Research Paper

Volume : 3 | Issue : 9 | September 2014 • ISSN No 2277 - 8179

Assessment in the Level of & Solids (Various Lipoproteins) in Disease Corneal Eye (Dry Eye) as Compared to Normal Through Chod-Pod Method of Visual Colorimetery

Medical Science

KEYWORDS : LDL low density lipoprotein ,HDL high density lipoprotein,VLDL very low density lipo protein,Tg triglycerides

Tandon Anupama, MS	Associate Professor, UP Rural Institute of Medical Science & Research, Saifai
Omar Balram, MD	Associate Professor, All India Institute of Medical Sciences & Research, Rishikesh
Panday Achyut, MD	Assistant Professor, UP Rural Institute of Medical Science & Research, Saifai

ABSTRACT

Aim- Main aim was to find out lipid layer of the tear film as the main cause of dry eye in the patients aged 41-60 yrs in tropical and subtropical areas in North Rural India

Materials and Methods:
Study Design : Observational comparative.
Methodology:50 subject including 25 cases of dry eye and 25 (N) Cases serving as control were taken between February 2009 and November 2012 with a minimum follow up of 6 months , ages between 40 to 60 yrs. were included .Complete history and diagnostic evaluation & findings in each visit were noted. Treatment protocol and results were noted.Sturdy maintained cold chain was done to get accurate results.Management of cases was done accordingly.
Results: There were 25 cases of dry eye aged 41-60 years in which lipoproteins were estimated. Among subgroups(41-50yrs) ,(51 -60 yrs) all parameters were significantly higher for age group 51 to 60 yrs except LDL. But with the same age group all the parameters were decreased in dry eye cases with the main role of HDL and LDL .5 cases were treated with punctal occlusion and cyclosporins. Apart from lubricants and gels used in all patients, the disease went into remission .Only one case was a failure in which visual acuity dropped with positive Rose Bengal stain and a increase in IgG/IgM levels was found
Conclusion :Dry eye Syndrome is a chronic condition and has no real cure. It is apparently a benign condition with an intractable course. Punctal occlusion combined with cyclosporine A drug therapy with maintenance of cold chain can be an effective treatment in severe dry eye in rural areas.

Introduction

Dry eye is the disorder of the tear film due to tear deficiency or excessive tear evaporation that causes damage to the interpalpebral ocular surface and is associated with the symptoms of ocular discomfort (5).Dry eye includes a variety of pathologic conditions characterized by abnormalities of the preocular tear film resulting in ocular surface damage. These disorders have grown substantially in the last decades (1 0)(13) The dry eye syndrome is certainly the most important disorder. It is characterizedby hypo secretion of a fragmented tearfilm that leads to altered metabolism of the corneal epithelium and dehydration of the corneal epitheliumand conjunctiva.(10)(13)

The lipid abnormality is mainly due to meibomian gland dysfunction either as a result of increased age or decreased secretion due to any pathological cause (4).Currently there are only a few studies of the detection of various lipoproteins in tears. To the best of my knowledge there are no reports for the comparison of various lipoproteins levels in tears of normal and diseased eye using CHOD –POD method of visual colorimetery.

Recent research has elucidated the lacrimal gland structure as containing two mucin secreting systems that serve to protect ocular surface, one is produced by the corneal and conjunctival epithelial cells(2). Outer glycocalyx cell and other highly hydrated mucin produced by the goblet cells (9) This method is easy, quick and available as commercial kits. Highly sensitive and high resolution. It can also be used as a tool to detect the immune system in the eyes as the tear lipid layer as a part of basic immune system.The present study has been undertaken to evaluate and analyze the biochemical composition of the tears in whichthe decreased lipoprotein i.e. lipid layer can serve as the main cause of the dry eye. This also deals with an early detection and thus treatment of the disease(5).There is growing evidence in literature that with increasing age the level of lipid decreases as a functional deformity of meibomian glands to secrete (4).In recent years cyclosporin A is fast becoming the preferred modality for most people > 40 years of age.(6)

Aim

The aim of the study was to find out the cause of dry in the patients aged 41-60 year in tropical and subtropical areas. It was also to evaluate the lipid layer of tear film as a cause of dry eye by detecting total cholesterol and total TG in tear film co relating with meibomian gland dysfunction.

Material and Methods. This observational comparative study includes 25 case of dry eye and 25 eyes of normal subject serving as control who attended the OPD of UP Rural Institute of Medical Sciences for an eye examination from February 2009 toNovember 2012. The normal subjects were selected by the systematic random method after obtaining acceptance of Medical Etical Committee.. The subject were from age group 40-60 year divided into 2 subgroups of first 40-50 years and second 51-60 years.Exclusion criteria were history of glaucoma , trauma, active ocular disease, any previous ocular surgery and systemic diseases with ophthalmic repercussions.All subjects underwent general ocular examination in a room with 32˚C temperature and 101 lux meter intensity.

