"CLINICAL STUDY OF OCULAR MANIFESTATIONS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS."

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LIST OF ABBREVIATIONS:-

BRAO	-	Branch retinal artery occlusion
BRVO	-	Branch retinal vein occlusion
CSME	-	Clinicallly significant macular edema
CWS	-	Cotton Wool spot
DCCT	-	Diabetes control and complication trial
DM	-	Diabetes Mellitus
DRS	-	Diabetic Retinopathy Study
ETDRS	-	Early Treatment Diabetic Retinopathy Study
FAZ	-	Foveal avascular zone.
H/Ma	-	Hemorrhage/microaneurysm
HRC	-	High risk characteristics.
IOP	-	Intra ocular pressure
IRMA	-	Intra retinal microvascular abnormalities
IDDM	-	Insulin dependent diabetes mellitus
NIDDM	-	Non insulin dependent diabetes mellitus
NPDR	-	Non proliferative diabetic retinopathy
NVD	-	New Vessels on disc
NVE	-	New vessels elsewhere in the retina.
NVI	-	New vessels in the iris
NVG	-	Neovascular glaucoma
PDR	-	Proliferative diabetic retinopathy
POAG	-	Primary open angle glaucoma.
PSC	-	Posterior SubCapsular Cataract
RD	-	Retinal detachment
WESDR	-	Wisconsin Epidemiologic Study of Diabetic Retinopathy
VTDR	-	Vision Threatened Diabetic Retinopathy

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ABSTRACT

Background & Objectives

Diabetes is a metabolic disorder characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both. [1]

The World Health Organization (WHO) estimates that worldwide, there are currently 220 million people living with diabetes. Diabetes is becoming an important chronic disease in India. Infact, India is infamously known as the Diabetes Capital of the World. In 2011, India had 62.4 million people with type 2 diabetes, compared with 50.8 million the previous year, according to the International Diabetes Federation (IDF) and the Madras Diabetes Research Foundation. The nationwide prevalence of diabetes in India now tops 9%.

The most significant complication of diabetes mellitus involving the eye and which develops in 85% to 100% of all diabetes eventually is retinopathy. Prevalence of all types of Diabetic Retinopathy depends on the duration of diabetes & level of glucose control.[2] A wide spectrum of ocular conditions other than diabetic retinopathy is associated with diabetes. Significant attention is paid to the retinal complications of diabetes mellitus and their potentially devastating effects on vision. Diabetes mellitus, however, is a multisystem disease, and diabetic eye disease is an end-organ response to the effects of the condition on the human system. Each portion of the eye is susceptible to the harmful effects of diabetes.[3]

Diabetic eye disease refers to a group of eye problems that people with diabetes may face as a complication of diabetes ranging from subtle lid xanthomas to vision threatening condition. This clinical study of ocular manifestations of patients with type

2 diabetes mellitus is undertaken in view of large spectrum of diabetic eye disease apart from diabetic retinopathy.

Aims and Objectives of this study were

- To determine the common ocular manifestations in diabetes.
- To determine ocular manifestations relating to duration of diabetes and severity of the diabetes

Methods: This is a prospective observational study on patients attending outpatient department and those referred to department of Ophthalmology at B.L.D.E. University's Shri B.M. Patil Medical College Hospital and Research Centre, Bijapur Karnataka from October 2012 to 31st march 2014 fulfilling the inclusion and exclusion criteria.

Results: Diabetic retinopathy was the most common ocular complication occurring in diabetes subjects (36.8%). The prevalence of cataract was 35.4% followed by glaucoma (4.6%) and other ocular pathologies like conjunctivitis, recurrent styes, dacrocystitis, etc. The strongest predictor for the prevalence of retinopathy in persons with type 2 diabetes is the duration of diabetes and was proven statistically significant. Both prevalence and severity of retinopathy correlates with HBA1C level in our study group. The most common type of cataract found was cortical type (41.2%) followed by senile posterior cortical (29.8%). In general, the visual prognosis following cataract surgery in diabetic patients is favourable. Diabetes predisposes to infection in different body parts, and ocular structures are not an exception.

Interpretation & Conclusion :

Diabetic retinopathy was the commonest ocular complication of diabetes, followed by cataract and primary open angle glaucoma. The prevalence and severity of diabetic retinopathy was higher in patients with longer duration of diabetes.

Key words: ocular complications, diabetes, diabetic retinopathy, cataract.

INTRODUCTION

In recent decades, diabetes mellitus has progressed from a disease affecting primarily people in developed countries into a true worldwide epidemic. The World Health Organization (WHO) in 1999 defined diabetes mellitus as "a metabolic disorder of multiple etiology characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both." The effects of diabetes mellitus include long term damage, dysfunction and failure of various organs, resulting from microvascular and macrovascular complications.[4]

It is estimated that in 2005 nearly 200 million people worldwide had diabetes mellitus. Most of these patients are classified as having type 2 diabetes mellitus and the metabolic syndrome. Most of the increase in total numbers of diabetic patients is expected to occur in developing countries. Worldwide, about 300 million people are expected to have diabetes by 2025, affecting 5.4% of the world's population .[5] Changing dietary and exercise trends appear to play a major role in the increasing prevalence of diabetes mellitus.

India is infamously known as the Diabetes Capital of the World. In 2011, India had 62.4 million people with type 2 diabetes, compared with 50.8 million the previous year, according to the International Diabetes Federation (IDF) and the Madras Diabetes Research Foundation. The nationwide prevalence of diabetes in India now tops 9%. By 2030, India will have 100 million people with diabetes.[6] Diabetes Mellitus being a lifestyle disease, is on the rise in urban areas; Shankar Nethralaya reported that the

prevalence of Diabetes Mellitus in the population older than 40 years, in urban India, was around 28% in 2014.[7]

Diabetic eye disease refers to a group of eye problems that people with diabetes may face as a complication of diabetes ranging from subtle lid xanthomas to vision threatening condition. Some of these are not characteristic while others are pathognomonic for diabetes.

The most important complications are briefly listed as follows.[8]

- **Eyelids :** Xanthelasmata, Blepharitis, Recurrent hordeolum, eczema.
- **Conjunctiva :** Microaneurysms, Venous dilatation.
- **Cornea :** Folds of Descement's membrane, neurotrophic keratitis.
- **Iris :** Iritis, Iris pigments on lens,Rubeosis Iridis.
- **Pupil :** Rigid pupil, light near dissociation.
- **Lens :** Cataract, refractive errors.
- **Vitreous :** Vitreous haemorrhage, asteroid hyalosis.
- **Retina :** Diabetic retinopathy; retinal vein occlusion, Lipaemia retinalis.
- **Optic nerve :** Ischemic papillitis; Optic atrophy.
- **Extra-ocular Muscles :** Palsy caused by 3rd, 4th, 6th cranial nerve involvement.
- **Orbit :** Mucormycosis.
- **Intra-ocular pressure :** Primary Open angle glaucoma, Neovascular glaucoma.

Diabetic retinopathy is the most well known ocular complication of diabetes and the leading cause of blindness among people 20–64 years of age in the U.S.[9] It is also 6th most common cause of blindness in India (NPCB).

A Meta-analysis by Yau JVY [10] provides a global estimate of the prevalence of DR and the severe stages of DR (PDR, DME) using individual-level data from population-based studies worldwide. On the basis of the data from all 35 studies on more than 20,000 participants with diabetes, they estimated that among individuals with diabetes, the overall prevalence of any DR was 34.6%, PDR was 7.0%, DME was 6.8%, and VTDR was 10.2%. The prevalence of DR in the Chennai Urban Rural Epidemiology (CURES) Eye Study in south India was 17.6 per cent, significantly lower than age-matched western counterparts. [11]

Numerous studies have shown that the key to decreasing diabetic complications lies with strict glucose control. Intensive glucose control reduced the risk of developing retinopathy by 54%. Neuropathy was reduced by 60% and albuminuria by 54%, respectively. With regards to type 2 diabetes mellitus, the United Kingdom Prospective Diabetes Study (UKPDS) was a randomized clinical trial involving 3867 newly diagnosed patients with type 2 diabetes .[12] After 3 months of diet treatment alone, patients with a mean of two fasting plasma glucose concentrations of 6.1 to 15.0 mmol/L were randomly assigned to either an intensive glycemic control group or a conventional control group. This study showed a 21% reduction in risk for progression of diabetic retinopathy over a 12-year period in the intensive group. In addition, there was a 29% reduction in the need for retinal photocoagulation in the intensive group compared to the conventional group. Overall, there was a 37% reduction in the risk of an adverse microvascular complication with intensive control that was less strict than current guidelines.

The UKPDS study also demonstrated that glycemic control appears to diminish with time . Clearly, the best indicator of glycemic control continues to be hemoglobin

A1C (HBA1C). Skyler and associates have demonstrated that HBA1C levels correlate in a direct relationship with the relative risk of diabetic microvascular complications .[13] Strict glucose control, weight control, and exercise, remain the essential elements to prevent the complications of diabetic disease.

Treatment interventions at early stages of diabetic retinopathy can reduce burden of blindness due to diabetic retinopathy. With the available cost-effective methods of early screening, appropriate strategies/models need to be developed. Such models need to have a well-developed mode for screening, diagnosis and referral at each hierarchal level beginning from primary health centres to specialized institutes for eye care. The National Program for Control of Blindness of India recommends opportunistic screening for identification of diabetic retinopathy. Every opportunity of contact with high-risk cases for diabetes and/or diabetic retinopathy should be utilized for screening, diagnosis and referral. All the stakeholders including the private sector will need to play a role. Along with this, awareness generation and behaviour change amongst the diabetics and care support systems should also be part of the overall model. A major role can be played by community participation and improving the health seeking behaviour among diabetics in order to reach a larger population and increasing the compliance for continued care.

It is the responsibility of ophthalmology community in creating awareness in the society so as to prevent and or delay these complications and to treat them at the earliest. It is in this context, we have studied the prevalence of diabetic eye complications at our hospital.

AIMS AND OBJECTIVES

- To determine the common ocular manifestations in diabetes.
- To determine ocular manifestations relating to duration of diabetes and severity of the diabetes.

REVIEW OF LITERATURE

LITERATURE SURVEY:

- Negi et al. (2003) have found that recurrent styes and blepharoconjunctivitis are the first indications of diabetes and should prompt tests to exclude it. Xanthelasma, is commonly seen in diabetics, with associated hyperlipidaemia.[14]
- Morikubo S ,Takamura Y , have shown that Recurrent corneal erosions in patients with diabetes are usually posttraumatic and the result of apparently mild epithelial breakdown following cataract or vitreoretinal surgery and compared with nondiabetic eyes, eyes of patients with diabetes mellitus showed more damage in corneal endothelial cells due to cataract surgery and a delay in the postoperative recovery of corneal edema.[15]
- Kruse A, Thomsen et al. have reported in Diabet Med , in 2006 that diabetes is a risk factor for acute infectious conjunctivitis.[16]
- In the Blue Mountains and Beaver Dam Eye studies, participants with diabetes were twice as likely to have glaucoma. [17] Several large epidemiological studies have reported positive associations between diabetes with primary open angle glaucoma (POAG). Glaucoma occurs more often in patients with diabetes (5%) than in the general population (2%). The risk of glaucoma has been reported to be 1.6–4.7 times higher in individuals with diabetes than in nondiabetic individuals.
- Bonavas S, Peponis V et al. [18] did a meta analysis results suggest that diabetic patients are at significantly increased risk of developing primary open-angle glaucoma. Clinicians should be aware of this possibility.

- Data from the Framingham and other eye studies (1985) indicate a three to fourfold increased prevalence of cataract in patients with diabetes under 65,and upto a two fold excess prevalence in patients with 65.
- Numerous studies have documented an association between diabetes and cataracts. [15] This association is supported by an abundance of data from clinical epidemiological studies and basic science studies . Both cross-sectional and prospective data from three population-based studies, the Beaver Dam Eye Study, the Blue Mountains Eye Study, and the Visual Impairment Project, have documented associations between diabetes and both prevalent and incident posterior subcapsular cataract and, less consistently, with prevalent and incident cortical cataracts but not nuclear cataract . The Blue Mountains Eye Study showed that impaired fasting glucose, in the absence of clinical diabetes, was also a risk factor for the development of cortical cataract. There is additional evidence that the risk of cataract increases with increasing diabetes duration and severity of hyperglycemia . Deposition of advanced glycation end products in the lens has been postulated as one possible pathogenic mechanism for diabetic cataract[6]
- Knorz M C,university of heidelbery , Germany have studied that posterior capsular opacification is the frequent complication following extracapsular cataract extraction in diabetics patients.
- Scherzter, Wang et al have shown that between 32% and 43% of neovascular glaucoma cases are caused by proliferative diabetic retinopathy [19]

- Bandello F, Menchini F suggest that Diabetic papillopathy is a risk factor for the progression of diabetic retinopathy and, in rare instances, papillopathy can precede the development of AION.[20]
- Watanabe K showed that in one study 1% of patients with diabetes were found to have cranial nerve palsies, compared with only 0.13% of control subjects. In another population-based study, patients with sixth cranial nerve palsy were six times more likely to have diabetes.[21]
- Prevalence of Diabetic retinopathy in wisconsin epidemiology study of Diabetic retinopathy (WESDR) [22] was 50%. 35-39% in United Kingdom Prospective Diabetes Study (UKPDS) in Diabetes mellitus.

HISTORY

Essential diabetes mellitus was recognized as ‘madhumeha’ or ‘honey urine’and the symptoms of thirst; foul breath and languor was noticed by Sushruta in 5th Century A.D. [23]

Aretaeus; a follower of Hippocrates of Alexandria in 2nd Century A.D. gave the name Diabetes (a passer through; siphon like) to the disease. [23]

In 1778 John Rollo first noticed that the sufferers from diabetes mellitus are particularly prone to development of cataract.[24] Diabetic cataract was first described by Berndt in 1834.

In 1856, Jaeger first described the existence of specific retinal changes in the fundi of diabetes. [25]

Meckenzie in 1887 presented in clinical form and with complete post mortem pathologic data a beautiful picture of capillary microaneurysms; retinal and vitreous haemorrhage.

Nettleship in 1888 first drew attention describing retinal venous stasis, tortuosity and dilatation of retinal veins. [26] In 1890, Hirschberg presented the first comprehensive classification of diabetic retinopathy. He distinguished between exudation and hemorrhagic retinopathy.

In 1921 Sir Fredrick Grass Banting and Charles Herbert Best discovered and isolated

Insulin.[23]

Salus in 1928 described the condition of rubeosis iridis.[27]

Clinical application of fundus photography was made by Bedel in 1939 to analyse photographs of 20 diabetics.[28]

Friedenwald in 1950 introduced the Hotchkiss McManus technique of staining flat retinal preparation. Ashton in 1950 employed this technique and compared the lesions of retina and kidney in diabetics.[29]

Poulsen in 1953, Kinsel et al in 1954 and Fust et al in 1955 showed that post partum necrosis; hypophysectomy and adrenelectomy have all been followed by improvement in diabetic retinopathy. [30]

Rucker in 1958 found that 6% of the 335 isolated third nerve lesions and 4% of 409 isolated sixth nerve lesions were in diabetics. [31]

The introduction of photocoagulation by Meyer – Schwickerath in 1959 proved to be an important step in the management of diabetic retinopathy. [32]

In 1961; Novotny and Alvis introduced fundus fluorescein angiography. [33]

The past decades have witnessed major advances in the treatment and understanding of diabetes. The field has been greatly aided by organizational agreement on an upgraded terminology necessary to properly classify the heterogeneity of the diabetes syndrome.

By the 20th century end, the long term acrimonious debate over the value of good glycemic control of diabetes became resolved with the results of several large well designed and well executed clinical studies. However despite major improvement in the options for care and depth of research in affluent areas, this progress is dampened by the challenge seen in an increasing epidemic of diabetes throughout the world.

A. LIDS:

Blepharitis, recurrent hordeolum and eczema with poor healing tendencies occur in diabetes mellitus . In diabetics gangrene of the lid following hordeolum is an example. Yellowish plaques called xanthelasma which occur due to hyperlipidemia are also common in diabetics mellitus.[34]

B. CONJUNCTIVA:

Aneurysms [35] of the conjunctival blood vessels are found commonly in diabetics. The significance of conjunctival aneurysms is disputed.

C. CORNEA:

Several corneal abnormalities have been identified in patients with long standing diabetes mellitus. [36] Common corneal complications-

1. Superficial punctuate keratopathy
2. Recurrent corneal erosions
3. Persistent epithelial defect
4. Filamentary Keratitis
5. Neurotropic keratopathy
6. Tear film abnormalities
7. Infiltrates
8. Endothelial damage
9. Increased corneal thickness
10. Wrinkling of descemet's membrane (Waite-Beetham lines)

Diabetic patients may have significantly decreased corneal sensitivity, and the severity of the decreased sensitivity is usually correlated positively with the severity of retinopathy. Diabetes has also been reported to be associated with dry eyes, with the severity of dry eyes correlated positively with the severity of diabetic retinopathy. Intrinsic abnormalities of the epithelial basement membrane complexes and impaired epithelial barrier function predispose to superfi cial punctuate keratitis, poor epithelial wound healing after trauma, and persistent epithelial defects. Diabetic patients are prone to recurrent corneal erosions, especially after photocoagulation and vitrectomy.

The poor adhesiveness of the diabetic corneal basement membrane may be related to changes in biochemical composition induced by increased sorbitol and fructose produced by the aldose reductase pathway.

D.IRIS:

Diabetic individuals are prone to both morphologic and vascular alterations. Iris neovascularization (rubeosis iridis) is known to occur due to frequent occlusion of small vessels. It develops as tiny dilated capillary tuffs or red spots around the pupillary margin and may be missed unless examined carefully under high magnification. The new vessels grow radially over the surface of the iris towards the angle, sometimes joining dilated blood vessels at the collarette. At this stage intraocular pressure (I0P) may be still normal in some cases and the new vessels may regress either spontaneously with good metabolic control and panretinal photocoagulation of the retina. [37]

E. PUPIL:

A brisk near response and a sluggish direct response to light is called light near dissociation. The most common cause of light near dissociation is diabetes mellitus. The mechanism is not well understood but may represent a selective neuropathy that involves pupillomotor parasympathetic fibres.[38]

F. REFRACTIVE CHANGES:

Refractive changes are known to be associated with diabetes mellitus and these can be acute or chronic. Regarding chronic refractive changes in diabetic patients, Duke-Elder reported that hyperglycaemia led to the development of myopia, while hypoglycaemia led to the development of hyperopia. Several papers have reported an abrupt reduction in plasma glucose in diabetic patients with marked hyperglycaemia induced transient hyperopia.[39] It has been seen that the degree of hyperopia is highly dependent on the magnitude of the change in plasma glucose concentration. Lenticular swelling has been suggested as a cause of hyperopia in diabetic patients. In patients with diabetes mellitus, excess glucose in the crystalline lens is converted to sorbitol through the action of aldose reductase. Sorbitol, a sugar alcohol, has poor permeability through membranes and tends to accumulate in lens. [40] When the body rapidly changes from a hyperglycaemic to a hypoglycaemic state, sorbitol, which is less permeable and harder to metabolise, will remain in the lens longer. The difference in osmotic pressure results in the influx of water from the aqueous humour into the lens, causing lenticular swelling with hyperopic refractive changes.

G. LENS:

Diabetic lens is larger than normal, disposed to refractive changes and at increased risk of cataract.

Lens thickness

Lens thickness is greater in diabetics than in normal subjects due to cortical thickening. [41] Diabetic duration was found to be a highly significant determinant of lens dimensions, such that age-related dimensional changes for various biometric parameters were accelerated by between 52% and 121% after the onset of diabetes.[42] These lens changes are more pronounced in insulin dependent diabetes mellitus.

CATARACT IN DIABETES

Cataract in diabetic patients is a major cause of blindness in developed and developing countries. Recent basic research studies have emphasized the role of the polyol pathway in the initiation of the disease process. Population-based studies have greatly increased our knowledge concerning the association between diabetes and cataract formation and have defined risk factors for the development of cataract.

It has been shown that the intracellular accumulation of sorbitol leads to osmotic changes resulting in hydropic lens fibers that degenerate and form sugar cataracts. In the lens, sorbitol is produced faster than it is converted to fructose by the enzyme sorbitol dehydrogenase. The increased accumulation of sorbitol creates a hyperosmotic effect that results in an infusion of fluid to countervail the osmotic gradient.

Overall risk for cataract formation in diabetes patients is 2-4 times as compared to non diabetes subjects. [43] Posterior subcapsular cataracts are particularly common in diabetic patients than other morphological types of cataract. [44] In type 2 patients increased severity of retinopathy, diuretic usage, lower IOP, smoking, lower diastolic blood pressure was associated with higher incidence of cataract .[43] Typically these are snow flake opacities, polychromatic crystals and vacuoles in lenticular cortex. Mechanism behind the cataract formation has been implicates to be the sorbitol pathway.

Cataract Surgery in Diabetes:

In individuals with diabetes, cataract occurs at a younger age and progresses more rapidly, resulting in higher rates of cataract surgery at a relatively young age.[15] In the Wisconsin Epidemiologic Study of Diabetic Retinopathy, [22] the 10-year cumulative incidence of cataract surgery was 8% in those with type 1 diabetes and 25% in those with type 2 diabetes. Predictors of cataract surgery included older age, greater severity of diabetic retinopathy, and baseline proteinuria in type 1 diabetes and older age and use of insulin in type 2 diabetes.

While the overall outcomes of cataract surgery are excellent, patients with diabetes may have poorer vision outcomes than those without diabetes, and the worst outcomes may occur in operated eyes with active proliferative retinopathy or preexisting macular edema. To improve cataract surgical outcomes in patients with diabetes, adequate control of diabetic retinopathy with laser treatment before cataract surgery is necessary.

The most devastating postoperative complication is endophthalmitis, a severe intraocular infection.

H.ASTEROID HYALOSIS

These are innumerable small, white or creamy opacities in the vitreous which move through a limited range with the movement of the head. They consist of calcium containing acidific lipids which lie between the vitreous fibrils. A high frequency of diabetes has been found in groups of patients having asteroid hyalosis.[45]

I. DIABETIC RETINOPATHY

EPIDEMIOLOGY

Diabetic retinopathy is among the most common ophthalmic complication of diabetes mellitus. [46] Studies have reported that the prevalence of diabetic retinopathy in India varies from 20-31%. The estimates of the prevalence of diabetic retinopathy in India suggests that there may be nearly 5.6 million people with diabetic retinopathy in India .

