescein stain dry spots (TBUT < 10 SEC)

mechanism for dry eye prevalence in diabetes mellitus is unclear. Autonomic dysfunction, poor glycaemic control, and aldose reductase which is the involved in sorbitol pathway may be involved.[5] Other systemic diseases like arthritis (11%) (Figure 2), thyroid disorder (3%), and SJS (7%) damage the lacrimal functional unit by lymphocytic infiltration. (Table 2)

Corneal complications are usually present in severe forms of dry eye syndrome with Sjogren syndrome leading to vision loss. In our study, 118 patients had corneal signs, superficial punctate keratitis (58%) was found to be more prevalent followed by corneal opacities (35%). Patients with Sjogren syndrome had more progressive corneal signs compared to Non-Sjogren syndrome.[6] Therefore, early differentiation is of utmost importance to prevent vision-threatening complications. (Table 3)

There is no gold standard diagnostic test for dry eye disease. A combination of a thorough history, diagnostic tests, and systemic risk factors workup help to determine and diagnose dry eye. In our study, clinical diagnosis was made based on typical symptoms with Schirmer test value <10mm, fluorescein staining, and reduced tear film breakup time less than or equal to 10 seconds.[7] Symptoms constitute an important part in the assessment of any disease process and dry eye is no exception. However, studies have also shown a poor association between the sign and symptoms of dry eye. In our study, 58 patients (29%) had Schirmer's between 0 to 5 mm while the remaining 142 patients (71%) had between 6 to 10 mm. (Figures 3 and 4) Fluorescein staining represents one of the most frequently used methods. In our study 86 patients (43%) had positive results either in one or both eyes which are indicative of ongoing damage to the eyes, the remaining 114 (57%) patients had negative results. Tear film breakup time is a practical method of assessing the stability of tear film. Normal tear film breakup time is greater than 10 seconds.[8] (Figure 5). TBUT is reduced in patients who have severe aqueous deficiency and mucin deficiency. In our study, 73 patients had abnormal or less than 10 seconds of TBUT. (Table 4)

All patients in our study were treated with artificial tears. It provides an environment in which the epithelium can recover its normal structure and function.[9] Patients are educated about risk factors, and medications that worsen dry eye and informed about environmental, lifestyle, and dietary modifications. In our study, patients with Sjogren syndrome had more severity and signs, these patients are treated with preservative-free topical lubricant eye drops.[10] Topical cyclosporine and topical tacrolimus were recently approved by FDA. These are more potent than traditional lubrication eye drops which are reserved for advanced cases. Punctal plugs and topical mucolytics were also advocated for patients. Patients with Non-SS showed good responses to carboxymethylcellulose or Hypromellose and lifestyle and environmental modifications. Patients with corneal complications were recommended amniotic membrane transplantation or limbal stem cell transplantation.[11]

5. Conclusion

The prevalence of dry eye in our study increases with age and was significantly higher in people more than 40 years of age. Female patients had more prevalence of aqueous deficient dry eye. Women approaching menopause were found to have more prevalence of aqueous deficient dry eye because of hormonal deficiency leading to change in the lacrimal gland. Therefore, the patient's age was of considerable importance as aqueous deficient dry eye is more common in elderly people.[12] Proportion of non-Sjogren syndrome patients outweighs the Sjogren syndrome. Primary Sjogren syndrome had more ocular surface signs and symptoms with significantly less Schirmer's test and less TBUT than that of secondary Sjogren syndrome or non-Sjogren syndrome. Therefore, all patients with aqueous deficient dry eye should be carefully evaluated to rule out primary Sjogren syndrome as it causes more ocular surface damage than that secondary and non-Sjogren syndrome patients.

6. Source of Funding

None.

7. Conflict of Interest

The authors declare that there are no conflicts of interest in this paper.

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