Criterion fixed for considering the subjects eye as dry eye were

1- Tear film break up time <10secs.
2- Positve Rose Bengal stain in palpebral area.
3- Schirmer's test between 5-10 mm
4- Tear film test containing small and thicker ferns

The 50 cases were subject to estimation of lipoproteins by enzymatic method through commercially available kits of Liquizone company based on CHOP-POD method.

VLDL and LDL were calculated using indirect method of estimation.

VLDL= (Total glycerides) /5
LDL= (Total cholesterol)-(HDL+VLDL)
Total cholestrol, total TG and HDL were estimated through kits.

The sample was collected through micropippet on slit lamp under aseptic conditions and the sample was directly implanted on kit with no preservative used. These evaluations were made on

kit colorimeter intensity chart provided to us based on the principle "intensity of light absorbed by the solution is directly proportional to the concentration."

Results:

Comparison of 25 cases of dry eye with 25 cases of normal eyes from peripheral rural areas in North India were included in the study. Screening of cases was done for exclusion (criteria already mentioned). Systemic examination was done to rule out any systemic disorder's ,Sex criterion is excluded. The mean age of patients was taken into 2groups ≈ 45 (41-50 years) and second ± 55 (51-60yrs). The patients were followed up for a mean period of 1year 8 months. Table shows the demographic and clinical characteristics of the cases included in the study. All patients had symptoms interfering with their daily activities. If we compare the subgroups in the table for difference in the levels,it was not significant The difference for total cholesterol was 0.77mg/dl, total triglycerides was 0.65mg/dl, HDL was 1.64 mg /dl, LDL was - 1 mg /dl and VLDL, -0.37mg/dl . All parameters were significantly higher for the age group 51-60 yrs but LDL was more in age group41-50 years (Table I)(3).

Statistical analysis was done using SPSS version and statistical significance was defined as P values <0.05 with student t-test. Above parameters did not show any significant changes (as P>0.05) If the comparison is made with the same age group (41-50 yrs) between normal and diseased cases, significant changes were noted.

These parameters were significantly decreased in dry eye cases

TC(≈5.25mg/dl≈36.45%) Tg (6.23mg/dl ≈38.2%) HDL (2.3mg / dl ≈50.54%) (13), LDL (5mg /dl≈62.68%) V LDL (3.08mg /dl ≈ 57.39%) . The p value drops were significant <0.0 1.(10) (13)

If the age groups 51-60 years were considered the same results were noted TC (6.6mg /dl ≈39.24% change) TG (6.97mg/dl≈41.02% change)HDL (4mg/dl ≈ 66.30% change) LDL (5.16mg/dl% ≈59% change) LDL (1.92mg/dl≈67.39% change).

The main role in dry eyes was of the HDL and LDL (9). Out of 25 cases all cases were treated with lubricant drops,(10) gels, but 5 cases required cyclosporine A . Before cyclosporine A treatment these cases were treated by permanent punctual occlusion as they did not respond well to lubricant drugs.(6) Cornea cleared gradually but clearing from nasal side was very gradual. In these cases there was positive Rose Bengal staining but schirmer's test and fern test were within normal limits. This was the last criterion for cyclosporine A to be started. Only 2 patients out of 5 were found immunoglobulin positive with increased IgG /IgM levels(esp. test by ELISA) Subjective visual recovery was felt in 88% cases with improvement of one line in Snellen's chart in almost 21 cases. 3 cases denied any improvement and in 1 case the VA decreased. One case of dry eye was labeled as a failure with post treatment decline in vision and increased scarring and redness. We have not taken surgical procedures as there were not possible in remote rural areas.

Discussion :

Dry eye syndrome is a chronic condition and currently has no real cure .It is a apparently a benign condition with an intractable course .This is often a frustrating for the sufferers and unrewarding for the ophthalmologists.yet timely therapy after early recognition usually helps to avert late complications (12). Despite good result in this study the need for a safe and effective alternative to the present treatment with lubricants and gels in form of topical lipid substitute is required to prevent visually incapacitating degenerative disease of cornea(6). This is especially required in rural places where the compliance and long term follow up of the patient is doubtful. Since more than 95% cases of my study were from a rural setting but still I preferred a controlled study keeping in mind the social status, state of ocular hygiene and increased chances of corneal infection over a less protected cornea by insufficiently immune tear bed . In this study we obtained subjective success in 72% cases and objective in 20%cases. Objective improvement of vision was obtained in 21 cases out of 25, one patient denied subjective improvement. 3 cases had a statisco. The overall subjective success as regards symptoms were also more than objective. This difference may in part be caused by the surface irregularity in such patients.It is observed that there was a significant decrease in all the biochemical parameters from our control group to the dry eye patients. This drop was more pronounced in the more elderly subgroup (51-60 years). (3)Observation made by Scot E. Moss, Ronald Klein and Barbara E.K. Klein MD (2000) (1) also revealed in dry eye with age. Within the subgroups there was no significant change irrespective of the fact from which group it was taken. These results can also be explained on the basis of life style, working condition and climatic condition . It is same as noted in Indonesia (Lee.G Crazzard, Koh, Widjaja, DTH Jan 2001) It was through their study we can say Dry Eye was more common in the tropical climatic conditions that can be as a result of allergy. The severity of dry eye was the direct result of the decrease of lipid levels found in the biochemical parameters. (Yokoi,Takehsa Kinoshita -1996) . They concluded that tear lipid layer interference patterns are highly correlated with dry eye severity. It concluded that lipoproteins and lipids are very important for maintenance of normal vision. All these patients suffered from meibomitis and gland dysfunction which was a cause of dry eye (Goto et al 2003) Sehirmers level decreased from control to dry eye patients as it is also evident from the reference by M. Ronalds,Refpjo , Kanyon (1983).