Pathogenesis of DR

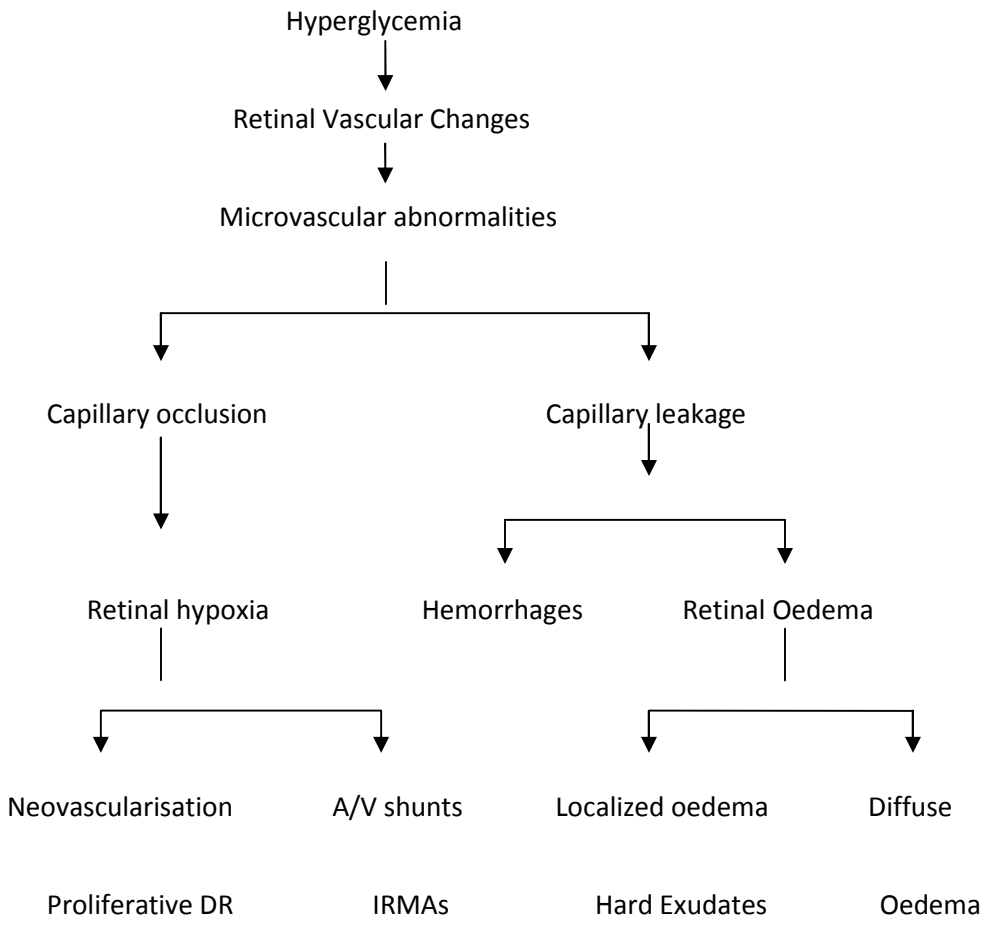


Table No. 1: Pathogenesis of Diabetic Retinopathy

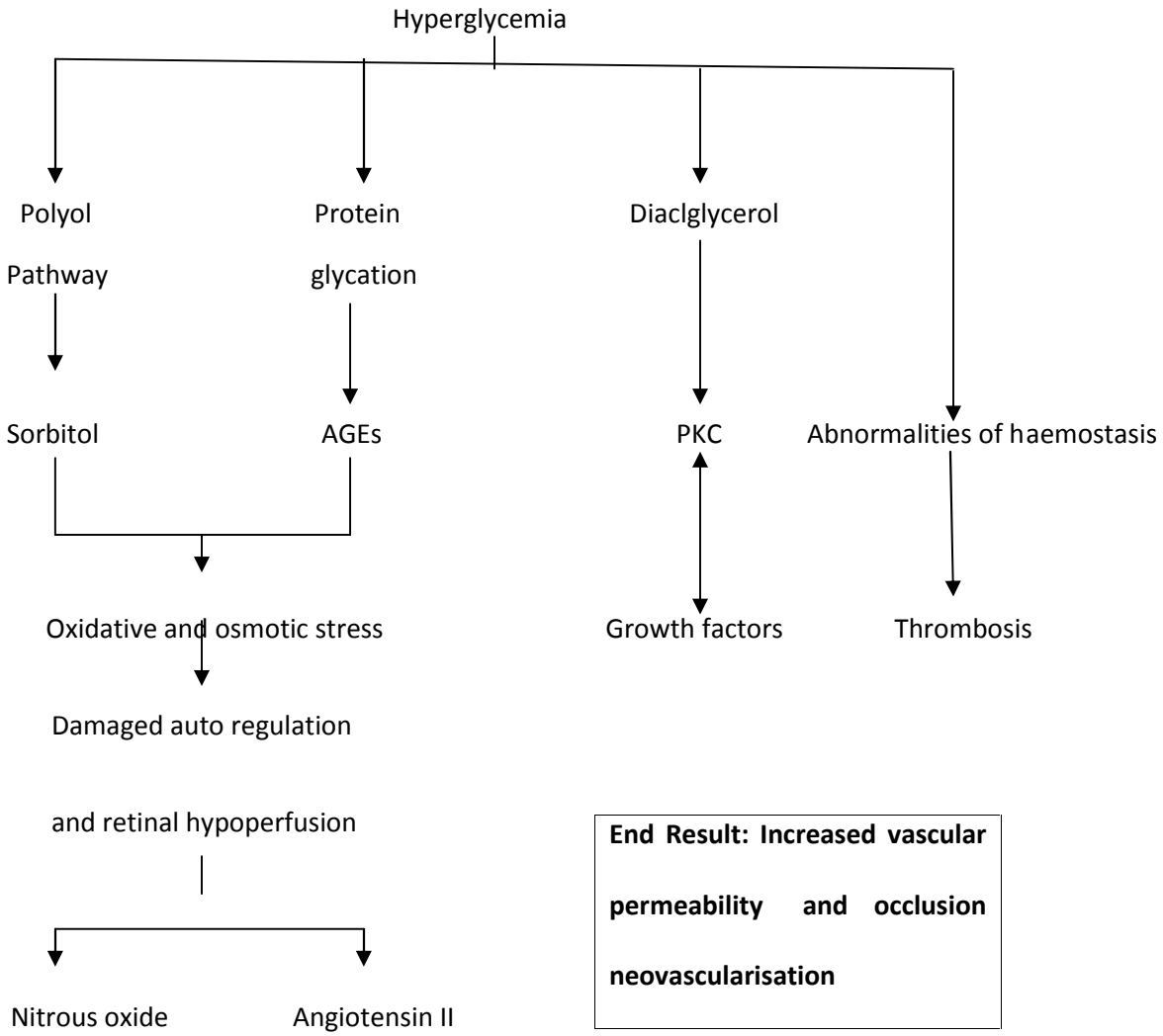


Table No. 2 : Effect of Hyperglycemia on pathogenesis of DR

CLASSIFICATIONS OF RETINOPATHY:

Many classifications have been proposed for diabetic retinopathy. Some of these are

I. Hirschberg's Classification :

In 1980 Hirschberg [47] recognised three following types

1. Inflammatory – characterised by spots and haemorrhages
2. Haemorrhagic
3. Pigmentary

II. Ballantyne and Michaelson's Classification:

Ballantyne and Michaelson [48] divided diabetic retinopathy into 5 stages

1. Microlesions –comprised of microaneurysms
2. Macrolesions –dot and blot haemorrhages
3. Vascular changes-Gross changes in veins
4. Destructive changes-intraocular haemorrhages, retinitis proliferans, RD,Glaucoma
5. Mixed forms- diabetic changes associated with arteriosclerosis and /or hypertension.

III. Scott's Classification : [49]

Stage 1a - capillary microaneurysms

Stage 1b - phlebosclerosis; loops; coils; or knots in distended veins

Stage 11a - punctuate haemorrhages with or without discrete flecks of exudates

Stage 11b - larger round or blot haemorrhages, with confluent exudates

Stage 111a - more numerous haemorrhages and exudates

Stage 111b - haemorrhage into the vitreous

Stage 1V - Retinitis proliferans, retinal detachment, gross degenerative changes.

IV. Alaert's and Slosse's Classification :

They suggested a classification [50] which allows the fact that in some cases there is preponderance of vascular whereas in others exudative lesions are seen, although in most cases they occur side by side.

V. Lee's Classification [51]:

1. Angiopathy type-venous dilation; microaneurysms, haemorrhage & neovascularisation
2. Exudative type
3. Proliferative retinopathy
4. Vitreous haemorrhage

VI. Duke Elder Classification[47] :

1. Pre retinopathic stage- characterised by uniform distension and turgescence of Veins
2. Simple diabetic retinopathy- characterised by microaneurysms, exudates, haemorrhage and venous changes.
3. Proliferative diabetic retinopathy- formation of new vessels in the retina and proliferation into the vitreous

VII. Peyman's Classification [52]:

1. Non proliferative/simple diabetic retinopathy- characterised by microaneurysms, dot and blot haemorrhages ,exudates.
2. Proliferative/malignanant diabetic retinopathy-characterised by new vessel and glial tissue proliferation.

VIII. Clinical classification of diabetic retinopathy-Kanski [53]:

1. Background diabetic retinopathy
2. Diabetic maculopathy- focal; diffuse; ischaemic
3. Pre proliferative diabetic retinopathy
4. Proliferative diabetic retinopathy
5. Advanced diabetic eye disease

- persistent vitreous haemorrhage
- retinal detachment
- opaque membrane formation
- neovascular glaucoma

IX. Modern ETDRS :

The ETDRS in the 1980s developed a staging system which is recognised as the gold standard for clinical trials. The ETDRS classification of DR[54] is based on the grading of fundus photography of seven stereoscopic fields and the severity of the retinopathy is determined after assessment of these photographs. Each ETDRS grade can predict the prognosis for developing sight-threatening retinopathy. In particular IRMA and venous beading have been identified as high risk for the development of PDR, and cotton wool spots are low risk. The ETDRS grading scheme is too complex to be easily used in clinical practice. Therefore an adaptation of the ETDRS classification is now widely used. This classification system translates features identified by ETDRS as high and low risk into clinical practice. The level of retinopathy represents the risk of developing sight threatening DR and is used to plan follow-up and treatment.

Levels of Retinopathy:

NPDR

A. Mild NPDR

At least one microaneurysm

Definition not met for B, C, D, E, F

B. Moderate NPDR

≥ Standard photograph Fig. No. 1

SE (CWS), VB, and IRMAs definitely present

Definition not met for C, D, E and F

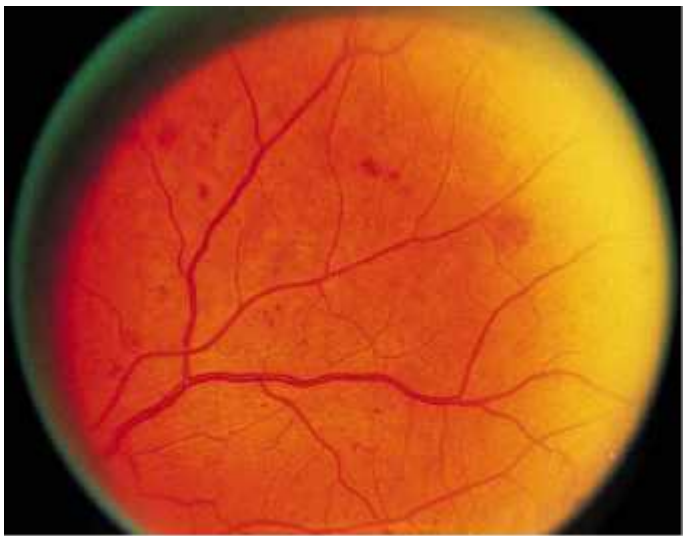


Fig No. 1 showing Moderate NPDR

C. Severe NPDR

H/Ma ≥ standard photograph Fig. No. 1 in all four quadrants

VB in two or more quadrants (Fig. No. 2)

IRMA ≥ standard photograph (Fig No. 3) in at least one quadrant

D. Very Severe NPDR

Any two or more of C

Definition not met for E, F.

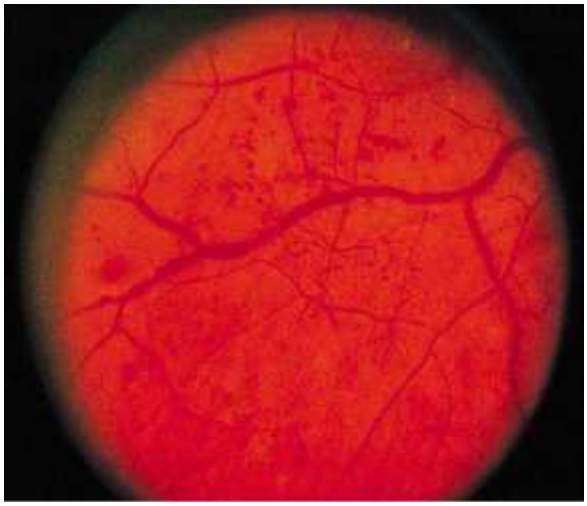


Fig No. 2: Severe NPDR

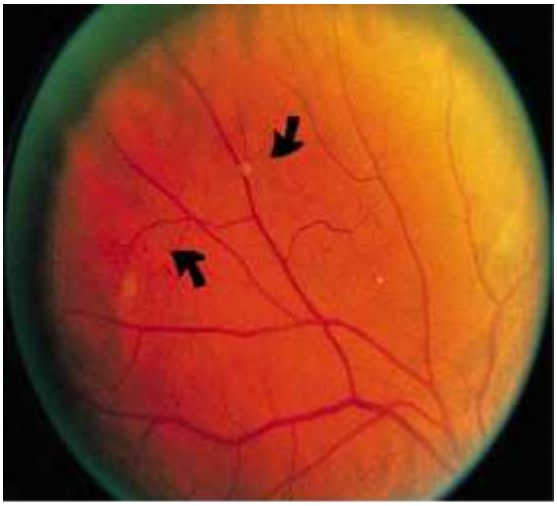


Fig No .3 : VB in ≥ 2Quadrants

PDR

(Composed of: [1] NVD or NVE, [2] preretinal or vitreous haemorrhage, [3]fibrous tissue proliferation)

E. Early PDR- New vessels

Definition not met for F

F. High-risk PDR

NVD ≥1/3-1/2 disc area **(**Fig. No. 4**)** or

NVD and vitreous or preretinal haemorrhage or

NVE ≥1/2 disc area and preretinal or vitreous haemorrhage

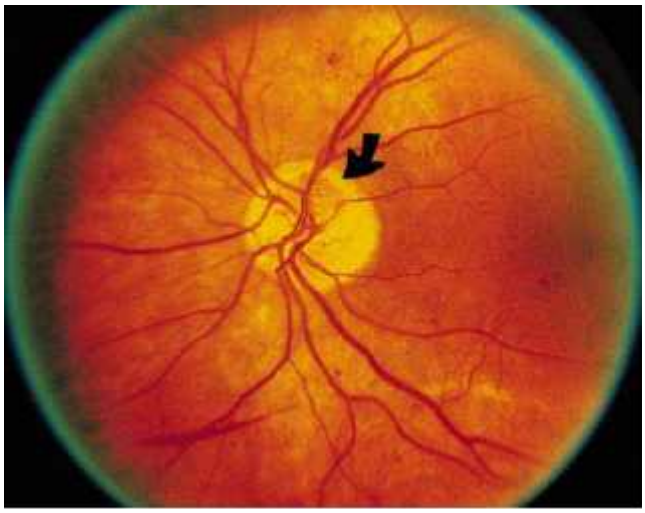


Fig No. 4: High risk PDR

X. International Clinical Diabetic Retinopathy Disease Severity Scale [55]:

Disease Severity Level	**Clinical features**
No apparent retinopathy	No abnormalities
Mild NPDR	Microaneurysm only
Moderate NPDR	More than just microaneurysms, but less than severe NPDR
Severe NPDR	Any of the following: >20 intra-retinal hemorrhages in each 4 quadrants definite venous beading in $\geq$ 2 quadrants and no signs of PDR
Very severe NPDR	All of the following: >20 intra-retinal hemorrhages in each of 4 Quadrants definite venous beading in $\geq$ 2 quadrants prominent IRMA in $\geq$ 1 quadrant
PDR	One or more of the following: neovasularisation vitreous/pre-retinal hemorrhage

Table No. 3: International Clinical Diabetic Retinopathy Disease Severity Scale

CSME :

1. Thickening of the retina located ≤500 μm from the centre of the macula or
2. Hard exudate with thickening of the adjacent retina located ≤500 μm from the centre of the macula or
3. A zone of retinal thickening, 1 disc area or larger in size located ≤1 disc diameter from the centre of the macula.

Diabetic macular oedema: divided into **two broad levels**:

Macular oedema apparently absent- no apparent retinal thickening or hard exudates in the posterior pole and Macular oedema apparently present- some retinal thickening or hard exudates in the posterior pole.

The below table shows the classification system for retinopathy and maculopathy; adapted from Scottish DRS grading scheme.

Retinopathy	**Description**
RO	No DR
R1 mild	Background DR The presence of ≥ 1 of the following: dot hemorrhages microaneurysms hard exudates cotton wool spots superficial/flame shaped hemorrhages
R2 (Observable)	Background DR-observable ≥4 blot haemorrhages in 1 hemifield only

R3 (referable)	Background DR-referable Any of the following: > 4 blot hemorrhages in both superior & inferior fieldsvenous bleeding IRMA
R 4 (proliferative)	PDR Any of the following: active new vessels vitreous hemorrhage refer ophthalmology
Maculopathy	**Description**
MO	No blot haemorrhages/hard exudates ≤2 disc diameters of the centre of fovea
M1 (observable)	Blot hemorrhages /hard exudates within a radius of >1 but <2disc diameters of centre of fovea
M2 (referable)	Blot haemorrhages /hard exudates within a radius of ≤ 1disc diameter of the centre of fovea

Table No. 4: Classification system for retinopathy and maculopathy.

Lesions of diabetic retinopathy:

Micro aneurysms: Originally noted by Mackenzie and Nettleship - Seen as red, round intraretinal lesions. Appear to derive from retinal capillaries and found in vicinity of occluded capillaries. Microaneurysms are clinically visible only when they are above 30 microns and the upper limit is 125 microns. More microaneurysms are seen on fundus angiography than clinically. On angiography they appear as hyperfluorescent dots. Generally they fill during early venous stage and some may leak dye to the surrounding retina.

Intraretinal haemorrhages: This appears secondary to ruptured microaneurysms, capillaries and venules. The shape of the intraretinal haemorrhage depends on the location within the retinal layer. Dot and blot haemorrhage – located in deeper layers of retina (between outer plexiform and inner nuclear layer of the retina) Flame shaped haemorrhages – located in the superficial nerve fibre layer Intraretinal haemorrhages resolve in 6-12 week period.

Hard exudates: These are collection of lipid adjacent to microvascular leakage. Intraretinal exuates appears as creamy – yellow flakes, flecks or dots. They may be arranged in individual streaks, in clusters, or in large circinate rings (if so almost always surround leaking microaneurysms or areas of capillary non perfusion). The hard exudates have an affinity for the posterior pole, particularly the macula .[56]

Soft exudates: Also known as cotton wool spots, it is seen secondary to arteriolar closure. It occurs in more advanced NPDR. These are small infarcts of nerve fibre layer. These appear as fluffy white/yellow white striations of nerve fibre layer. Cotton wool spots generally resolve in 2-3 months.

Venous beading and loops

Represent focal areas of venous dilatation. Other venous abnormalities include loops and reduplication of venous segments. The degree of venous beading in ocular fundus images has been shown to be a more powerful predictor of conversion to proliferative diabetic retinopathy than any other type of retinal abnormality. Further, the degree of venous beading has been shown to be well correlated with disease progression. Reduplication of veins is the least common retinal abnormality but is of the most important prognostic significance. These changes are associated with capillary non perfusion and retinal ischemia.[57]

Foveal Avascular Zone Abnormalities: Normally FAZ is approximately 350 to 750 microns in diameter. Abnormalities seen in the FAZ are irregular intercapillary spaces. Decrease vision without macular oedema warrants a suspicious outlook towards the FAZ.

Intraretinal microvascular abnormalities: Intraretinal microvascular abnormalities (IRMA) represent either new vessel growth or remodelling of pre-existing vessels through endothelial cell proliferation within the retinal tissues to act as shunts through areas of nonperfusion. They are irregular, segmental dilatation of the capillary bed running between the arteriole and venule adjacent to capillary non perfusion area. They

stain on fluorescein angiography, but usually do not leak fluorescein. These eyes are at high risk of developing PDR. [58]

Proliferative lesions: Proliferative diabetic retinopathy .As a response to retinal ischemia there is development of extra retinal fibrovascular proliferation. For the diagnosis of PDR the following lesions are necessary: presence of newly formed blood vessel and/or presence of fibrous tissue arising from retina or optic disc and extending along the inner surface of the retina or into the vitreous cavity. These immature vessels have a propensity to bleed. They also cause development of firm adhesion between retina and vitreous body, and when they contract can cause tractional retinal detachment. [58]

Neovacularisation of disc (NVD): It is seen as fine vessels bridging across physiological cup. NVD has a tendency to follow temporal arcade. Grows between the internal limiting membrane of the retina and posterior hyaloids face of the vitreous and adheres to it. As NVD matures fibrous tissue grows to accompany it. With time the fibrovascular bridge may form linking the superior and inferior temporal arcade. [58]

Fig No. 5: Neovacularisation of disc

New vessels arising from elsewhere (NVE): Seen as wheel like networks with vessels radiating like spokes from centre and circumferential vessel bounding the periphery. When vitreous haemorrhage does occur it assumes a classic boat like configuration.

High risk characteristics:

NVD -1/4th TO 1/3rd in extent

NVD with pre-retinal haemorrhage

NVE with vitreous haemorrhage

Advanced diabetic eye:

Advanced diabetic eye disease is the end stage of proliferative retinopathy defined by any of the following potentially blinding complication of proliferative diabetic retinopathy. [59]

- Severe vitreous haemorrhage
- New vessels in the iris
- Neovascular glaucoma
- Tractional retinal detachment

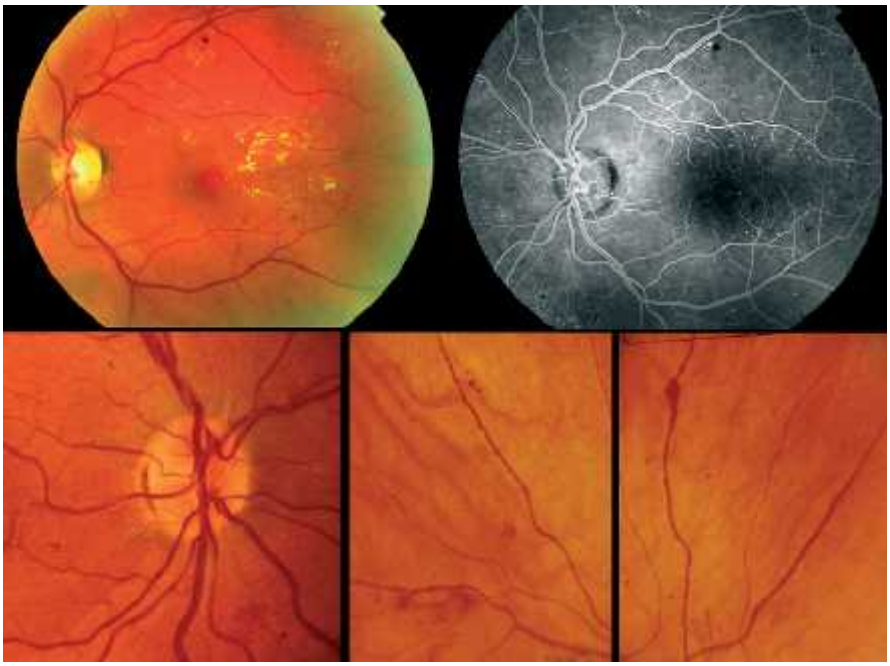


Fig No. 6: Non-proliferative diabetic retinopathy Cardinal signs are retinal microaneurysms, haemorrhages, and hard exudates ; and intraretinal microvascular abnormalities; venous beading ; and venous loop formation.