Conclusion:

Dry eye Syndrome is achronic condition and has no real cure. (5) It is apparently a benign condition with an intractable course. This is often frustrating for the sufferers and unrewarding foe the Ophthalmologist.(9)Yet ultimately therapy after early recognition usually helps to avert late complications. Quantitative analysis of corneal topography and surgeries including lacrimal gland though preferable for this study, was not possible owing to lack of necessary equipment for the same in the remote rural set up. The learning curve for the diagnosis, treatment and follow up was steep and no major hindrances encountered. The procurement of the diagnostic kit, drugs and maintenance of cold chain for dry was not easy in the rural area for 100% results. Punctal occlusion combined with cyclosporine A drug therapy with maintenance of cold chain can be an effective treatment in severe dry eye in rural areas.(6)

Table I: Showing comparison of age groups and disease eye

	Age 41 to 50 year			Age 51 to 60 Years			P value n= .05	Change from normal mg/dl
	Normal eye	Diseased	% Change	Normal eye	Diseased	% Change		
Total cholesterol	16.05mg/dl	10.2mg/dl	36.45%*	16.82mg/dl	10.22mg/dl	39.24%*	0.01	0.77
Total triglyceride	16.32mg/dl	10.09mg/dl	38.2%*	16.97mg/dl	10.01mg/dl	41.02%*	0.01	0.65

HDL	4.65mg/dl	2.3mg/dl	50.54%*	6.29mg/dl	2.12mg/dl	66.3%	0.005	1.64
LDL	8.4mg/dl	3.0mg/dl	62.68 %*	7.04mg/dl	2.88mg/dl	59.0%*	0.005	-1
VLDL	3.08mg/dl	1.4mg/dl	54.54%*	3.45mg/dl	1.47mg/dl	67.39%*	0.005	-0.37

REFERENCE

1. Scot E.Moss, MA ; Ronald klein , MD. Barbara E.K Klein. MD- " Prevalence of and risk factors for dry eye syndrome" _ Arch ophthalmol, 2000; 118: 1264-1268. | 2. Holly FJ, Lemp MA- " Tear physiology and dry eyes" . Surv ophthalmol 1977:22:69-87. | 3. Schein OD, Munoz B, Tielsch JM, et al.-" prevalence of Dry Eye among the elderly" Am J ophthalmol1997: 124: 723 – 728. | 4. Mc culley Jp , Shine WE-" Meibomian gland and tear film lipids: Structure, function and control"- Adv Exp Med Biol 2002;506:373- 378. | 5. Stern ME, Beuerman RW, Fox RJ, et al.- "The Pathollgy of Dry eye: the interaction between the ocular surface and lacrimal glands"- Cornea 1998;17:584-589. | 6. Perry HD, Donenfeld ED.- "Dry Eye diagnosis and management in 2004"Curr Opin Ophth 2004;15:299-04. | 7. DT, Dohlmon CH EDITORS: Smolin and Thoft's the cornea scientific Foundations and clinical practice.New York. 2005:601-27. | 8. Debra A. Schaumberg: Julie Burning : David A. Sullivan – "Hormone Replacement Therapy and Dry Eye syndrome" JAMA Vol.286 No.17, (November 7,2001) | 9. Lemp MA. Report of The national eye institute/industry Workshops on clinical trials in the dry eyes. CLAOJ 1995: 21:221-32. | 10. RISK FACTORS FOR OCULAR SURFACE DISORDERS IN PATIENTS WITH TYPE 2 DIABETES. CLARA GRAZIA CHISARI, EDOARDO STAGNI*, MARCO DI MAURO**, MAURIZIO DI MAURO**, MARIA GIORDANO***, SALVATORE SEBASTIANO FICHERA***, MASSIMO MOTTA***, ELEONORAMARGHERITA CHISARI***, GIUSEPPE CHISARI Center of Ocular Microbiology, Department of Bio-Medical Science, University of Catania -*Cinical Distefano Velona- Catania - **Department of Internal Medicine and Systemic Diseases -***Great Senescence Center, University of Catania |