Preretinopathy	**Mild NPDR**	**Moderate NPDR**	**PDR**	**Advanced DED**
	→	→	→	→
Abnormalities of:	Microaneurysms	Venous bleeding	NVE	NVI
Electrophysiology	Intra-retinal hemorrhages	Venous loop	NVD	NVG
Psychophysics	Cotton wool spots	Cotton wool spots	Fibrovascular proliferation	Vitreous hemorrhage
Retinal blood flow	Venous dilatation	Cluster hemorrhages		TRD
Vascular permeability	Exudates	IRMA		

Table No.5: Progression of diabetic retinopathy

Glycemic Control:

Glycemic control has a strong influence on many indices of diabetic retinopathy such as prevalence of retinopathy, incidence of retinopathy, progression of retinopathy, need for focal and scatter photocoagulation, and loss of visual acuity.[60] The influence of glycemic control is apparent in both type 1 and type 2 diabetes. The concept of a laboratory cutpoint for blood glucose normality is vague. however, 5–9.8% of patients over age 40 in developed countries have typical lesions of diabetic retinopathy even though they do not meet criteria for diabetes.[61] Retinopathy consistent with diabetic retinopathy can develop in certain patients whose blood glucoses range in the normal range for the population; in adults over the age of 49, the 5-year incidence of such an event is 10%. This may in part reflect increased genetic susceptibility to the effects of hyperglycemia. Responsiveness to treatments for manifestations of diabetic retinopathy may also depend on glycemic control. Failure of DME to respond to focal/grid laser photocoagulation has been associated with higher glycosylated hemoglobin.[62]

INVESTIGATIONS for a case of diabetic Retinopathy:

1. Regular:

Technique	Advantages	Disadvantages	Recommendatations
Direct Ophthalmoscopy	-Mobile -Inexpensive	-Requires pupil dilatation -Small field -Low sensitivity -Less effective than slit- amp biomicroscopy	-Optional for Screening -Pupils must be dilated
Indirect Ophthalmoscopy	-Mobile -Large field -Relatively inexpensive	-Requires pupil dilatation -small abnormalities may be missed -Less effective than slit- lamp biomicroscopy	-Optional for Screening -Pupils must be Dilated
Slit-Lamp Biomicroscopy	-Large field	-Requires pupil dilatation -Immobile -Requires special lenses	-Required for ophthalmologic examination
Non Mydriatic retinal photography	-Large field -non-medical staff can be trained to use -can be digitally stored	-Relatively inexpensive -dark space required	Recommended for screening

Table No. 6: Investigations available for Diabetic Retinopathy

2. Fluorescein angiography:

Fluorescein angiography ranks as one of the crucial diagnostic aids for detecting ocular pathophysiologic mechanisms. Chao and Flocks provided the earliest description of fluorcscein angiography in 1958 and it was introduced into clinical use in 1861 by Novotny and Alvis.[63] The interaction of pthalic acid anhydride and resorcinol results in the formation of sodium fluorescein (C20 H10 05 Na2). It has a low molecular weight. It is highly soluble in water. It absorbs light maximally between 480 to 510nm wavelength whilst its emission spectrum peaks at 530nm. Toxic reaction to fluorescein is rare. These mainly include nausea, vomitting, urticaira, skin rashes; hypotension and shock.

The various phases of fluorescein angiography normally observed are as follows.

1. Choroidal phase

- 8 to 10 seconds after injection of dye in antecubtal vein. (arm to retina time)
- Seen as a diffuse fluorescent flush
- Patchy filling may be seen

2. Retinal arterial phase

- 8.5 to 11.0 seconds after injection of dye in antecubital vein.
- Temporal artery fills somewhat earlier than the nasal one and the upper artery slightly before the lower one.

3. Capillary phase

- Around the disc are seen the radial peri-papillary capillaries.
- Macula shows the typical capillary pattern with the central avascular Zone (500 microns in diameter).
- No special pattern can be recognised in the middle and far fundus periphery.

4. Venous phase

- Earliest venous filing occurs at the posterior pole.

5. Recirculation phase

- Begins within the first minute after injection.

In diabetic retinopathy, fluorescein angiography is useful for early detection of neovascularization, areas of capillary non perfusion, intraretinal microvascular abnormalities, microaneurysms etc. It is also done before the retina is subjected to photocoagulation.

3. OCT

The development of imaging equipment is allowing new features of diabetic macular oedema to be identified, which may have implications for treatment in the future.[64] OCT has identified macular pathologies that cannot be observed by clinical examination and therefore have not been part of prognosis and treatment planning in the past.

TREATMENT OF DIABETIC RETINOPATHY

I. Medical line of treatment

II. Photocoagulation

III. Surgical line of treatment

I. Medical line of treatment

Control of diabetes by oral hypoglycaemic drugs, conventional insulin treatment or continuous insulin pumps play an important role. Clofibrate has been claimed to be useful in clearing retinal hard exudates. [65] Calcium dobesylate has been shown to have a beneficial effect on abnormal retinal capillary permeability.

Agent	Molecules tried
Antiplatelet/anti-coagulants	Aspirin Ticlopidine
Aldolase reductase inhibitors	Ponalrestat Tolrestat
GH suppressors	Octreotide
Anti-angiogenesis	Curcumin
ACE inhibitors	Candesartan Perindopril
PKC-beta inhibitors	Ruboxistaurin

Table No. 7: Potential molecules for the management of diabetic retinopathy

II (i) Panretinal Photocoagulation (PRP)

a. Pretreatment Discussion with Patients:

Patients usually need numerous follow-up visits and may require supplementary laser treatment.

- PRP reduces the risk of visual loss and blindness.
- Although laser treatment is effective, some patients may still develop vitreous hemorrhage. The hemorrhage is caused by the diabetes and not by the laser; it may mean the patient needs more laser treatment.
- Laser treatment often reduces peripheral and night vision; treatment may moderately reduce central vision. This short-term side effect is compensated by the significant long-term reduction in severe vision loss and blindness in laser-treated patients.

b. Lenses for PRP:

The three-mirror Goldmann contact lens has a central opening for treating the posterior pole, and side mirrors for treating the mid peripheral and peripheral retina. Disadvantages: small field of view, which requires continual manipulation of the lens to complete treatment. Spot size is set at 500μm.

Newer wide-angle contact lenses are often used. Although the image is inverted, there is a large field of view allowing for many burns with the field while easily maintaining orientation to the disc and macula. The optics of these wide-angle lenses will affect the laser spot size on the retina. Wide-angle indirect ophthalmoscopy lenses provide an inverted image, but show a large field of view and a magnification of the spot in the retina. Scatter treatment can be applied to a large area of retina in a single image, and it is easy to visualize the disk and the macula.

c. Technique for PRP:

i. The pupil should be fully dilated and topical anesthesia is used. Retrobulbar subtenons anesthesia to reduce pain and decrease eye motion can be employed as necessary.

ii. The most common wavelengths used are Argon green, blue green (generally avoided currently), and 532 green laser, using the slit-lamp delivery system. In case of hazy media, Krypton red or diode red laser (814 nm) can be used. Slit-lamp treatment is most commonly done through a contact lens but can also be performed using indirect ophthalmoscopy. For example, when treatment is given under general anesthetic.

iii. Typical initial settings on the Argon laser would be 500 μm spot size, a 0.1 second exposure and 250-270 mw power. The power is gradually increased until a whitish reaction is obtained on the retina. The lesions are placed 1 burn width apart.

iv. A total of 1600-3000 burns are placed in 1 or more sittings, carefully avoiding themacular area and any areas of tractional elevation of the retina. The burns are placed 2 to 3 disc diameters away from the center of the macula and 1 disc diameter away from the disc, usually outside the arcades and extended peripherally up to the equator and beyond.

v. Laser treatment should not be applied over major retinal veins, preretinal hemorrhages, darkly pigmented chorioretinal scars, or within 1 DD (200-300 μm) of center of macula, so as to avoid risk of hemorrhage or large scotomas.

vi. Other considerations:

- Additional photocoagulation is needed if there is evidence of worsening of proliferative DR.
- Add laser burns in between scars of initial treatment further peripherally and also at the posterior pole, sparing the area within 500-1500 μm from the center of macula.
- Favor quadrants with active new vessels or areas with intraretinal microvascular abnormalities where scars are more widely spaced and areas of severe ischemia not previously treated, such as the temporal part of the posterior pole.
- Direct treatment of NVE in between scars is possible.

d. Panretinal (Scatter) Photocoagulation Technique Following Diabetic Retinopathy Clinical Research Network (DRCRNet) Consensus.

Panretinal (scatter) photocoagulation initially consists of 1200 to1600 burns (or the equivalent area treated with a multi-spot laser), with a spot size on the retina of approximately 500 μm given over 1 to 3 sittings and completed within eight weeks days of initiation, As shown in the below table No.8.

Burn Characteristic	**Direct/Grid Photocoagulation(Modified ETDRS technique)**	**Mild Macular Grid Photocoagulation technique**
Direct treatment	Directly treat all leaking microaneurysms in areas of retinal thickening 500 to 3000 μm from centre of the macula	Not applicable
Change in MA color with direct treatment	Not required, but atleast a mild gray white burn should be evident beneath all microaneurysms.	Not applicable
Burn size for direct treatment	50-100 μm	Not applicable
Burn duration for direct treatment	0.05-0.1 sec	Not applicable
Grid treatment	Applied to all areas with diffuse leakage /non-perfusion within area described below for treatment	Applied to entire are described below for treatment

Area considered for grid treatment	-500-300 µm superiorly, nasally and inferiorly from center of macula. -500-3500 µm temporally from macular center. -No burns are placed $\leq$ 500µm of disc	-500-300 µm superiorly, nasally and inferiorly from center of macula. -500-3500 µm temporally from macular center. -No burns are placed $\leq$ 500 µm of disc
Burn size for grid treatment	50-100 µm	50 µm
Burn duration for grid treatment	0.05-0.1 sec	0.05-0.1 sec
Burn intensity	Barely visible (light gray)	Barely visible (light gray)
Wavelength(grid and focal treatment)	Green to yellow	Green

Table No.8: Modified-EDTRS and the Mild Macular Grid Photocoagulation Techniques

II(ii)Laser photocoagulation

Focal laser

Possible mechanisms of action

• Direct closure of leaking microaneurysms

• Laser induced endovascular thrombosis

• Heat-induced contraction of the vessel wall Procedure – compare vascular landmarks on fluoroscein angiograms are compared to the fundus.

- Fundus is precisely located.
- All fluorescein leaks are directly treated.
- Laser burns are spaced one burn width apart.

- The end point is whitening or darkening of the treated area.
- Laser parameters- 100-200 microns spot size, 0.1 second duration, 50-100 Mw power

II (iii) Grid laser

Photoreceptor destruction increases inner retinal oxygenation resulting in vasoconstriction, decreased retinal blood flow and decreased vascular leakage

- Retinal pigment epithelium damage causes retinal capillary and venule endothelial dysfunction.
- Photocoagulation debridement of dysfunctioning RPE cells may result in enhanced blood retinal barrier
- Grid photocoagulation is performed in areas of thickened retina showing diffuse leakage or capillary dropout.
- Laser parameters- 100-200 micron spot size, 0.1 to 0.5 sec duration, 50- 100mw power, light intensity burns.
- Grid is not done within 500 microns of the macula/disc margin

Pan retinal photocoagulation for proliferative diabetic retinopathy:

It may alter the extracellular modulating factors responsible for control of intraocular neovascularisation. Destruction of oxygen consuming photoreceptors and RPE may improve inner retinal oxygenation, thus decreasing stimulus for vasoproliferative factors

Procedure – laser spots are placed outside the arcades and extend peripherally up to the equator and beyond

- Laser settings- 300-500micron spot size, 0.1 second, 220-27- mw power
- Power and duration are adjusted till gray white reaction is achieved
- Burns are placed one burn width apart; a total of 1600-2000 burns are applied in 2-3 sittings starting first with the inferior quadrant, because if vitreous haemorrhage occurs then the inferior quadrant will be difficult to treat.

Size(on retina)	500 μm
Exposure	0.1sec recommended
Intensity	Mild white(i.e. 2+ to 3+)
Distribution of sessions	Edges 1 burn width apart
Number	1-3
Nasal proximity to disk	No closer than 500 μm
Temporal proximity to center	No closer than 3000μm
Superior/inferior limit	No further posterior than 1 burn within temporal arcades
Extent	Arcades (3000μm from macular center) to atleast the equator
Total number of burns	1200-1600n
Wavelenghth	Green or yellow(red can be used if vitreous hemorrhage)

Table No. 9: The burn characteristics for panretinal photocoagulation

III. Surgical line of treatment

Pituitary ablation by ytrrium 90 implantation or hypophysectomy advocated as a treatment for proliferative retinopathy following a case report by Poulstein in 1953 Kohner and co-workers have advocated pituitary ablation as a treatment of choice for diabetic retinopathy characterised by progressive capillary dilatation, capillary occlusion, cotton wool spot formation and severe proliferative diabetic retinopathy. [66]

(i)Vitrectomy forms a mainstay of the surgical line of proliferative treatment of diabetic retinopathy with its attendant complications.[67]

Indications for vitrectomy in severe diabetic retinopathy

(a) Media opacity

- Non clearing vitreous haemorrhage
- Pre macular haemorrhage

(b) Tractions

- Progressive fibrovascular proliferation
- Tractional retinal detachment involving macula
- Combined rhegmatogenous and tractional retinal detachment
- Macular oedema associated with taut posterior hyaloids

(c) Others

- Recurrent vitreous haemorrhage
- Anterior hyaloid fibrovascular proliferation
- Goals of vitrectomy in proliferative diabetic retinopathy
- To clear the media
- To relieve all tractions on the retina
- To reattach retina where needed
- Closure of retinal breaks if any

The aims of vitrectomy*:*

1. To clear media opacities such as vitreous haemorrhage;
2. To remove proliferative tissue causing tractional forces on the retina;
3. Prevent further neovascularization by laser endophotocoagulation and by removal of vitreous gel so removing the scaffold along which fibrovascular tissue can proliferate;
4. Repair retinal detachment by excising tractional membranes and removing fibrovascular tissue from the surface of the retina.

Surgical technique:

The central core vitreous gel is first removed with the vitrectomy probe. If there is no posterior vitreous separation then this is next elevated in an accessible area without tight vitreo-retinal adhesion. The optic disc is often a good location for this if no posterior vitreous separation exists elsewhere. The neovascular membrane complexes are now dissected away from the retina being careful to ensure that the dissection is in the correct plane and not in a false plane of vitreo-schisis, which can occur in PDR.This can be achieved using an ‘en-bloc’ dissection then delamination technique using the remaining posterior hyaloids face to exert antero-posterior traction to open up the plane of dissection . Alternatively via circumcision from the posterior hyaloid face and then segmentation of neovascular complexes followed by their delamination from the surface of the retina. ‘En-bloc’ dissection and delamination involve the use of horizontal cutting scissors to cut through vascular ‘pegs’ joining the membrane complexes to the retina. Segmentation may involve vertical cutting scissors to divide membranes between pegs in order to relieve traction between these. Once the traction has been relieved the retina is

carefully inspected for signs of retinal breaks. If identified these are treated with laser to form a surrounding chorioretinal adhesion and then gas or oil is used as tamponade. PRP is completed if deficient using indirect or endolaser and often continued up to the pars plana, which possibly reduces the rate of post vitrectomy bleeding.

Complications:

1. Post-vitrectomy vitreous cavity haemorrhage can occur in some patients.(10-20%)
2. Retinal tears and holes
3. Raised IOP
4. Cataracts can develop following vitrectomy surgery, especially in patients over 60 years.
5. Rubeosis-rare.

Visual prognosis post vitrectomy: Overall, about 70–90% of patients will get an improvement in vision with vitrectomy surgery with the final acuity result depending largelyon the degree of maculopathy. Less than 5% may be made worse.

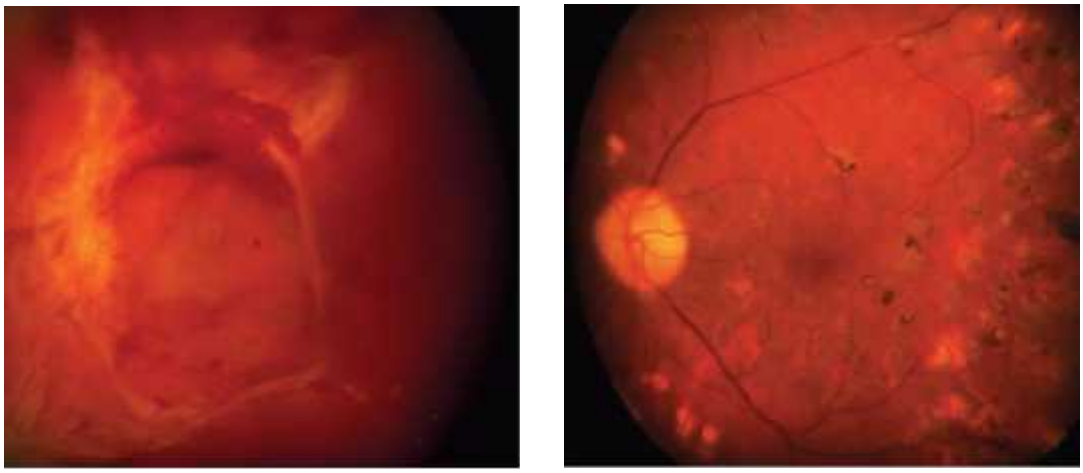


Fig No. 7: (a,b) Pre and post vitrectomy for vitreous haemorrhage and traction retinal detachment. VA postoperatively 6/12.

(ii) Intravitreal drugs:

Intravitreal triamcinolone has been used for macular oedema refractory to laser treatment.[68] Using OCT has shown this treatment to reduce retinal thickness. Improvement in vision has been recorded in some cases. However, this effect is transient and appears not to be sustained despite repeat injections. A recent randomised clinical trial showed that laser is more effective than intravitreal triamcinolone at preventing visual loss. There are also significant side-effects with intravitreal triamcinolone, with raised intraocular pressure and cataract being very common

Intravitreal injections of anti-VEGF such as ranibizumab, pegaptanib and bevacizumab are currently being explored as therapies for DR. Several trials have shown a beneficial effect when anti-VEGF agents are used alone or combined with laser for macular oedema.[69]

A recent randomised trial of 854 eyes has shown that ranibizumab combined with laser for 'centre involving' diabetic macular oedema (ie DMO that involves the fovea) is more effective than laser alone. [70] At 1 year there was a significantly greater mean increase in visual acuity in eyes treated with ranibizumab and laser, than those who had only laser. Multiple injections were required, however, and were also necessary in the second year of the study, but the authors report no systemic side-effects attributable to the treatment. There is concern that these drugs can, though rarely, affect patients systemically to increase the risk of stroke and myocardial infarction. Additionally, VEGF may be necessary in maintaining the function of healthy retina. However, it is very likely that anti-VEGF therapy in combination with laser has a place in the management of both PDR and macular oedema.

Severity of retinopathy	Presence of CSME	Follow-up (Months)	Scatter(Panretinal) Photocoagulation	Fluorescein Angiography	Focal laser
Normal/ Mild NPDR	No	12	No	No	No
Mild to Mod NPDR	No	6-12	No	No	No
	Yes	2-4	No	Usually	Usually
Severe to very Severe NPDR	No	2-4	Sometimes	Rarely	No
	Yes	2-4	Sometimes	Usually	Usually
Non high-risk PDR	No	2-4	Sometimes	Rarely	No
	Yes	2-4	Sometimes	Usually	Usually
High risk PDR	No	3-4	Usually	Rarely	No
	Yes	3-4	Usually	Usually	Usually
High risk PDR Not amenable to PC	-	1-6	Not possible	Occasionally	Not possible

Table No. 10: Management recommendations for patients with Diabetes retinopathy

The recommended follow up regimen for newly diagnosed diabetic patients is as given in table no.11

	IDDM	NIDDM
1st Examination	5years after onset if patient's age < 30 yr. At puberty after diagnosis	On diagnosis immediately if patient's age >31 yr.
Follow-up	Annually *	Annually*

* normal at first examination

Table No. 11: Ocular examination and follow up schedule in diabetes subjects

J. NEURO OPHTHALMIC ASSOCIATIONS:

Diabetics are at risk to develop cranial mononeuropathies particularly at the occulomotor, trochlear, abducens and facial nerves .The principal metabolic defect implicated are disruption of polyol-myoinositol-aldose reductase pathways, altered lipid metabolism, advanced glycosylated end product formation, increased oxidative stress and diabetes-induced defects in growth factors. These mononeuropathies are caused by microvascular infarction of the peripheral nerves in the brain. These patients usually recover over a period of 2 to 6 months without developing aberrant regeneration.

K. ORBIT:

Patients with diabetes mellitus are known to develop infectious processes including orbital cellulitis. Orbital cellulitis is characterised by proptosis, periorbital swelling, and ophthalmoplegias, including internal ophthalmoplegia. Most patients will have a concomitant sinus disease. Although generally the most common infective organism are bacterial, in any diabetic patient , zygomycosis (or other fungal infections) must be the leading diagnosis until excluded by biopsy. Mucormycosis is though known to occur in patients with ketoacidosis, all patients with diabetes mellitus are at risk of developing this complication

L. INTRAOCULAR PRESSURE:

Primary Open-Angle Glaucoma:

Diabetes was common in participants of the Barbados Eye Survey and participants of the Baltimore Eye Survey, it was unrelated to the prevalence of open angle glaucoma. [71] In the Beaver Dam Eye Study, older-onset diabetes (≥30 years of age) was associated with a modest increase in the risk of glaucoma. [72] In the Blue Mountains Eye

Study, there was a significant association between diabetes (diagnosed from history or from elevated fasting plasma glucose level) and open-angle glaucoma.[73] The Ocular Hypertension Treatment Study (OHTS) found that diabetes mellitus appeared to be protective against the development of POAG in patients with ocular hypertension.[74] When patients are treated medically for POAG, it is important to recognize that the potential side effects of beta-adrenergic antagonists include reduced glucose tolerance and masking of hypoglycemic signs. Therefore, this class of antiglaucoma medications should be used cautiously in diabetic patients.

Angle-Closure Glaucoma (ACG):

One study found that patients with ACG had a higher prevalence of abnormal glucose tolerance test results compared with POAG patients and controls. [75]Patients with ACG also have a high prevalence of non-insulin-dependent diabetes. [76] It has been hypothesized that, in some cases, ACG may be a symptom of diabetes, perhaps due to autonomic dysfunction. [77]

Hyperosmotic agents are commonly included in the medical management of acute episodes of elevated IOP. In diabetic patients, isosorbide is preferred to glycerol because isosorbide is not metabolized into sugar, while glycerol is metabolized into sugar and ketone bodies. Glycerol, therefore, can produce hyperglycemia and, rarely, ketoacidosis in diabetic patients

Despite the widespread use of panretinal photocoagulation (PRP), proliferative diabetic retinopathy (PDR) remains a leading cause of neovascular glaucoma. In 1984, Brown and associates reviewed 208 cases of neovascular glaucoma and reported that

36% were caused by central retinal vein occlusion, 32% by diabetic retinopathy, and 13% by carotid occlusive disease.[78]

The reported incidence of any neovascularization of the iris (NVI) [79] among diabetic patients ranges from 1% to 17% . In the early stages, NVI usually appears as small vascular tufts either at the pupillary margin or in the anterior chamber angle. As these vessels later spread across the iris surface, they are frequently accompanied by fibrous tissue, which contracts and may cause ectropion uveae.

Management of primary open angle glaucoma in diabetes is same as in otherwise normal patients. If the intraocular pressure cannot be controlled by medical therapy alone, trabaculectomy is the surgery of choice. Glaucoma drainage surgery in diabetic patient is associated with poor prognosis due to increased scarring at the site of surgery, secondary to increased proliferation of tenons capsule.

M. OPTIC NERVE ABNORMALITIES:

Acute optic disc edema associated with diabetes, or diabetic papillopathy, usually occurs in the second to fourth decades of life and generally shows no correlation with the severity of diabetic retinopathy. It is typically associated with mild loss of vision (≥20/50), and the visual field may be normal or may show defects, such as an increased blind spot, arcuate scotoma, or altitudinal scotoma. Fluorescein angiography usually demonstrates diffuse leakage at the disc. The condition presents bilaterally in approximately 50% of cases,[80] while in other cases, the second eye may be affected as late as 3 years after initial presentation. The visual prognosis is usually good, with nearly all younger patients recovering to a visual acuity of ≥20/30. Visual field defects

infrequently persist. While the optic disc appearance usually returns to normal, occasionally, diffuse or segmental atrophy may result.

In diabetic papillopathy, diffuse disc swelling may mimic papilledema of raised intracranial pressure. However, careful visual field testing may demonstrate an arcuate or altitudinal defect, which would be unusual in papilledema. To avoid unnecessary PRP, it is important to differentiate the prominent telangiectasia of disc vessels often seen in diabetic papillopathy from neovascularization of the disc.

Diabetic papillopathy differs from anterior ischemic optic neuropathy (AION). Typical AION is generally seen in middle-aged to elderly frequently hypertensive persons with or without diabetes, and is characterized by acute unilateral moderate-to-marked loss of vision, swelling of the optic disc with variable nerve fiber layer hemorrhages, segmental areas of nonperfusion on fluorescein angiography, poor prognosis for visual recovery, and late optic disc pallor .

N. INFECTIOUS DISEASES:

Endophthalmitis.

The increased risk of postoperative endophthalmitis among diabetic patients is not surprising, because patients with diabetes have been demonstrated to have impaired cellular and humoral immune responses, as well as altered phagocytic capabilities. Further, it is well known that diabetic patients are more likely than nondiabetic patients to experience delayed wound healing . Thus, diabetic patients may be predisposed to wound breakdown or persistent wound defects or both, which, in turn, may increase their risk of developing endophtha lmitis.

In a case-control study of endophthalmitis following secondary intraocular lens implantation, 50% of patients had a history of diabetes compared with 5.9% of control patients. [81]

Finally, vitrectomy for complications of PDR often requires longer surgical time and more instrument changes passing through the pars plana sclerotomies compared with vitrectomy for other diseases.

Mucormycosis. It is a rare orbital infection that affects diabetic patients, especially those with ketoacidosis. Orbital mucormycosis usually originates in adjacent sinuses and presents with complete internal and external ophthalmoplegia, decreased vision, proptosis, ptosis, and chemosis. Histopathologic hallmarks of the disease are vascular invasion and tissue necrosis. Clinically, affected areas are characterized by black eschars and discharge, although this may be a late finding. Mucormycosis is associated with a significant risk of mortality, [82] which underscores the importance of prompt diagnosis and treatment with tissue debridement and amphotericin B.

MATERIALS AND METHODS

SOURCE OF DATA

This was a prospective observational study on patients attending outpatient department and those referred to department of Ophthalmology at

from

October 2012 to 31st march 2014

METHOD OF COLLECTION OF DATA

- Patients were selected on the basis of history, clinical examination and blood investigations
- Patients were labeled as type 2 diabetes mellitus based on the criteria laid down by the American Diabetes Association.
- All subjects were interviewed as per the prepared proforma and the complete ophthalmic examination was done.
- Estimation of RBS at admission and FBS and PPBS second day of admission

SAMPLE SIZE:

With a prevalence rate of type 2 diabetes 9% at 95%confidence interval and +/- 3 margin of error, the calculated sample size was 349.

$$n=4pq/L^2$$

where ; n= sample size,

p= incidence rate,

q= 100-p,

L= allowable error.

STATISTICAL ANALYSIS:

Data was analyzed using following statistical method

- Diagrammatic presentation.
- Mean +/- SD

RESEARCH HYPOTHESIS:

It was an observational study to know the incidence and prevalence of various forms of diabetic eye disease in the study population.

Inclusion criteria

a) Patient who has been diagnosed type 2 Diabetes Mellitus.

b) Patients more than 30 years of age

Exclusion criteria

a) Patient with type 1 diabetes

b) Patients with known eye disease not related to diabetes.

c) Patients with hypertension.

d) Patients who have undergone treatment earlier for any form of diabetic eye disease

INVESTIGATIONS :

- Blood sugar levels(FBS & PPBS)
- Urine sugar, Albumin, Microscopy.
- HBA1C
- Slit Lamp Examination
- Fundoscopic Examination
- IOP
- Fundus Fluorescein Angiography if necessary

Does the study required any investigations or interventions to be conducted on patients or other humans or animals?

YES.

Had ethical clearance been obtained from your institution in case Of 7.3?

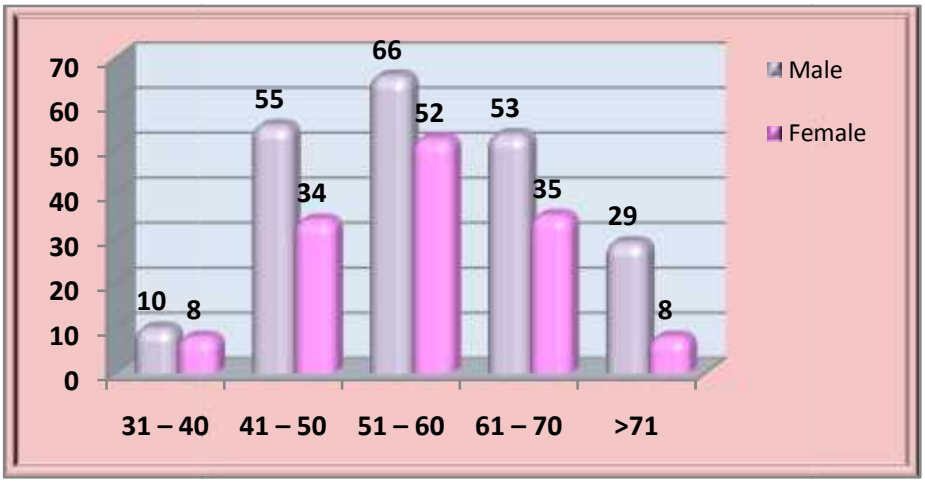
YES

OBSERVATIONS AND RESULTS

This observation study was conducted on totally 350 consecutive patients of NIDDM attending our institute. Out of 350, 211 were males (60.3%) and 139 (39.7%) were females. Among both the sexes, the age groups between 51 to 60 years had maximum number of patients (33.7%).

Table No. 12 .Distribution of Patients according to Age and Sex

Age in years	**Male (%)**	**Female (%)**	**Total (%)**
31 – 40	10(4.7%)	08(6.5%)	18(5.1%)
41 – 50	55(26.1%)	34(24.5%)	89(25.4%)
51 – 60	66(31.3%)	52(37.4%)	118(33.7%)
61 – 70	53(25.1%)	35(25.2%)	88(10.6%)
71 and above	29(13.7%)	08(5.8%)	37(25.1%)
Total	211(100%)	139(100%)	350(100%)

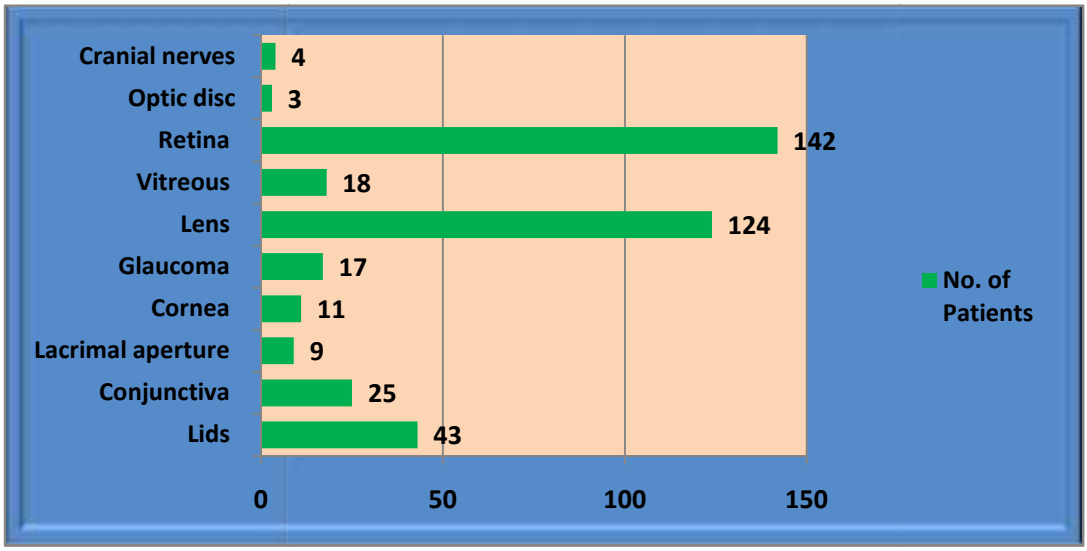


Graph No.1: Distribution of Patients according to AGE and SEX

TABLE NO. 13: We have accumulated data of all the possible diabetic ocular complications in this study population. It shows that the most common prevalent ocular complication is of retina: 142 patients (40.6%) followed by the lens 124(35.4%). We can observe that all the anatomical parts of eye are involved in diabetes.

Table No. 13. Overall prevalence of ocular involvement due to diabetes mellitus

Sr. No.	Ocular morbidity	No. of Patients	Percentage
1.	**Lids**	43	12.3%
2.	**Conjunctiva**	25	7.1%
3.	**Lacrimal aperture**	9	2.6%
4.	**Cornea**	11	3.1%
5.	**Glaucoma**	17	4.6%
6.	**Lens**	124	35.4%
7.	**Vitreous**	18	5.2%
8.	**Retina**	142	40.6%
9.	**Optic disc**	3	0.9%
10.	**Cranial nerves**	4	1.1%

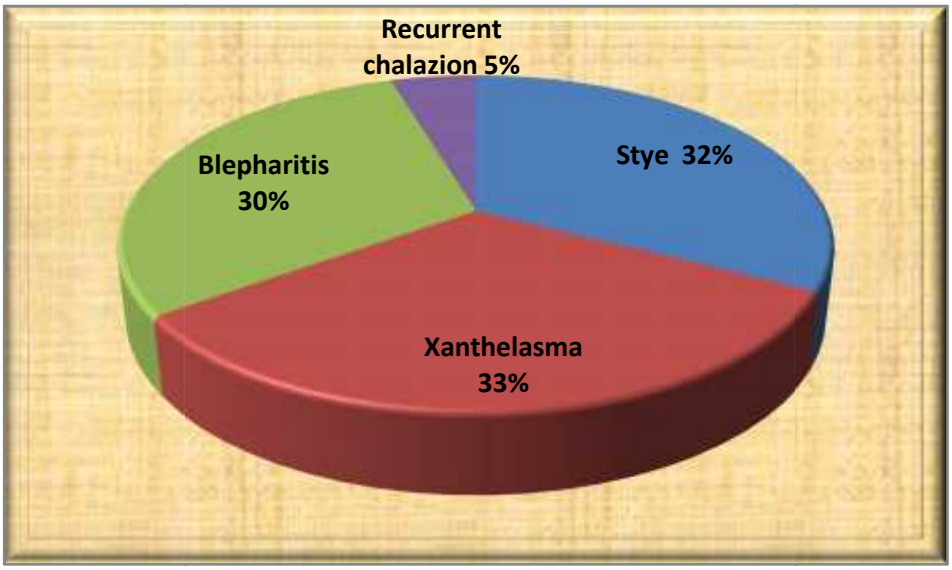


Graph No. 2: Overall prevalence of ocular involvement due to diabetes mellitus

TABLE NO. 14: 43 patients had some eyelid lesions, out of which 14 had Stye and another 14 had Xanthelesma, 13 had Blepharitis and 2 had recurrent chalazion.

Table No. 14. Distribution of patients according to type of lid lesion present

Type of Lid Lesion	No. of patients	%
Stye	14	4.0
Xanthelasma	14	4.0
Blepharitis	13	3.7
Recurrent chalazion	02	0.6
Total	43	12.3

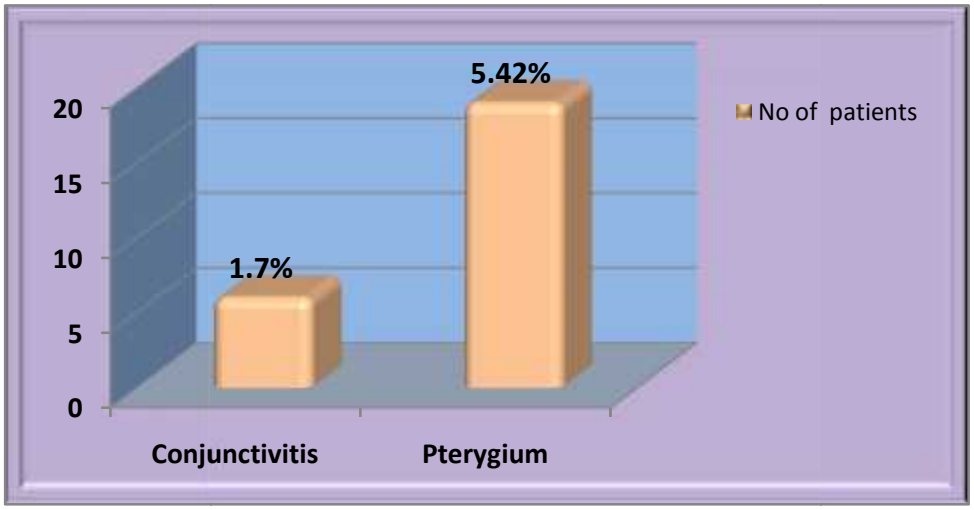


Graph No 3: percentage distribution of patients according to type of lid lesion.

TABLE NO 15: Conjunctival lesions found were pterygium in 19 patients (5.4%) and infective conjunctivitis in 6 patients (1.7%).

Table No. 15. Conjunctival lesions

Conjunctival lesion	**No of patients**	**%**
Conjunctivitis	06	1.71
Pterygium	19	5.42

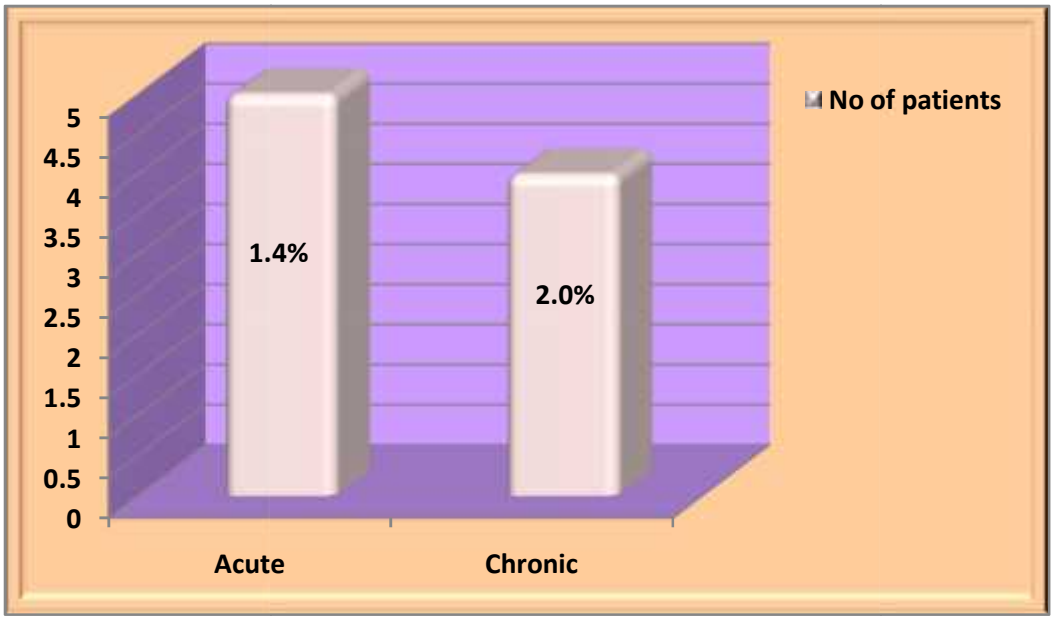


Graph No 4: Frequency and percentage distribution of conjunctival lesions

TABLE NO. 16: Both acute (1.4%) and chronic (1.1%) form of dacryocystitis is found

Table No. 16. Distribution of patients according to lacrimal system affection

Type of Dacryocystitis	No of patients	Percentage
Acute	5	1.4%
Chronic	4	1.1%
Total	9	2.6%

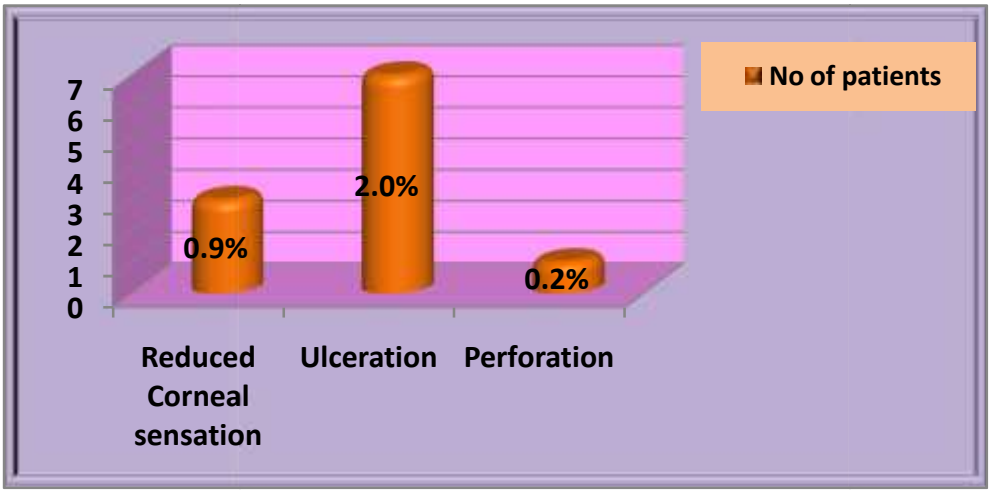


Graph no 5: Distribution of patients according to lacrimal system affection

TABLE NO 17 shows that 7 patients had corneal ulceration (2%), 3 had reduced corneal sensation (0.9%) while 1 patient (0.3%) had a corneal perforation . 4 out of these 7 ulcers were non healing bacterial type.

Table No. 17. Distribution according to type of corneal lesions present.

Corneal lesion	No of patients	Percentage
Reduced Corneal sensation	03	0.9
Ulceration	07	2.0
Perforation	01	0.2
Total	11	3.1



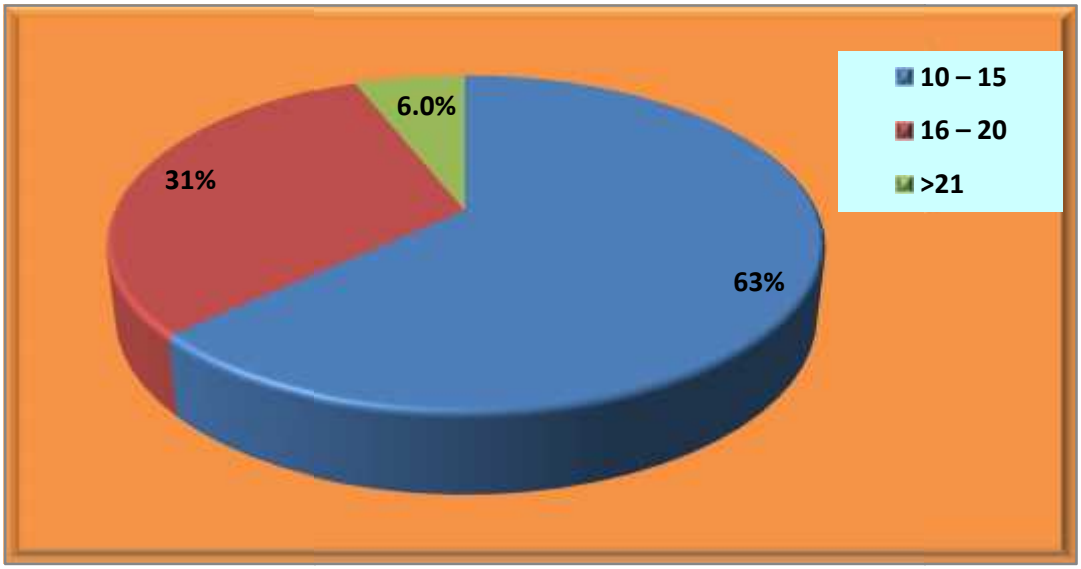
Graph No. 6: Frequency distribution of type of corneal lesions present.

TABLE NO. 18: We measured the IOP in all the patients bilaterally with an indentation tonometer and recorded the findings. None of the 350 patients had hypotonia. Most of these patients had IOP between 10 to 15 mm Hg (63%), while 21 (6%) of them had more 21 mm Hg. These findings are statistically significant ($p < 0.001$), which means presence of intra ocular hypertension in this population is having a positive association.

Table No. 18. Distribution of Patients according to IOP recorded

IOP mm Hg	**No of patients**	**Percentage**
10 – 15	221	63
16 – 20	108	31
>21	21	6.0
Total	350	100

p-value = 0.0001

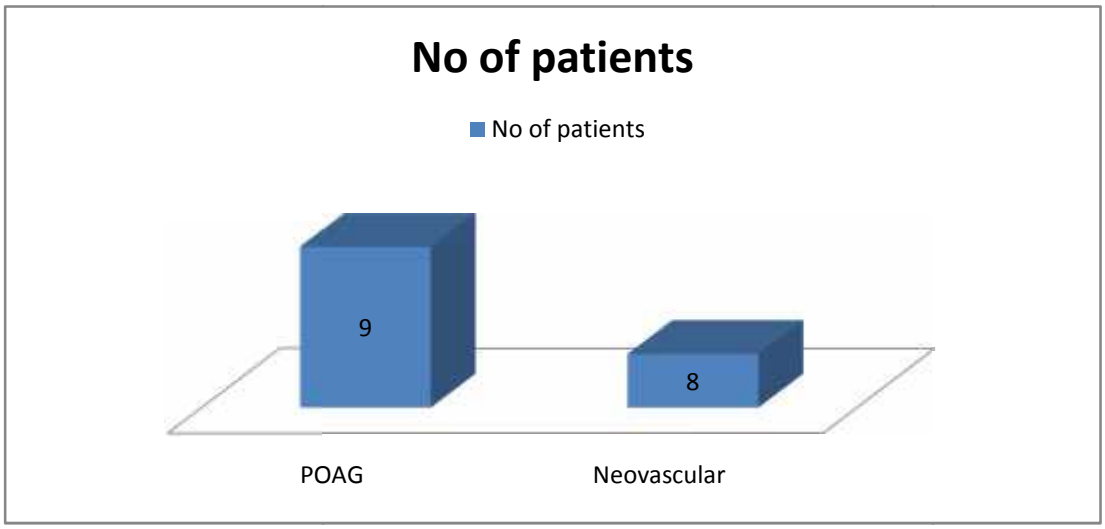


Graph No 7: Percentage Distribution of Patients according to IOP recorded.

TABLE NO. 19: 9 patients (2.7%) were diagnosed with Primary open angle glaucoma . 8 patients (2.3%) had neovascular glaucoma

Table No. 19. Distribution of patients according to type of glaucoma present.

Type of glaucoma	No of patients	Percentage
POAG	9	2.6%
Neovascular	08	2.3%
Total	17	4.9%

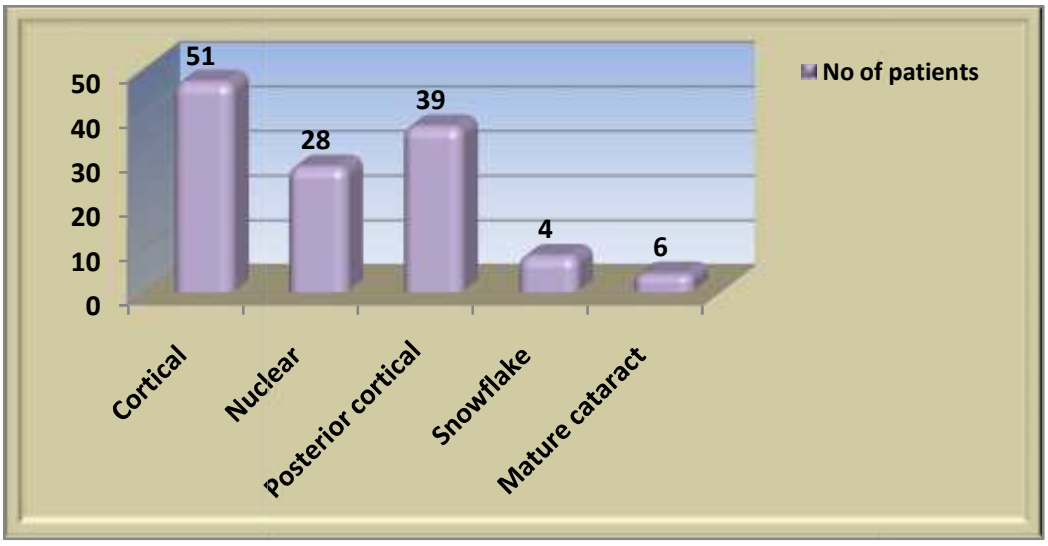


Graph No. 8. Distribution of patients according to type of glaucoma.

TABLE 20: shows the number of patients affected by lenticular opacities. 124 of the total patients had presented with cataract (35.4%) which makes it the second most common mode of ocular diabetic disease in our study. Most common variant found was cortical : 51 of them(41.2%) in the study which is more prevalent than the 39 posterior cortical (31.4%), considered to be a typical diabetic cataract. 28 patients also had nuclear cataract(29.8%). 6 patients had mature cataract (4.8%), while 4 patients (3.2%) had the characteristic snow flake appearing cataract .

Table No. 20. Distribution of patients according to type of cataract present

Type of cataract	**No of patients**	**Percentage**
Cortical	51	41.2
Nuclear	28	22.6
Posterior cortical	39	31.4
Snowflake	4	3.2
Mature cataract	6	4.8
Total	124	100



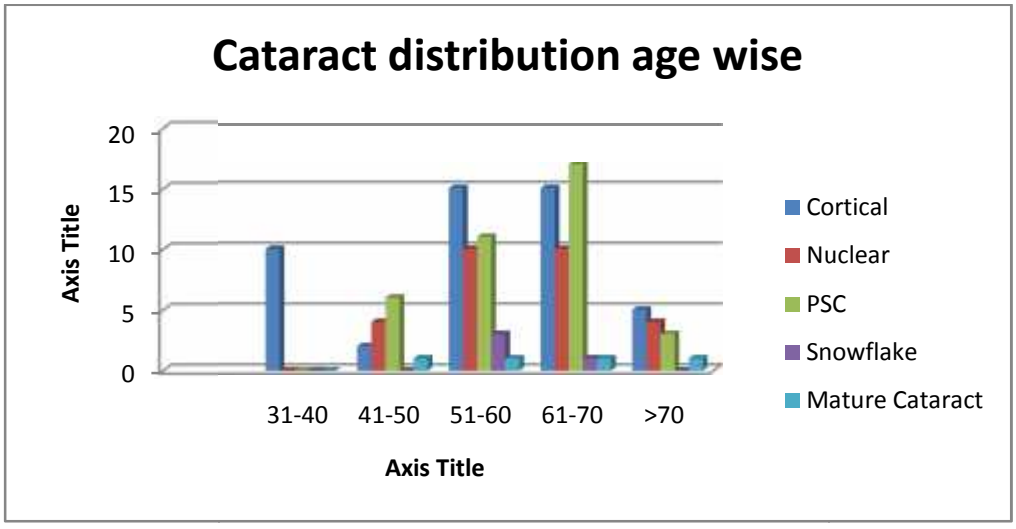
Graph no 9: Distribution of patients according to type of cataract

TABLE NO. 21: It clearly shows that most of the people develop any one of these cataracts in the age group of 51-70 years (70.9%), which coincides with that of non-diabetic population. The finding has been confirmed by statistical significant p- value of 0.008.

Table No. 21: Distribution of cataract according to age

Age (Years)	Cortical	Nuclear	PSC	Snowflake	Mature Cataract	Total cataract/Study group
31-40	10	0	0	0	0	10
41-50	2	4	6	0	1	13
51-60	15	10	11	3	1	40
61-70	19	10	17	1	1	44
>70	5	4	3	0	1	13
Total	51	28	37	04	04	124

p-value = 0.008

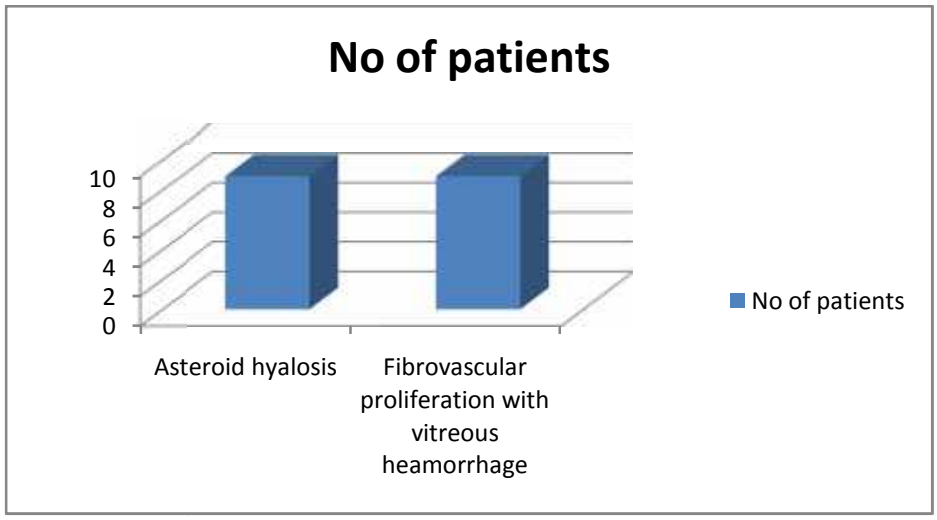


Graph No. 10. Distribution of Cataracts according to age groups

TABLE NO. 22: 9 patients had vitreous hemorrhage at presentation (2.6%), while there were another 9 patients having asteroid hyalosis.

Table No. 22. Distribution of patients according to findings in vitreous

Vitreous finding	**No of patients**	**%**
Asteroid hyalosis	9	2.6%
Fibrovascular proliferation with vitreous heamorrhage	9	2.6%
Total	18	5.2%

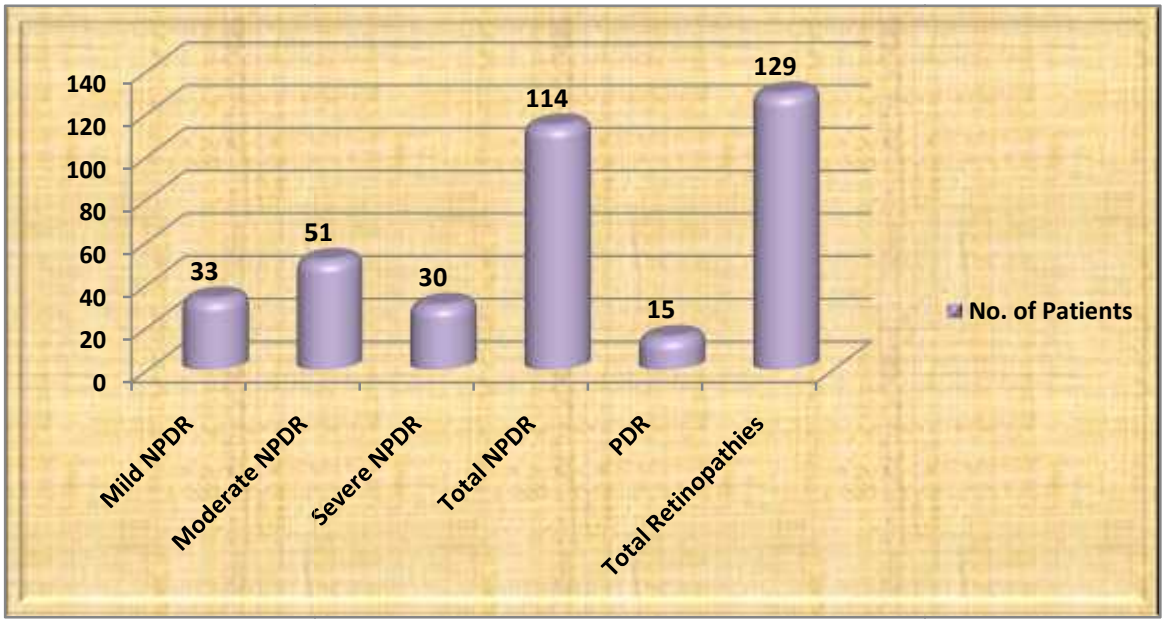


Graph No. 11. Distribution of patients according to findings in vitreous

TABLE NO. 23: We did the fundoscopy of all patients to find out the retinal changes in them. 129 patients were affected by some form of retinopathies (36.8%) making it the most common pathological condition found in the study population. 114 of them (32.6%) had NPDR while 15 had PDR (4.3%) . In the NPDR group, 33 of them had mild NPDR (25.6%), 51 had moderate (39.5%) and 30 had severe NPDR (23.5%). 18 of these patients had CSME (5.6%).

Table No. 23. Distribution of patients according to type of retinopathy.

Type of Retinopathy	No. of Patients	Percentage
Mild NPDR	33	25.6
Moderate NPDR	51	39.5
Severe NPDR	30	23.2
Total NPDR	114	88.3
PDR	15	11.6
Total Retinopathies	129	100



Graph no 12: Distribution of patients according to type of retinopathy

TABLE No. 24: In this study, most of the patients were found to be in the age group of 51-60 years (33%). The average age of the patients studied was 50.9yrs. A significant association was found between age group and retinal complication of diabetes mellitus.(p value=0.001)

Table No. 24: Distribution of patients according to age group.

Diagnosis		**Age**					
		31-40	41-50	51-60	61-70	>71	Total
Mild NPDR	**Frequency**	01	03	14	10	05	33
	Percentage	6.3	10.7	24.6	23.3	22.7	19.9
Moderate NPDR	**Frequency**	00	10	20	12	09	51
	Percentage	00	35.7	35.1	27.9	40.9	30.7
Severe NPDR	**Frequency**	12	02	06	08	02	30
	Percentage	75.0	7.1	10.5	18.6	9.1	18.1
PDR	**Frequency**	01	03	04	04	03	15
	Percentage	6.3	10.7	7.02	9.3	13.6	9.03
CSME	**Frequency**	0	6	7	4	1	18
	Percentage	00	21.4	12.3	9.3	4.5	10.8
OTHERS	**Frequency**	2	4	6	5	2	19
	Percentage	12.5	14.3	10.5	11.6	9.1	11.4
TOTAL		16	28	57	43	22	166

p-value = 0.0001

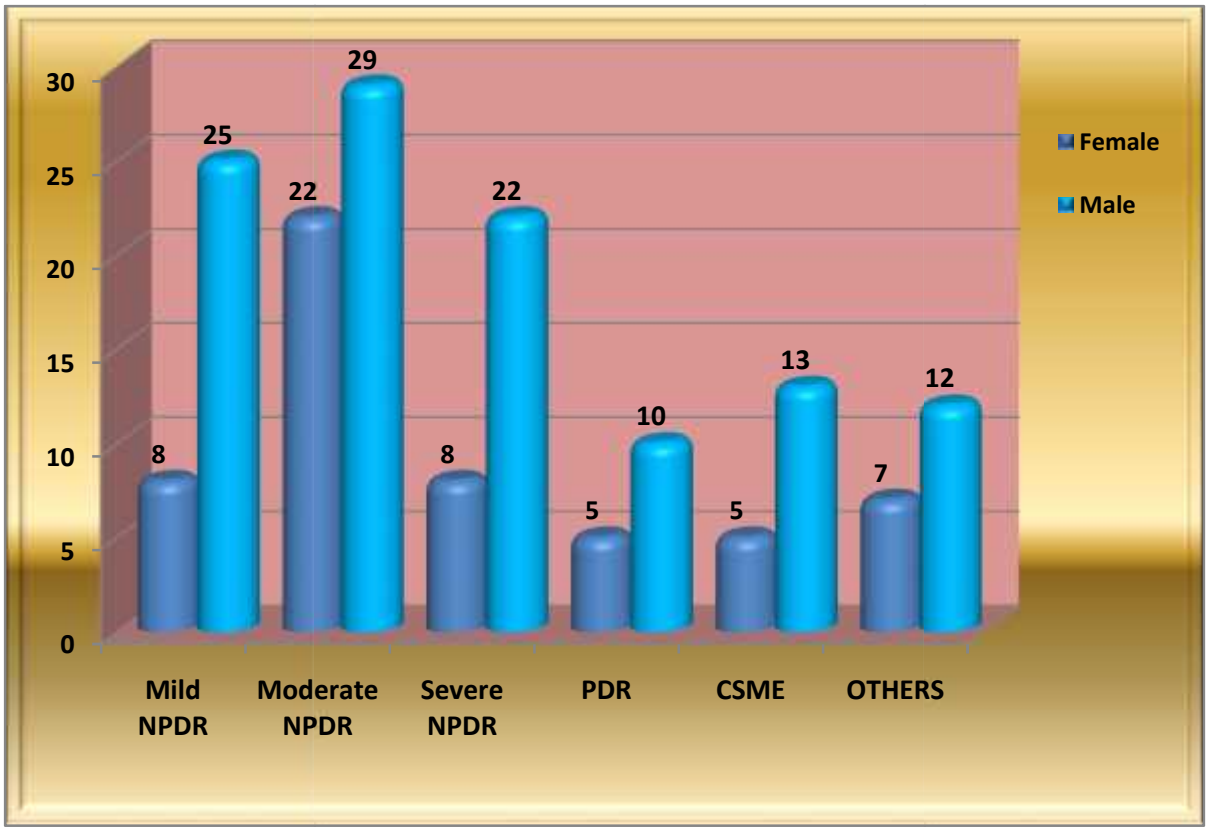
TABLE NO. 25: Shows the prevalence of the same retinal lesions in accordance with the sexual distribution. In the present study 211 patients were male while 139 patients were female. Of these, 111 men and 55 women were affected by some kind of retinal disease. We found significant association between sex and ocular complication of diabetes mellitus (p-value < 0.001) wherein both mild NPDR and severe NPDR were more common in males than in females. Our study showed no difference in prevalence of PDR in either sexes (9% each), while slightly more common CSME in men (11.7%) than in females (9.1%).

The prevalence of combined retinal lesions were however more common in males (211, 52.6%) than females (120, 39.6%)

Table No. 25: Distribution of patients according to sex

Diagnosis		**Sex**		
		Female	**Male**	**Total**
Mild NPDR	**Frequency**	08	25	33
	Percentage	14.5	22.5	19.9
Moderate NPDR	**Frequency**	22	29	51
	Percentage	40.0	26.1	30.7
Severe NPDR	**Frequency**	08	22	30
	Percentage	14.5	19.8	18.1
PDR	**Frequency**	05	10	15
	Percentage	9.1	9.0	9.03
CSME	**Frequency**	05	13	18
	Percentage	9.1	11.7	10.8
OTHERS	**Frequency**	07	12	19
	Percentage	12.7	10.8	11.4
TOTAL		55	111	166

p-value= 0.001



Graph No. 13: Distribution of retinopathy patients according to sex

TABLE NO. 26: Shows the prevalence of retinopathies with the duration of diabetes. 11.7% of people are affected by Mild NPDR within 5 years of getting type 2 Diabetes, which increases significantly to 23.7% and 25% by 10 years and thereafter. Similarly, Moderate NPDR rises from 25% to 28.9% and 36.8% in same interval. The severe NPDR type prevalence rises from 8.3% to 18.8% within 5 years to more than 10 years of diabetes. Also, PDR prevalence increased from 1.7% to 13.2%.

Table No. 26. Co relation between duration of diabetes and type of retinopathy

Diagnosis		**Duration of DM**			
		0-5	**6-10**	**>10**	**Total**
Mild NPDR	**Frequency**	07	09	17	33
	Percentage	11.7	23.7	25.0	19.9
Moderate NPDR	**Frequency**	15	11	25	51
	Percentage	25.0	28.9	36.8	30.7
Severe NPDR	**Frequency**	17	07	06	30
	Percentage	8.3	12.4	18.8	18.1
PDR	**Frequency**	01	05	09	15
	Percentage	1.7	13.2	13.2	9.03
CSME	**Frequency**	07	02	09	18
	Percentage	11.7	5.3	13.2	10.8
OTHERS	**Frequency**	13	04	02	19
	Percentage	21.7	10.5	2.9	11.4
TOTAL		60	38	68	166

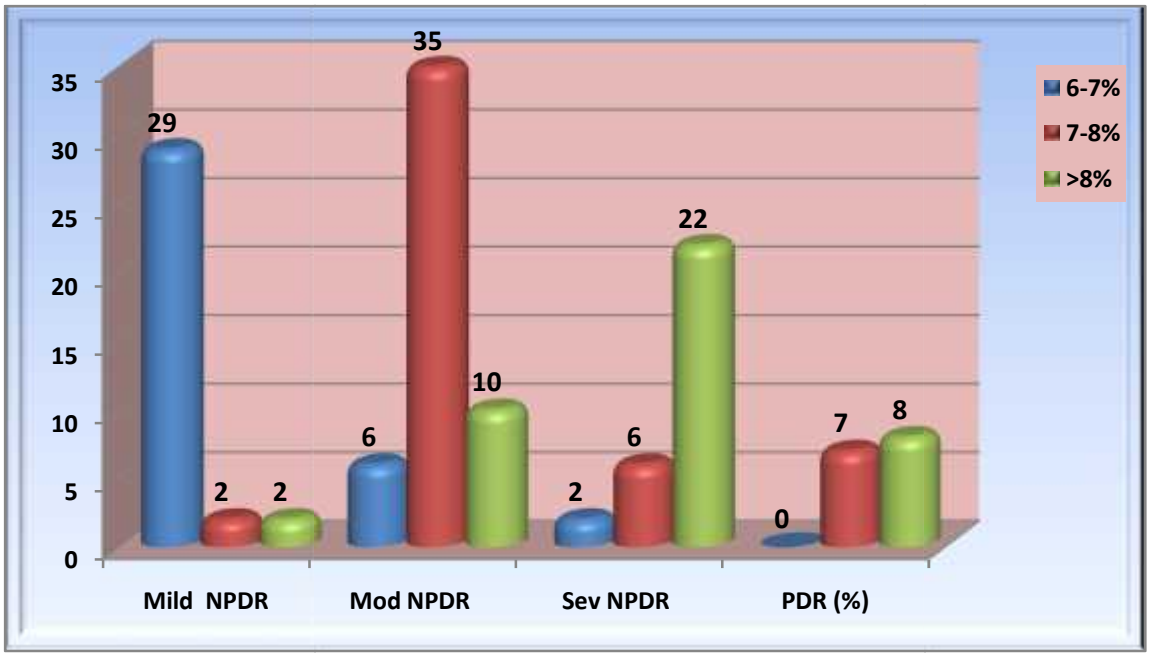
p-value = 0.002

TABLE NO 27: HBA1C has been known as a marker of glycemic control. We used this serum marker to identify the relation between the levels of uncontrolled hyperglycemia with prevalence of different retinopathies. The study yielded a highly significant result. (p- value <0.0001). Our study found that with increasing HBA1C levels, the prevalence of retinopathies increases. From Table No.27, it is clear that 16.1%, 65.8% and 95.5% prevalence was observed for HBA1C of 6-7%, 7-8% and > 8 % respectively. It is also seen that the mild NPDR (87.9%) is found clustering at lower levels of HBA1c (<8 %), moderate NPDR(68.6%) is most prevalent between 7-8 % of HBA1C levels and Severe NPDR(73.3%) is most common at > 8 % levels.

Table No. 27. Co- relation between HBA1C levels and prevalence of retinopathy

HBA1C	No. of Patients	Mild NPDR	Mod NPDR (%)	Sev NPDR (%)	PDR (%)	Total
6-7%	230	29(87.9)	6(11.7)	02(6.7)	00(0)	37(16.1%)
7-8%	76	02(6.1)	35(68.6)	06(20.0)	07(46.7)	50(65.8%)
>8%	44	02(6.1)	10(19.6)	22(73.3)	08(53.3)	42(95.5%)
Total	350(100)	33(100)	51(100.)	30(100)	15(100)	129(100)

p-value <0.0001



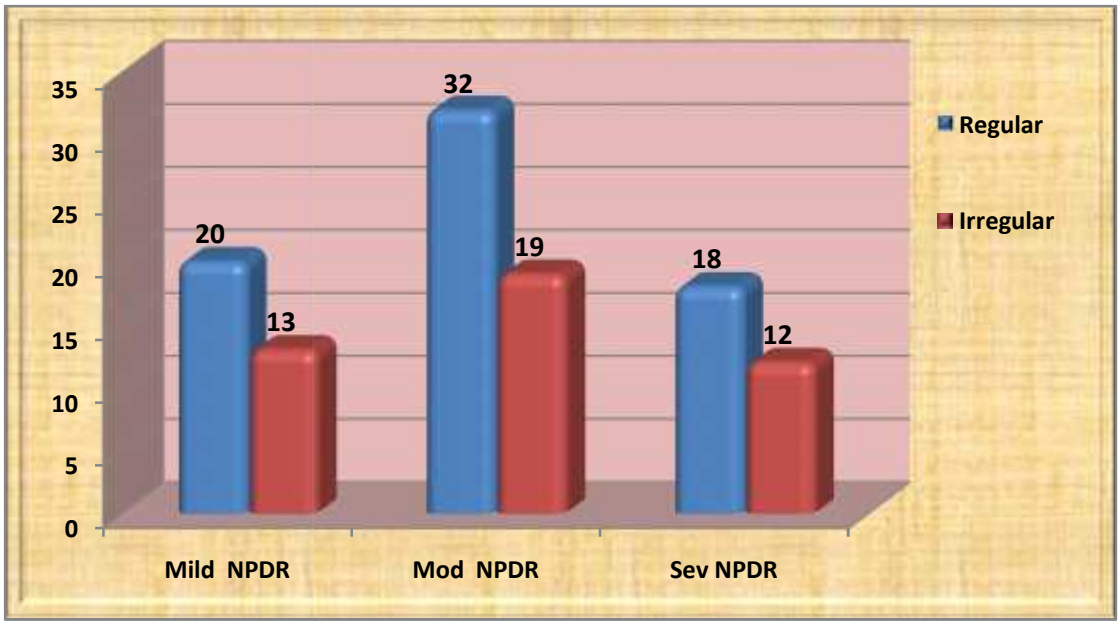
Graph No. 14. Co- relation between HBA1C levels and prevalence of retinopathy

TABLE NO. 28: We also did a comparative study of prevalence of NPDR in patients accordance to their diabetes treatment compliance. Most of these patients had been advised either oral hypoglycemic in the form of metformin, glipizide, gluconorm, etc. or subcutaneous insulin. 250 of our patients (i.e. 65.1%) were taking regular treatment, while 90 (34.9%) of them were not regular with their medications. Apparently, 60.6% of Mild NPDR patients were on regular treatment than 39.3% who were not. In the same way, both moderate and severe variety of NPDR were found more commonly with regular treatment than irregular ones. The p- value of this is 0.964, which indicates dissociation between the two.

Table No. 28. Severity of NPDR versus regular and irregular treatment

Treatment		**Mild NPDR**	**Mod NPDR**	**Severe NPDR**	**Total**
Regular (250/350)	**Frequency**	20	32	18	60/249
	%	60.6	62.7	60.0	73.6
Irregular (90/350)	**Frequency**	13	19	12	44/90
	%	39.3	37.3	40.0	39.4
Total (350)	**Frequency**	33	51	30	114
	%	100	100	100	100

Chi square=0.07 p-value=0.964



Graph No. 15. : Severity of NPDR versus regular and irregular treatment

TABLE NO. 29 : Other retinal lesions like ARMD was present in 4 of them, CRVO,BRAO, CRAO & Retinal detachment in 2 each, while 1 patient had BRVO. These 13 patients altogether does not make a significant statistics.

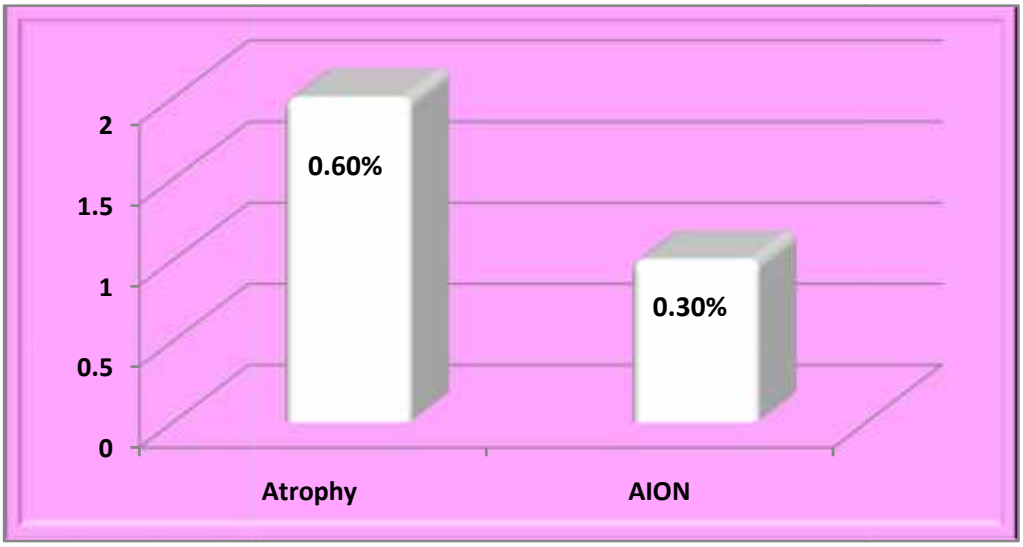
Table No. 29. Distribution of patients according to other retinal lesions

Other retinal lesions	**No of patients**	**%**
ARMD	04	1.1%
CRVO	02	0.6%
BRVO	01	0.3%
BRAO	02	0.6%
CRAO	02	0.6%
Retinal detachment	02	0.6%
Total	13	3.7%

TABLE NO.30: 2 of the patients also had optic nerve atrophy while 1 had an acute inflammation

Table No. 30. Number of Optic nerve lesions

Optic nerve lesions	**No of patients**	**%**
Atrophy	2	0.6%
AION	1	0.3%

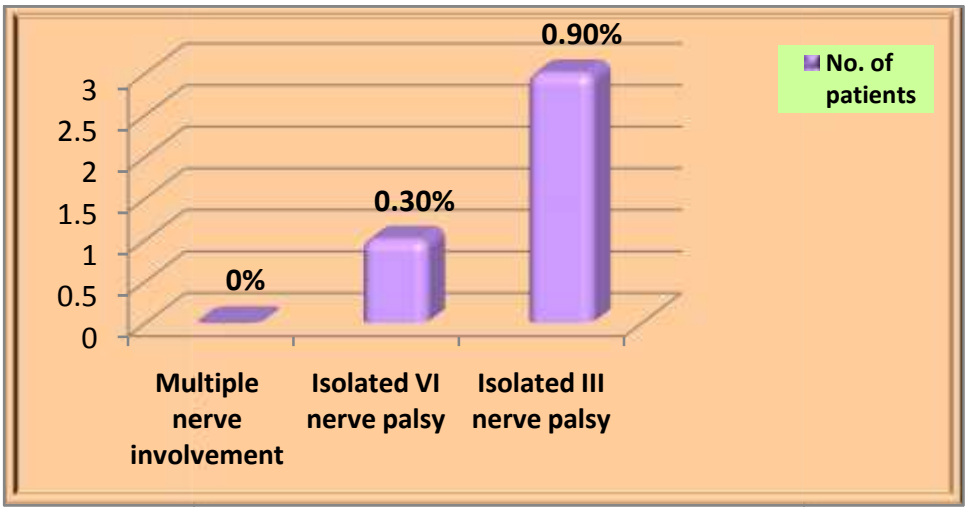


Graph no. 16. Number of Optic nerve lesions.

TABLE NO. 31: There were 3 patients with isolated 3rd cranial nerve palsy with no CNS involvement, while another patient had 6th nerve palsy with no other neurological deficits.

Table No.31. Distribution of patients according to cranial nerve involvement

Cranial nerves involved	**No. of patients**	**%**
Multiple nerve involvement (III,IV,V,VI,VII)	0	0%
Isolated VI nerve palsy	1	0.3%
Isolated III nerve palsy	3	0.9%



Graph No 17. Distribution of patients according to cranial nerve involvement.

DISCUSSION

In this study most of the patients were found to be in the age group of 51-60 years (33.7%). All the patients were aged above 30 years. There were 211 males and 139 females in the study group. The average age of the patients studied was 54.9 years for males and 56.2 years for females. Comparable age distribution was found in the Wisconsin epidemiologic study of diabetic retinopathy. [22] The average duration of diabetes in the study group was 6.4 years in males and 7.3 years in females.

In the present study we found retinal lesions were the most common ocular complication occurring in diabetes subjects (40.6%), of which retinopathies of all kind constituted majority of them(36.8%). The prevalence of cataract was 35.4% followed by glaucoma (4.6%) and other ocular pathologies like conjunctivitis, recurrent styes, dacrocystitis, etc. Stanga PE,[83] in their review of literature in 1999, have found that retinopathy is the most common ocular complication of long standing diabetes mellitus followed by other lesions like cataract, uveitis, neuro-ophthalmitis, etc. It is generally recognised in existing literature that retinopathy is the most common ocular complication in type 2 diabetes. Our study confirms that diabetic retinopathy in its various forms is the most common complication of diabetic eye disease in India.

Different eye lid lesions were noted in our study such as recurrent stye (4%), Xanthelesma (4%), Blepharitis (3.7%), recurrent chalazion (0.6%), etc. Xanthelasma are rare in the general population. Variable incidence of 0.56%-1.5% has been reported from the western developed nations.[84]The incidence in our study is 4%, which is explained by the fact that xanthelesma is a cutaneous marker for underlying diabetes and dyslipidemia.

Diabetes predisposes to infection in different body parts, and ocular structures are not any different from it. Thus, recurrent styes (4%),blepharitis(3.7%), conjunctivitis(1.7%) and dacrocystitis(2.6%) can be explained in our group of patients. Kruse , have confirmed in their case control study that diabetes is a risk factor for acute infectious conjunctivitis, with an Odds Ratio (OR) of 1.24 in diabetics.[85] We did not get a study attributing causal relation or direct association between diabetes and the above said other lesions.

There were 19 patients with Pterygium in our study group, which makes it 5.42% prevalence. Two different studies, one by Asokan , (Chennai group, 2012) [86] and Hua Zhong[87] (study of adult chinese population) have statistically found out no association between prevalence of pterygium and diabetes. We need to find out the disparity among our population with prevalence of pterygium.

Microbial corneal ulcer is a sight-threatening condition and one of the major causes of blindness. Diabetic patients with microbial keratitis are at an increased risk than non-diabetic persons and require immediate medical attention. In this context, recording the local microbiological status of microbial corneal keratitis would be more useful for clinicians / ophthalmologist as to provide effective treatment. The present study evaluated presence of corneal ulcers in the study population, but did not record the microbiology of diabetic subjects who were diagnosed with corneal ulcer of bacterial / fungal etiology. There were 7 patients with corneal ulcer of which 5 were bacterial type and 1 was nonhealing. There was 1 patient presenting with corneal perforation . This signifies the need for appropriate microbiological diagnosis of microbial corneal ulceration in order to provide prompt and effective medical remedy and to avoid empirical treatment.

Nielsen found that the prevalence rate of primary open angle glaucoma and ocular hypertension was 6.0% and 3.0%, respectively in diabetes type 2 patients. Neovascular glaucoma occurred in 2.3% of all diabetics .[88] In our study, we had 21 patients, i.e. 6% with ocular hypertension (IOP > 21mmHg), 8 patients (2.3%) were of Neovascular type and rest being POAG (2.6%). Thus, the prevalence is similar in both studies.

Cataract:

Persons with diabetes mellitus have been found to be at increased risk of developing cataracts when compared with non diabetic persons. The report by Klein describes the study of characteristics which may be related to this problem in a population-based sample of diabetic persons. Prevalence of surgical aphakia and cataract increased with increasing age in both younger and older onset diabetic persons. [89] Nearly two thirds of the Indian diabetic population showed evidence of cataract; mixed cataracts were more common than the monotypes ones in a recent study by Shankar Nethralaya.[90] 35.4% of our study population had cataract which is lesser than the Shankar Nethralaya group. 20 patients in our group had mixed type of cataracts (14.7%) which is lesser than the total number of monotypes. The most common type of cataract found was cortical type (41.2%) followed by senile posterior cortical (29.8%). The characteristic snow flake cataract of diabetes is found in only 3.2% of cataract patients, which is of similar lower incidence in many studies.

Data from the Framingham and other eye studies indicate a three to fourfold increased prevalence of cataract in patients with diabetes under the age of 65, and up to a twofold excess prevalence in patients above 65. The risk is increased in patients with longer duration of diabetes and in those with poor metabolic control. Cataracts may be reversible in young diabetics with improvement in metabolic control. The most frequently seen type of cataract in diabetics is the age-related or senile variety, which tends to occur earlier and progresses more rapidly than in

nondiabetics. Presence of mostly cortical variant in our study could reflect environmental or genetic factors. Most of the people develop any one of these cataracts in the age group of 51-70 years (42.7%), which coincides with that of 3 times that of non-diabetic population.[91]

Recent studies on cataract surgery in diabetics tend to report a lower incidence of complications and better visual outcomes. This trend of improvement may be due to better preoperative management of retinopathy, evolutions in operative techniques and appreciation of the importance of systemic factors such as glycemic and hypertensive control.

In general, the visual prognosis following cataract surgery in diabetic patients is favorable. Diabetic patients with little or no retinopathy enjoy the same good prognosis as individuals without diabetes. However, in the presence of significant diabetic retinopathy, postoperative visual acuity may be suboptimal and the results of surgery may be disappointing. Presence of CSME and poor preoperative visual acuity (reflecting diabetic maculopathy, ischemia and traction) have been recognized as risk factors for poor postoperative visual acuity following cataract surgery. [92]

We operated on all patients with visual acuity of < 6/36, 2 patients had posterior capsular opacity, 1 had conjunctivitis, and rest did not have any major problems. We infer that cataract surgery in diabetes is safe and good results can be expected as in any other group.

Retinopathy:

The prevalence of retinopathy in our study population was 36.8%, of which NPDR were 32.6 % and PDR were 4.3%. Studies have reported that the prevalence of diabetic retinopathy in India varies from 20-31 %. The Aravind Eye Disease Survey in southern India reported a retinopathy prevalence of 27% in a population aged 30 years or older with self-reported diabetes, [93] similar to the 22% prevalence reported from another population-based study in an urban population in Hyderabad, India.[94] The prevalence of DR in the Chennai Urban Rural Epidemiology (CURES) Eye Study in south India was

17.6 per cent, significantly lower than age-matched western counterparts. Thus, our study shows a higher prevalence of retinopathies than other Indian studies.

A recent pooled study examined the prevalence of retinopathy among people 40 years and older from eight population-based studies, including the WESDR.[95] The studies included in these meta-analysis used standardized methods to grade retinopathy from fundus photographs and estimated an overall prevalence of retinopathy of about 40% and a prevalence of sight-threatening disease.

The prevalence of NPDR was significantly higher in female diabetes patients (34.3%) than in male diabetes patients (31.8%). Wisconsin Epidemiological study of Diabetic Retinopathy had also found higher prevalence of Diabetic Retinopathy in females. There was no significant difference in prevalence of PDR, CSME or other lesions. Thus, females are at higher risk of NPDR than males.

In the younger onset group in the WESDR, the prevalence of any retinopathy was 8% among participants with diabetes duration of 3 years, 25% for 5 years, 60% for 10 years, and 80% for 15 years.[22] In the present study, the prevalence of proliferative retinopathy was 1.7% for those with diabetes duration of 5 years, increasing to 13.2% for 10 years. In our study, the prevalence of NPDR varied from 26.1% in persons who had diabetes for less than five years to 32.3% in persons who had diabetes for 5 to 10 or more years and 78.7% in more than 10 years.

Increased incidence of CSME was noted as the duration of diabetes increased (11.7% to 13.2% over the same duration intervals of diabetes.) Similar increased incidence of CSME with increased duration of diabetes was noted in a study by Varma.[96] The findings are thus consistent with the fact that the strongest predictor for the prevalence of

retinopathy in persons with type 2 diabetes is the duration of diabetes and was proven statistically significant (p-value < 0.002)

Two landmark multicentered clinical trials, the DCCT and the UKPDS assessed the relationship between glycemic control and vascular complications of diabetes. One of the most important predictive factors for diabetic retinopathy is the level of glycemic control. The WESDR showed that both the younger-onset and older-onset patients with diabetes who had no retinopathy had significantly lower mean glycosylated hemoglobin values than those patients with retinopathy.[95] Patients with higher glycosylated hemoglobin values were shown to have a higher risk of retinopathy, such that those with mean HbA1c levels over 12% were 3.2 times more likely to have retinopathy after 4 years than subjects with HbA1c levels under 12%.[97] Our study population exhibits a similar pattern : 16.1% of diabetic patients with HBA1C between 6-7% had some form of DR, while the prevalence rises to 65.8% and 95.5% with HBA1C of 7-8% and more than 8% (i.e. uncontrolled type) respectively. It is also seen that the mild NPDR is found clustering at lower levels of HBA1c (<7 %), moderate NPDR is most prevalent between 7-8 % of HBA1C levels and Severe NPDR is most common at > 8 % levels. Thus, both prevalence and severity of retinopathy correlates with HBA1C level in our study group.

In our study, subjects taking regular treatment (oral tablets/insulin) had a combined NPDR prevalence of 24% which is lower when compared to the group not taking treatment regularly (48.9%). Regular treatment and follow up should be stressed in the management of diabetes mellitus. In a study conducted by Alan MJ [98] Compared with individuals with continuous follow-up, patients with irregular clinical visits were more likely to be from families of lower socioeconomic class levels, have a parental history of

separation and divorce, and were members of families that reported being least openly expressive of positive emotions. Poor glycemic control in year 1 was associated with irregular follow-up in years 2 through 4. Patients with irregular follow-up continued to have worse glycemic control in years 2 through 4 than patients with continuous follow-up. Retinopathy occurred more frequently among those in the irregular follow-up group.

Rush JA showed that diabetes is the underlying cause in 25–30% of patients aged 45 years and older who develop acute extra ocular muscle palsy .[99] In a study by Watanabe K, 1% of patients with diabetes were found to have cranial nerve palsies, compared with only 0.13% of control subjects.[21] 1.1% of our patients (i.e. 4 of them) had cranial nerve palsy, same as with the Watanabe study.

We found a prevalence of 0.3% BRVO amongst diabetics in our study while BRVO were detected in 0.79% in a study conducted by Kawasaki R.[100]

CONCLUSION

- Retinal lesions (like Retinopathies, CSME, BRVO,BRAO, ARMD and RD) were the most common ocular complication occurring in diabetes subjects (40.6%), of which retinopathies of all kind constituted majority of them (36.8%).
- The prevalence of cataract was 35.4% followed by glaucoma (4.6%) and other ocular pathologies like conjunctivitis, repeated styes, dacrocystitis, etc
- Xanthelesma are rare in general population (0.56%-1.5%), but are found more commonly in diabetic patients (4%).
- Diabetes predisposes to infection in different body parts, and ocular structures are not an exception. We could not find a attributable cause, but others have found diabetes as a risk factor for such infective pathologies.
- Pterygium was found to have a high prevalence in our study (5.42%), but others have not found an association of it with diabetes.
- Diabetic patients with microbial keratitis are at an increased risk than non-diabetic persons and require immediate medical attention.
- The prevalence of Primary open angle glaucoma was 2.6% and 2.3% had neovascular glaucoma.
- 35.4% of our study population had cataract which is lesser than the Shankar Nethralaya group. Monotypes were more common than the mixed type of cataracts.
- The most common type of cataract found was cortical type (41.2%) followed by senile posterior cortical (29.8%). In general, the visual prognosis following cataract surgery in diabetic patients is favorable.

- The prevalence of retinopathy in our study population was 36.8%, of which NPDR were 32.6% and PDR were 4.3%. Our study shows a higher prevalence of retinopathies than other Indian studies
- The prevalence of NPDR was significantly higher in female diabetes patients (34.3%) than in male diabetes patients (31.8%).
- The prevalence of NPDR varied from 26.1% in persons who had diabetes for less than five years to 32.3% in persons who had diabetes for 5 to 10 or more years and 78.7% in more than 10 years.
- The strongest predictor for the prevalence of retinopathy in persons with type 2 diabetes is the duration of diabetes and was proven statistically significant (p-value < 0.0001).
- 16.1% of diabetic patients with HBA1C between 6-7% had some form of DR, while the prevalence rises to 65.8% and 95.5% with HBA1C of 7-8% and more than 8% (i.e. uncontrolled type) respectively. It is also seen that the mild NPDR is found clustering at lower levels of HBA1c (<7 %), moderate NPDR is most prevalent between 7-8 % of HBA1C levels and Severe NPDR is most prevalent at > 8 % levels. Thus, both prevalence and severity of retinopathy correlates with HBA1C level in our study group.
- 1.1% of our patients (i.e. 4 of them) had cranial nerve palsy, same as with the Watanabe study and higher than in general population (0.13%).

SUMMARY

Diabetes is a group of metabolic disorder characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both. The nationwide prevalence of diabetes in India now tops 9%. By 2030, India will have 100 million people with diabetes. Diabetes mellitus, is a multisystem disease, and diabetic eye disease is an end-organ response to the effects of the condition on the human system. Each portion of the eye is susceptible to the harmful effects of diabetes. This clinical study of ocular manifestations of patients with type 2 diabetes mellitus was undertaken in view of large spectrum of diabetic eye disease apart from diabetic retinopathy.

This was a prospective observational study on 350 type 2 diabetes patients. Collected data of each patient including detailed diabetes history, ocular complaints and did complete ophthalmological examination. The data gathered was tabulated into a master chart and statistical analysis done with SPSS for relevant tables.

Significant Results included:

- All ocular structures can be affected by some diabetic complication.
- The most common prevalent ocular complication in type 2 diabetes is of retina: 142 patients (40.6%) followed by the lens 124(35.4%).
- Diabetics have been found to be at increased risk of developing cataracts when compared with nondiabetic persons. 35.4% of our study population had cataract which is lesser than the other South Indian studies.
- The most common type of cataract found was cortical type (41.2%) followed by senile posterior cortical (29.8%).

- The prevalence of retinopathy in our study population was 36.8%, of which NPDR were 32.5% and PDR were 4.3%.Our study shows a higher prevalence of retinopathies than other Indian studies (20-31%).
- The strongest predictor for the prevalence of retinopathy in persons with type 2 diabetes is the duration of diabetes.
- Patients with higher glycosylated hemoglobin values (HbA1C >8 %) were shown to have a higher risk of retinopathy.

Appropriate treatment of diabetes and optimal metabolic control are key goals in the prevention of many ocular complications of diabetes. At the same time, following the various guidelines to screen and detect these complications will make a difference in the final outcome of the patients.

BIBLIOGRAPHY

1. The Expert Committee on the Diagnosis and Classification of Diabetes Mellitus: Report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus. Diabetes Care 1997; 20: 1183–97.
2. Diabetic Eye clinic, Nnamdi, Azikilve university teaching hospital, Nnewi nogeria. Diabetic Retinopathy: management updates nwosusn, Niger postgrad Med.J 2003 Jun;10(2)115 – 20.
3. Cavallerano JD. A review of non-retinal ocular complications of diabetes mellitus. J Am Optom Assoc. 1990 Jul; 61(7):533-43.
4. National Diabetes Data Group. Classification and diagnosis of diabetes mellitus and other categories of glucose intolerance. Diabetes 1979; 28: 1039-57.
5. King H, Aubert RE, Herman WH. Global burden of diabetes, prevalence, numerical estimates, and projections. Diabetes Care 1995; 21:1414–31.
6. Ramachandran A, Snehalatha C, Ma RC. Diabetes in South-East Asia: an update for 2013 for the IDF Diabetes Atlas. Diabetes Res Clin Pract 2014; 103:231–37.
7. Rajiv R, Rani PK, Sudhir R. Prevalence of diabetic retinopathy in India SankaraNethralaya Diabetic Retinopathy Epidemiology and Molecular Genetics Study report 2. Ophthalmology 2009; 116: 311–18.
8. Cavalleranoj. Ocular manifestations of diabetes mellitus. Optom Clin 1992; 2:93-116.
9. Congdon NG, Friedman DS, Lietman T. Important causes of visual impairment in the world today. JAMA 290:2057– 60.

10. Yau JVY. Global prevalence and major risk factors of diabetic retinopathy. Diabetes Care 35:556-64.
11. Rema S. Prevalence of Diabetic Retinopathy in Urban India: The Chennai Urban Rural Epidemiology Study (CURES) Eye Study . IOVS,46,7:2329-33.
12. UK Prospective Diabetes Study Group. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes. Lancet. 1998; 352:837–53.
13. Skyler JS. Diabetic complications: The importance of glucose control. Endocrinol Metab Clin. 1996; 25:243–54.
14. Negi A, Vernon SA. An overview of the eye in diabetes. Journal of The Royal Society of Medicine 2003; 96:266-72.
15. Jeganathan V, Swetha E, Wang, Jie J, Wong, Tien Y. Ocular Associations of Diabetes Other Than Diabetic Retinopathy. Diabetes Care 2008 Sep;31 (9): 1905-12.
16. Kruse A, Thomsen RW, Hundborg HH . Diabet Med. ;23(4):393-7.
17. Rowe NG. Diabetes, fasting blood glucose and age-related cataract: the Blue Mountains Eye Study. Ophthalmic Epidemiol 2000 7:103–14.
18. Bonovas S, Peponis V. Diabetes mellitus as a risk factor for primary open-angle glaucoma: a meta-analysis. Diabet Med. 2004 Jun; 21(6):609-14.
19. Schertzer RM, Wang D, Bartholomew LR: Diabetes mellitus and glaucoma. Int Ophthalmol Clin 1998; 38:69–87.
20. Bandello F, Menchini F: Diabetic papillopathy as a risk factor for progression of diabetic retinopathy. Retina 2004; 24:183–84.

21. Watanabe K. Characteristics of cranial nerve palsies in diabetic patients. Diabetes Res Clin Pract 1990; 10:19 –27.
22. Klein R, Klein BEK, Moss SE. The Wisconsin epidemiologic study of diabetic retinopathy III. Prevalence and risk of retinopathy when age at diagnosis is 30 or more years. Arch Ophthalmol 1984; 102:527–32.
23. Krall LP, Levine R, Barnett D. The history of diabetes. In: Kahn CR, Weir GC,Editors Joslin's Diabetes Mellitus:13th ed. Philadelphia : Lea and Feibiger:1994;1-17.
24. Rollo J. An account of two cases of diabetes mellitus, with remarks as they arose during the progress of the cure. London: C. Dilly: 1797; 116-19.
25. Kalantzis G, Angelou M, Rebelakou EP. Diabetic retinopathy: An historical assessment Hormones 2006; 5(1):71-74.
26. Mackenzie S, Nettleship E. A case of glycosuric retinitis. Roy ophth Lond HospRep9:134.
27. Laatikainen L. Development and classification of rubeosis iridis in diabetic eye disease.Br J Ophthalmol 1979; 63:150-56.
28. Bedell JA. Stereoscopic fundus photography. J Am Med Assoc 1935; 105 (19):1502-09.
29. Woods AC. Jonas S Friedenwald: In Memorium. Bulls Johns Hopkins Hosp 1956; 99:37.
30. Poulsen JE. Recovery from retinopathy in case of diabetes with simmonds disease. Diabetes 1953; 2:7-12.

31. Rucker CW. Paralysis of third, fourth and sixth cranial nerves. Am J Ophthalmol 1958; 46:787-94.
32. Kalantzis G, Angelou M, Rebelakou EP. Diabetic retinopathy: An historical assessment.Hormones 2006; 5(1):73.
33. Novotny HR, Alvis DR. A method of photographing fluorescence in circulating blood in the human retina. Circulation 1961; 24:82.
34. Esperance FA and James WA. The eye and diabetes mellitus. Ellenberg M and Rifkin H. In: Diabetes Mellitus – Theory and Practice 3rd edition Medical Examination Publishing, New York 1983; 727-58.
35. McCulloch, Pashby TJ. The significance of conjunctival aneurysms in diabetics. Br J Ophthalmol 1950; 34:495.
36. Inoue K, Kato S, Ohara C. Ocular and systemic factors relevant to diabetic keratoepitheliopathy. Cornea 2001; 20:798-801.
37. Kanski JJ. Chapter 9- glaucoma. In: Clinical Ophthalmology- A Systemic Approach, 5th edition. Butterworth- Heinmann 2003; 193-210.
38. Friedman S, Feiner R, Podalk, Bedell R. Pupillary abnormalities in diabetic neuropathy. Ann Intern Med 1967; 67:977.
39. Saito Y, Ohmi G, Kinoshita S. Transient hyperopia with lens swelling at initial therapy in diabetes. Br J Ophthalmol 1993; 77:145-8.
40. Gabbay KH. The sorbitol pathway and the complications of diabetes. New Engl J Med 1973; 288:831-6.
41. Bron AJ, Sparrow J,Brown NAP, Harding JJ. The lens in diabetes. Eye 1993; 7:260-75.

42. Bron AJ, Sparrow J, Brown NAP, Neil HAW. Biometry of the crystalline lens inearly onset diabetes. Br J Ophthalmol 1990; 74:654-60.
43. Klein BE, Klien R, Moss SE. Prevalence of cataracts in a population based study of persons with diabetes mellitus. Ophthalmology 1985; 92:1191-96.
44. Rowe NG, Mitchell PG, Cumming RG, Wans JJ. Diabetes, fasting blood glucose and age related cataract: the Blue Mountains Eye Study. Ophthalmic Epid 2000; 7:103–14.
45. Caird, F. I., Pirie, A., and Ramsell, T. G., Diabetes and the Eye. Blackwell Scientific; Oxford 1969; 114.
46. Rema M, Deepa R, Mohan V. Prevalence of retinopathy at diagnosis among Type 2 diabetic patients attending a diabetic centre in S India . Br J Ophthal 2000; 84:1058-60.
47. Duke elder S, Dobree JH. Systems of classification of diabetic retinopathy. System of ophthalmology 1967; 10:414.
48. Ballantyne AJ, Michaelson. Classification of diabetic retinopathy. Trans Ophthalmol Soc UK 1947; 67:54.
49. Scott DJ, Dollery, Hill A. Classification of diabetic retinopathy. Br J Ophthalmol 1963; 47:588.
50. Alaerts, Slosse. Classification of diabetic retinopathy. Bull Soc Belge Ophthalmol 1957; 115:160.
51. Lee, McMeel, Schepens. Classification of diabetic retinopathy. Am j of Ophthalmol 1966; 62:207.

52. Peymann GA, Saunders DR, Goldberg MF. Diabetic retinopathy. Principles and Practice of Ophthalmology. 1987; 2:1205.
53. Kanski JJ. Clinical Ophthalmology- A Systemic Approach. Butterwor-Heinmann 1989;302.
54. Early Treatment Diabetic Retinopathy Study Group. ETDRS Report 1991. Fundusphotographic risk factors for progression of diabetic retinopathy. Ophthalmology 1991; 98:823-33.
55. Early treatment Diabetic Retinopathy Study Group. ETDRS Report. Grading diabetic retinopathy from stereoscopic color fundus photographs-an extension of modified Arlie House classification. Ophthalmology 1991; 98:786-806.
56. Kohner EM, Dollery CT, Bullpitt CJ. Cotton –wool spots in diabetic retinopathy. Diabetes1969; 18:691-704.
57. Ballantyne AJ, Michaelson. Classification of diabetic retinopathy. Trans Ophthalmol Soc UK 1947; 67:54.
58. Early Treatment Diabetic Retinopathy Study Group. ETDRS Report 1991. Fundus photographic risk factors for progression of diabetic retinopathy.Ophthalmology 1991;98:823-33.
59. Das T, Jalali S, Vedantam V, Majji AB. Retinal vascular disorders. In : Saxena S Ed: Clinical practice in ophthalmology. New Delhi: jaypee brothers 2003: 350.
60. Leske MC, Wu SY, Hennis A, Nemesure B, Hyman L, Schachat A. Incidence of diabetic retinopathy in the Barbados Eye Studies. Ophthalmology. 2003;110:941–47.

61. Van Leiden HA, Dekker JM, Moll AC, Nijpels G, Heine R. Riskfactors for incident retinopathy in a diabetic and nondiabetic population. The Hoorn Study. Arch Ophthalmol. 2003;121:245–51.
62. Shah SM, Sung JU, Haller JA, Nguyen QD. Persistent diabetic macular edema is associated with elevated hemoglobin A1c. Am J Ophthalmol. 2005;139: 620–23.
63. Novotny HR, Alvis DR. A method of photographing fluorescence in circulatingblood in the human retina. Circulation 1961; 24:82 .
64. Kim NR, Kim YJ, Chin HS, Moon YS. OCT patterns in diabetic macular oedema: prediction of visual outcomes after focal laser photocoagulation. Br J Ophthalmol 2009; 93:901-05.
65. Duncan LJP, Cullen LF, Ireland JT, Nolan J, Clarke BF, Oliver MF. A 3 yeartrial of atromid in exudative diabetic retinopathy. Diabetic 1986; 17:458.
66. Kohner EM, Joplin GF, Cheng H, Black R, Fraser TR. Florid diabetic retinopathyand its response to treatment by photocoagulation or pitituary ablation. Diabetes 1976; 25:104.
67. Diabetic retinopathy vitrectomy study research goup. Vitrectomy in diabeticretinopathy. Arch ophthalmol 1985; 103:1644.
68. Diabetic Retinopathy Clinical Research Network. A randomized trial comparing intravitreal triamcinolone acetonide and focal/grid photocoagulation for diabetic macular edema. Ophthalmology 2008;115: 1447-9.
69. Scott IU, Edwards AR, Beck RW. Diabetic Retinopathy Clinical Research Network A phase II randomized clinical trial of intravitreal bevacizumab for diabetic Macular edema. Ophthalmology 2007;114: 1860-67.

70. Cunningham ET Jr, Adamis AP, Altaweel M . Macugen Diabetic Retinopathy Study Group. Ophthalmology 2005;112:1747-57.
71. Tielsch JM, Katz J, Quigley HA. Diabetes, intraocular pressure, and primary open-angle glaucoma in the Baltimore Eye Survey. Ophthalmology. 1995;102:48–53.
72. Klein BE, Klein R, Jensen SC. Open-angle glaucoma and older-onset diabetes: the Beaver Dam Eye Study. Ophthalmology. 1994;101:1173–77.
73. Dielemans I, de Jong PT, Stolk R. Primary open-angle glaucoma, intraocular pressure, and diabetes mellitus in the general elderly population. The Rotterdam Study. Ophthalmology. 1996; 103:1271–75.
74. Gordon MO, Beiser JA, Brandt JD. The Ocular Hypertension Treatment Study. Baseline factors that predict the onset of primary open-angle glaucoma. Arch Ophthalmol. 2002; 120:714–720.
75. Mapstone R, Clark CV. Prevalence of type 2 diabetes mellitus in glaucoma. Br Med J. 1985;291:93–95.
76. Clark CV, Mapstone R. The prevalence of diabetes mellitus in the family history of patients with primary glaucoma. Doc Ophthalmol. 1986;62:161–63.
77. Mapstone R, Clark CV. The prevalence of autonomic neuropathy in glaucoma. Trans Ophthalmol Soc UK. 1985; 104:265–69.
78. Armaly MF, Baloglou PJ. Diabetes mellitus and the eye, I: changes in the anterior segment. Arch Ophthalmol 1967; 77:485– 92.
79. Madsen PH. Haemorrhagic glaucoma: comparative study in diabetic and nondiabeticpatients. Br J Ophthalmol. 1971; 55:444–50.

80. Bayraktar Z, Alacali N, Bayraktar S. Diabetic papillopathy in type II diabetic patients.Retina 2002; 22:752–58.
81. Scott IU, Flynn HW Jr, Feuer W. Endophthalmitis after secondary intraocular lens implantation: a case-control study. Ophthalmology. 1995; 102:1925–31.
82. Parfrey NA. Improved diagnosis and prognosis of mucormycosis: a clinicopathologic study of 33 cases. Medicine 1986; 65:113–23.
83. Stanga PE, Boyd SR, HamiltonAM: Ocular manifestations of diabetes mellitus. Curr Opin Ophthalmol 10:483–89.
84. Jonson A, Sigfusson N. Letter: Significance of xanthelasma palpebrarum in normal population. Lancet 1976; 1: 372.
85. Kruse A, Thomsen RW. Diabetes and risk of acute infectious conjunctivitis—apopulation-based case-control study. Diabet Med. 2006 Apr; 23(4):393-97.
86. Asokan R . Prevalence and associated factors for pterygium and pinguecula in a South Indian population. Ophthalmic Physiol Opt. 2012 Jan;32 (1):39-44.
87. Hua Zhong. Prevalence of and Risk Factors for Pterygium in Rural Adult Chinese Populations of the Bai Nationality in Dali: The Yunnan Minority Eye Study. Investigative Ophthalmology & Visual Science: 53 (10) 6616-18.
88. Nielsen NV. The prevalence of glaucoma and ocular hypertension in type 1 and 2 diabetes mellitus. An epidemiological study of diabetes mellitus on the island of Falster, Denmark. ActaOphthalmol: 1983; 61(4):662-72.
89. Klein BE, Klein R, Moss MS. Prevalence of cataracts in a population-based study of persons With diabetes mellitus. Ophthalmology 1985; 92:1191-96.

90. Raman R.Pal SS, Adams JSK . Prevalence and Risk Factors for Cataract in Diabetes: Sankara Nethralaya Diabetic Retinopathy Epidemiology and Molecular Genetics Study, Report No. 17.Investigative Ophthalmology & Visual Science: 1 (5): 12.
91. Pollreisz A., Erfurth US. Diabetic Cataract—Pathogenesis, Epidemiology and Treatment. Journal of Ophthalmology . Vol. 2010; 1-8.
92. Javadi M., Ghanavati S Z. Cataracts in diabetic patients: a review article: J Ophthalmic Vis Res 2008; 3 (1): 52-65.
93. Narendran V, John RK, Raghuram A, Ravindran RD, Nirmalan PK, Thulasiraj RD. Diabetic retinopathy among self reported diabetics in southern India: a population based assessment. Br J Ophthalmol. 2002; 86(9):1014–18.
94. Dandona L, Dandona R, Naduvilath TJ, McCarty CA, Rao GN. Population based assessment of diabetic retinopathy in an urban population in southern India. Br J Ophthalmol 1999;83(8):937–40.
95. Klein R, Klein BE, Moss SE, Davis MD, DeMets DL. The Wisconsin epidemiologic study of diabetic retinopathy. Prevalence and risk of diabetic retinopathy when age at diagnosis is less than 30years. Arch Ophthalmol. 1984; 102(4):520–26.
96. Varma et al. Four-year incidence and progression of diabetic retinopathy and macular edema: The Los Angeles Latino Eye Study. Am J Ophthalmol .2010 May; 149(5):752-6.

97. Klein R, Klein BE, Moss SE, Davis MD, DeMets DL. Glycosylated hemoglobin predicts the incidence and progression of diabetic retinopathy. JAMA. 1988; 260(19):2864–71.

98. Jacobson AM, Hauser ST, Willett J, Wolfsdorf JI, Herman L. Consequences of irregular versus continuous medical follow-up in children and adolescents with insulin dependent diabetes mellitus. Jour Paed 1997; 131(5):727-33.

99. Rush JA. Extra ocular muscle palsies in diabetes mellitus. International Ophthalmology Clinics 1984; 24 :155–59.

100. Kawasaki R. The Prevalence of Diabetic Retinopathy and other Fundus Diseases in Japanese Population: 2nd Year Experience in Funagata, Japan. Invest Ophthalmol Vis Sci 2002; 43: 43-82.

ANNEXURE I- ETHICAL CLEARANCE

B.L.D.E. UNIVERSITY'S
SHRI.B.M.PATIL MEDICAL COLLEGE, BIJAPUR-586 103
INSTITUTIONAL ETHICAL COMMITTEE

OUTWARD No. 046/12 18/10/12

INSTITUTIONAL ETHICAL CLEARANCE CERTIFICATE

The Ethical Committee of this college met on 18-10-2012 at 3:30pm to scrutinize the Synopsis of Postgraduate Students of this college from Ethical Clearance point of view. After scrutiny the following original/corrected & revised version synopsis of the Thesis has been accorded Ethical Clearance.

Title Clinical Study of Ocular Manifestations in patients with type 2 diabetes Mellitus

Name of P.G. student Dr. Shilpa M. Umarani
Ophthalmology

Name of Guide/Co-investigator Dr. Vallabha. K
Prof & HOD. Ophthalmology

DR.TEJASWINI VALLABHA
CHAIRMAN
INSTITUTIONAL ETHICAL COMMITTEE
BLDEU'S, SHRI.B.M.PATIL
MEDICAL COLLEGE, BIJAPUR.

Following documents were placed before E.C. for Scrutinization
1) Copy of Synopsis/Research project.
2) Copy of informed consent form
3) Any other relevant documents.

ANNEXURE 2-

INFORMED CONSENT FORM

Title of the study: "A Clinical Study of the Ocular Manifestations in patients with type 2 Diabetes Mellitus."

Name of the participant:_____

Name of the principal investigator:

Name of the institution:

Hospital and Research Centre

I _____aged_____yrs attending ophthalmology OPD in SHRI BLDEA Medical College, Hospital and Research Center, BIJAPUR, have been explained in my own language the need for clinical examination and evaluation of my eyes and investigations (fundus fluorescein angiography) that I may have to undergo as a participant in the study.

Consent form for Fundus Fluorescein Angiography:

Fluorescein angiography is a diagnostic test which uses special camera to photograph the structures of the back of the eye. This test is used to detect any leakage or damage to the blood vessels that nourish the retina.

Flourescein dye glows in visible light and is injected into a vein in the arm of the patient ,the dye reaches the retinal vessels through the vascular system. This test does not involve the use of X-ray or any other harmful form of radiation.

Fundus fluorescein angiography is considered to be a very safe test and side effects are uncommon. However the possibility of side effects cannot be completely ruled out. Fluorescein does not contain iodine and hence can be used in patients allergic to iodine. Some patients can experience slight nausea and vomiting. some patients who are allergic to the dye can develop rashes, which require medications such as antihistaminics and steroids. Very rarely a life threatening allergic reaction known as anaphylaxis can occur which requires prompt medical treatment.There may be infiltration of the dye into the skin at the site of injection, which could cause discolouration of the skin at that site. Flourescein dye will turn a patients urine orange and may slightly discolour the skin as well for a brief period of time.

I understand that fluorescein angiography is only a test and not a treatment modality . I understand the risks involved with this test and hereby give consent to undergo this test.

I hereby also give my consent to be included as a participant in the study

“A Clinical Study of the Ocular Manifestation in patients with Diabetes Mellitus type 2.”

Name of the patient _____ Date _____

Signature of the patient_____ Time _____

Name of the impartial Witness_____

Signature of the impartial witness _____

Name of Investigator_____

Signature of the Investigator _____

ANNEXURE IX

PROFORMA

NAME :

AGE/SEX : I.P. NO:

OCCUPATION :

ADDRESS:

SOCIO ECONOMIC STATUS:

CHIEF COMPLAINTS

OCULAR SYMPTOMATOLOGY

DURATION

INSULIN TREATMENT

VISUAL ACQUITY RE: LE:

PH: PH:

INSULIN: REGULAR / IRREGULAR

PAST HISTORY: HTN / TB / DRUG ALLERGY / NEPHROPATHY

HISTORY OF SIMILIAR COMPLAINTS

HISTORY OF OCULAR DISEASES

PREVIOUS OCULAR CHECK UP: YES/NO

FAMILY HISTORY:

OCULAR EXAMINATION:

LOCAL OCULAR EXAMINATION:

Head posture:

Facial Symmetry:

Ocular position:

Ocular movements:

Vision:

Lids:

*Stye

*Xanthelasma

*Blepharitis

*Others:

*None:

Conjunctiva:

*Microaneurysm

Cornea:

*Sensations

*Erosions

*Others

Anterior Chamber (A/C)

*Depth:

*Angle:

*Neovascularisation

*Glaucoma; Present / Absent:

Type, if present:

Iris:

*Pattern:

*Ectropion Uveae:

*Neovascularisation:

*Iridocyclitis:

Pupil:

*Reaction: Direct: Indirect:

*Responne to mydriatrics:

Lens:

*Cataract:

Type:

IOP:

Sac Syrnging:

Vitreous (SLE):

*Asteroid Hyalosis:

*Haemorrhages:

*Fibrovascular Proliferations:

Fundus:

*Retinopathy:

*Maculopathy:

INVESTIGATIONS

RBS

FBS

URINE ALBUMIN

IOP

FUNDUS FLUORESCEIN ANGIOGRAPHY(whenever indicated):

TREATMENT ADVISED

NONE

MEDICAL MANAGEMENT

FOCAL LASER

PRP

VITRECTOMY

CATARACT SURGERY

REFERRED

ANNEXURE 4 –

KEYS TO MASTER CHART

Ac	-	Acute
Chr	-	Chronic
CC	-	Cortical Cataract
Dacr	-	Dacrocystitis
M	-	male
F	-	female
FBS	-	Fasting Blood Sugar
RE	-	right eye
RFT	-	Renal Function Test
LE	-	left eye
POAG	-	Primary Open Angle Glaucoma
Pseudo P	-	Pseudo Phakia
PSC	-	posterior subcapsular cataract
PRP	-	Pan Retinal Photocoagulation
NAD	-	Nothing Abnormal Detected

NS	-	Nuclear sclerosis
CF	-	Counting fingers
HM	-	Hand movements
PL PR	-	Perception of light ,projection of rays
PPBS	-	Post Prandial Blood Sugar
m	-	Meter
VL	-	Vitreous leak
ME	-	Macular Edema
PCO	-	Posterior capsular opacification
CSME	-	Cystoid macular edema
RD	-	Retinal detachment
IP	-	iris prolapsed
ARM	–	Age related maculopathy
ARMD	-	Age related macular degeneration
BRVO	-	Branch retinal vein occlusion

ANNEXURE 5-

MASTER CHART

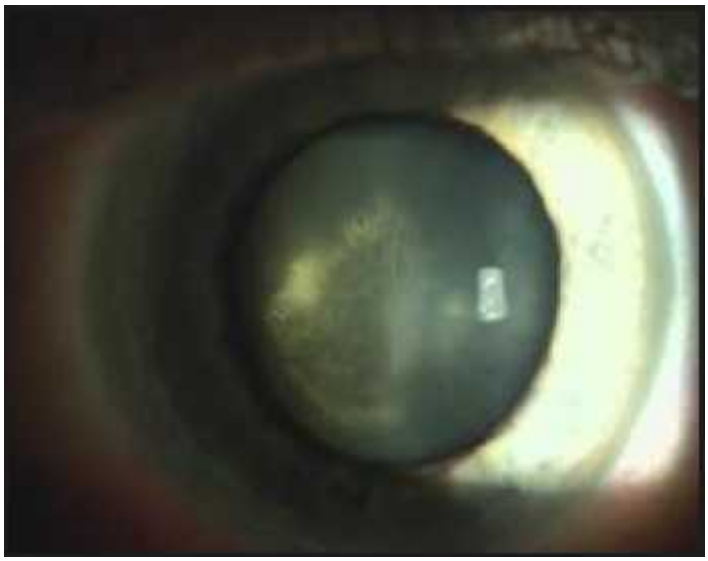


Fig No. 8 POSTERIOR SUB CAPSULAR CATARACT

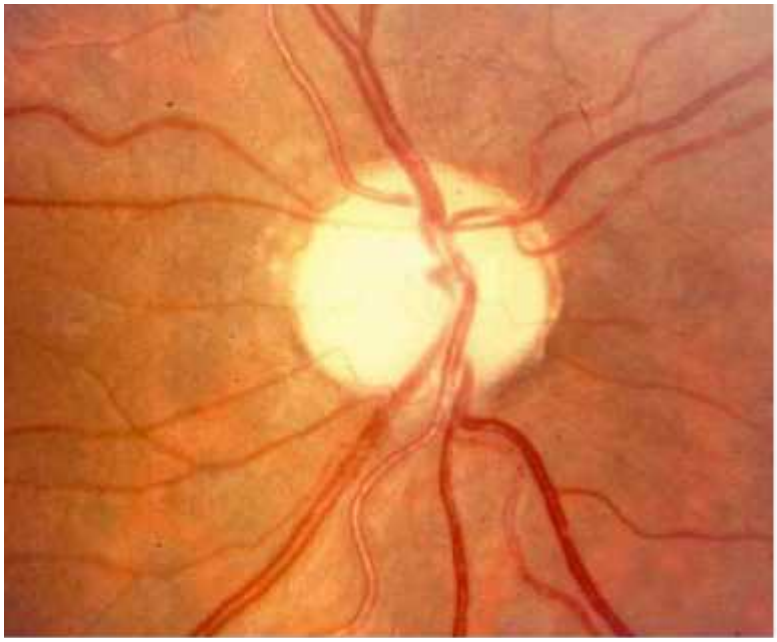


Fig No 9 PRIMARY OPTIC ATROPHY

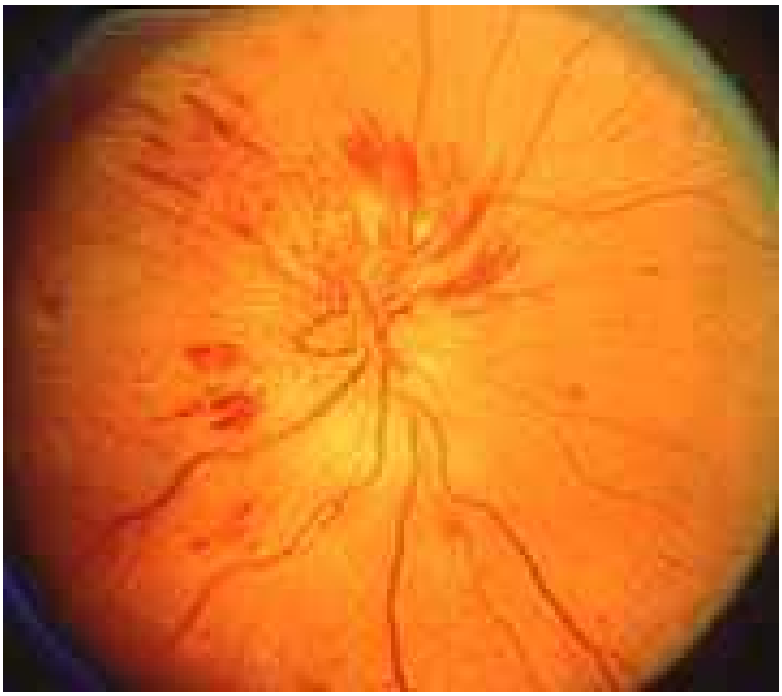


Fig No 10 NON ARTERITIC AION

Fig. NO. 11 CSME WITH VITREOUS HAEMORRHAGE

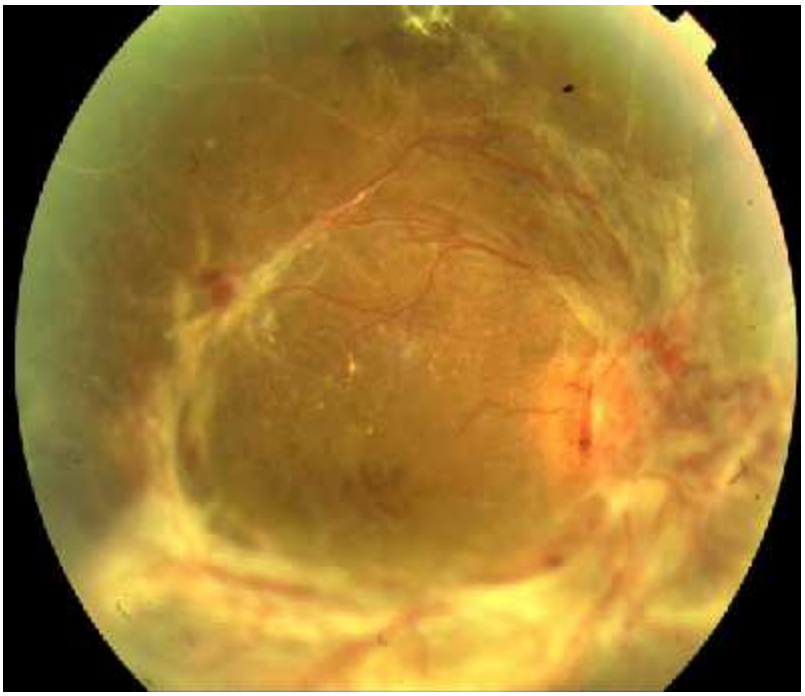


Fig. NO 12 PROLIFERATIVE DIABETIC RETINOPATHY

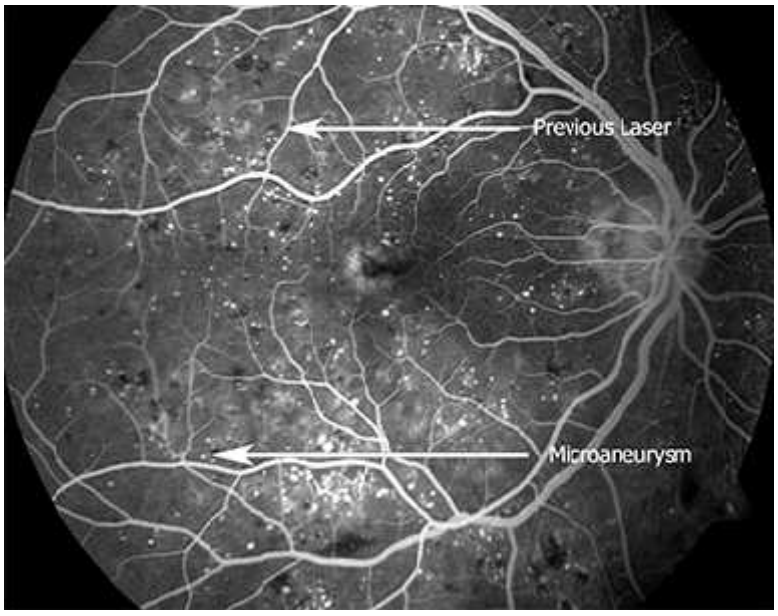


Fig. NO 13 FUNDUS FLUORESCEIN ANGIOGRAPHY

SL NO.	NAME	AGE/SEX	IP/OP NO.	Duration of DM	TREATMENT	HBA1C	FBS/PPBS	URINE ALBUMI	Vision		Pin Hole		IOP		EYE LID		CONJUNCTIVA		CORNEA		PUPIL		LENS		RETINA		DIAGNOSIS		TREATMENT	
					Reg/Irreg.				RE	LE	RE	LE	RE	LE	EYE LID	LE											RIGHT EYE	LEFT EYE	RIGHT EYE	LEFT EYE
1	Yallappa	41/M	103948	1 yr	Regular	7.4	262/305	Nil	6/9	6/9	6/6	6/6	17.3	17.3	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
2	Chidanand	75/M	17887	15yrs	irregular	7.1	178/234	Nil	6/9	6/6	6/6	6/6	14.6	14.6	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	PDR	PDR	PDR	PDR	Normal	Med mag
3	Mohancha	48/M	134428	18yrs	Regular	6	108/150	Nil	6/12	6/12	6/6	6/9	14.6	17.3	normal	normal	Pterigium	Pterigium	normal	normal	normal	normal	normal	normal	Normal	Normal	Pterygium	Pterygium	Med mag	Med Mag
4	Gangabai	55/F	176678	3yrs	Regular	6.6	156/235	Nil	6/36	6/36	6/9	6/9	14.6	15.9	normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Normal	Normal	cortical cataract	cortical cataract	Med mag	Med Mag
5	B B Jadhav	65/M	156049	7yrs	irregular	7	141/229	Nil	6/6	6/9	6/6	6/6	12	12	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
6	Gurappa G	52/M	176303	6yrs	Regular	6	112/123	Nil	6/6	6/6	6/6	6/6	13.4	12.2	normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Normal	Normal	PSC	Normal	Med mag	Med Mag
7	Annasaheb	46/M	9382	3yrs	Regular	6.8	156/186		6/36	6/36	6/9	6/9	12.2	12.2	normal	normal	Pterigium	Pterigium	normal	normal	normal	normal	normal	normal	Normal	Normal	Pterygium with PSC with Mild	Pterygium with PSC with PSC	Med mag	Med Mag
8	Vitabai	55/F	9704	5yrs	irregular	6.6	266/281	1+	6/24	6/9	6/24	6/18	12	10	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	MILD NPDR + APMD	MILD NPDR + APMD	Mild NPDR	Mild NPDR	Med mag	Med Mag
9	Bhimanna	75/M	176490	17yrs	Regular	7	237/337	2+	6/36	6/12	6/9	6/12	15.9	18.9	normal	normal	normal	normal	normal	normal	normal	normal	PseudoP	PseudoP	Mild NPDR	Mild NPDR	Mild NPDR	Mild NPDR	Med mag	Med Mag
10	S M Shirha	55/M	136431	8yrs	irregular	7.5	160/300	Nil	CF	6/9	NI	6/6	13.2	13.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	Mod NPDR	Mod NPDR	Mod NPDR	Mod NDPR	Focal Laser	Focal Laser
11	Sundraww	45/F	132313	6yrs	Regular	6	299/388	Nil	6/9	6/6	6/6	6/6	17.3	17.3	normal	normal	normal	normal	ulcer	normal	normal	normal	normal	normal	Normal	Normal	Cor ulcer	Normal	Med mag	Med Mag
12	Basanna N	58/M	111224	10yrs	Regular	6	150/192	Nil	6/6	6/6	6/6	6/6	14.6	14.6	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
13	S S Kedach	70/M	284098	30yrs	irregular	7.5	170/310	2+	6/60	6/36	6/36	6/12	14.6	14.6	normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Mod NPDR	Mod NPDR	PSC with Mod NPDR	PSC with NPDR	Med mag	Med Mag
14	Basayya Hi	62/M	294043	5mon	Regular	7.8	156/220	Nil	6/36	6/60	6/18	6/36	17.3	17.3	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	Mod NPDR	Mod NPDR IT tributary	Mod NPDR	Mod NPDR with Arterial occlusion	Med mag	Focal Laser
15	M R Bhavik	80/M	291776	4yrs	Regular	6	130/198	Nil	6/36	6/12	6/12	6/6	14.6	14.6	normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Normal	Normal	PSC	PSC	Med mag	Med Mag
16	Mohan Ksh	38/M	192220	2yrs	Regular	6	103/163	Nil	6/6	6/6	6/6	6/6	17.3	14.6	normal	normal	normal	normal	normal	normal	normal	normal	Cortical	normal	Normal	Normal	Cortical	Normal	Med mag	Med Mag
17	Kamanna N	61/M	132290	5yrs	Regular	6	236/266	Nil	6/36	6/36	6/24	6/24	10.2	12.2	normal	normal	Pterigium	normal	normal	normal	normal	normal	NS1	NS2	Normal	Normal	Pterygium	Normal	Med mag	Med Mag
18	Rayappa M	47/M	132242	1yr	Reg	6	110/134	Nil	6/6	6/6	6/6	6/6	17.3	17.6	Stye	Chalazion	Conjunctivitis	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Stye+Conjunctivitis	Chalazion	Med mag	Med Mag
19	Shivamurti	48/F	107762	2yrs	Reg	6.6	82/200	Nil	6/6	6/6	6/6	6/6	14.6	14.2	Ac Dacr	normal	normal	normal	ulcer	normal	normal	normal	normal	normal	Normal	Normal	Ac Dacr	Cor Ulcer	Med mag	Med Mag
20	Uma	62/F	161798	13 yrs	Regular	6.4	150/312	1+	CF- 3m	PL	CF-3m	PL	17.3	17.3	normal	normal	normal	normal	normal	normal	normal	normal	PseudoP	NS 2	Mod NPDR with CSME	Mod NPDR	Normal	Normal	PRP	Focal Laser
21	Chayavva	35/F	8688	6yrs	Regular	6.6	356/500	1+	6/60	CF-3m	6/36	6/60	12.2	12.2	Blepharitis	Blepharitis	normal	normal	normal	normal	normal	normal	cortical cataract	Cortical cataract	Mild NpDR	Mild NPDR	Blepharitis with cataract with	Blepharitis with cataract with mild NPD	Med mag	Med Mag
22	Dundavva	55/F	7192	8yrs	Regular	8.8	198/309	Nil	6/36	CF-3m	6/12	NI	10.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	Sev NPDR	Sev NPDR	Sev NPDR	Sev NPDR	Med mag	Med Mag
23	Umarmath	58/F	81443	12 yrs	Regular	6.5	168/200	Nil	6/36	6/36	6/24	6/24	20.6	22.6	Xanthelesma	Xanthelesma	normal	normal	normal	normal	normal	normal	Snow Flake	Snow flake	Mod NPDR	Mod NPDR	Xa	Normal	Focal Laser	Focal Laser
24	Jayalaxmi	58/F	81502	3yrs	Regular	6.6	101/222	Nil	6/60	6/9	6/60	6/9	15.9	15.9	normal	normal	normal	normal	normal	normal	normal	normal	NS3	Early cortical	Normal	Normal	Normal	Normal	Med mag	Med Mag
25	Gangabai	55/F	139499	10yrs	Regular	6.1	152/232	Nil	6/60	6/18	6/18	6/9	12.2	12.2	Blepharitis	Blepharitis	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	DES	DES	Med mag	Med Mag
26	Hulawwa B	52/F	139519	1yr	Regular	6	96/117	Nil	6/9	6/9	6/6	6/6	8.9	7.6	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
27	Kusuma Al	59/F	139521	3yrs	Regular	6.4	180/263	Nil	6/12	6/12	6/12	6/12	22.4	20.6	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	POAG	POAG	Med mag	Med Mag
28	Sharda Gu	50/F	139520	4yrs	Regular	6	227/340	Nil	6/6	6/6	6/6	6/6	17.3	17.3	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
29	Vijaylaxmi	40/F	139588	10yrs	Regular	6	113/237	Nil	6/6	6/6	6/6	6/6	11.2	12.2	normal	normal	Pterigium	Pterigium	normal	normal	normal	normal	Cortical	normal	Normal	Normal	Pterygium+CC	Pterygium	Med mag	Med Mag
30	Sujatha Mu	35/F	139482	2yrs	Regular	6.2	223/343	Nil	6/6	6/6	6/6	6/6	14.6	12.3	Ac Dacr	Stye	normal	normal	ulcer	normal	normal	normal	Cortical	Cortical	Normal	Normal	Ac Dacr+CC	Stye+Cortical cataract+Mild NPDR	Med mag	Med Mag
31	chandraka	40/F	139441	4yrs	Regular	6.6	209/334	Nil	6/9	CF-2M	6/9	CF-2M	17.3	17.3	normal	normal	normal	normal	normal	normal	normal	normal	normal	Cortical	Normal	Normal	Normal	AIOL+Cortical	Med mag	Med Mag
32	Shardabai	62/F	134970	1yr	Regular	7.8	145/205	Nil	6/60	CF-3m	6/36	6/60	14.6	14.6	normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC with NS3	Normal	Normal	PSC	PSC with NS3	Med mag	Med Mag
33	Mahadevi	60/F	192240	8yrs	Regular	7.8	174/324	Nil	6/36	6/36	6/36	6/18	14.6	15.9	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Mod NPDR	Mod NPDR	Mod NPDR	Mod NPDR	Med mag	Med Mag
34	Shantabai	45/F	176293	7yrs	Regular	9	136/222	Nil	6/36	6/9	6/18	6/9	14.6	12.3	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	Sev NPDR	Sev NPDR	Mild NPDR	Mild NPDR	Med mag	Med Mag
35	Gangabai V	55/F	176678	3yrs	Regular	6.6	125/239	1+	6/36	6/36	6/9	6/9	11.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Mild NPDR	Mild NPDR	Mild NPDR	Mild NPDR	Med mag	Med Mag
36	Mahadevi	48/M	1922298	6mon	Regular	6.1	95/115	Nil	6/9	6/9	6/6	6/6	11.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
37	Kantabai	60/F	3085	20yrs	irregular	9.7	247/437	2+	6/36	6/12	6/36	6/12	14.6	13.4	normal	normal	normal	normal	normal	normal	normal	normal	Cortical Cataract	Cortical cataract	Severe NPDR	Severe NPDR	Cortical cataract with sev NPD	Cortical Cataract with Sev NPDR	Focal Laser	Focal Laser
38	Hanumant	61/F	37324	5yrs	Regular	8.8	166/240	1+	6/60	CF-1.5m	6/24	NI	14.6	14.6	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Severe NPDR	Severe NPDR	Severe NPDR	Severe NPDR	PRP	PRP
39	Prabhavati	41/F	7103	2yrs	Regular	6.4	164/347	Nil	6/6	6/9	6/6	6/6	13.4	14.6	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
40	Mallawwa	54/F	7146	5yrs	Regular	7.6	130/190	Nil	6/24	6/24	6/12	6/12	17.3	14.6	normal	normal	normal	normal	normal	normal	normal	normal	cortical cataract	cortical cataract	Mod NPDR	Mod NPDR	Cortical cataract with Mod NP	Cortical cataract with Mod NPDR	Med mag	Med Mag
41	Basavraj Ka	66/F	2494	15yrs	irregular	7.5	121/230	1+	6/12	6/18	6/6	6/12	13.4	14.6	Stye	Chr Dacr	Conjunctivitis	normal	normal	normal	normal	normal	Normal	Cortical cataract	Normal	Normal	Stye+Conjunctivitis	Chr Dacr+CC	Med mag	Med Mag
42	Jamabai ch	46/F	347658	1.5yrs	Regular	8.5	159/229	Nil	6/6	6/6	6/6	6/6	10.2	11.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Sev NPDR	Sev NPDR	Sev NPDR	Sev NPDR	PRP	PRP
43	Chandappa	60/M	330212	5yrs	REGULAR	7	69/89	Nil	6/60	cf-1.5m	6/36	NI	17.3	14.6	normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Cortical cataract	Mild NPDR	Mild NPDR	Pseudo P with mild NPDR	Mild NPDR	Med mag	Med Mag
44	Neelawwa	60/F	338940	4yrs	Regular	6.9	130/240	Nil	6/12	6/12	6/6	6/6	18.9	15.4	Xanthelesma	Xanthelesma	normal	normal	normal	normal	normal	normal	Normal	normal	Sev NPDR	Sev NPDR	Sev NPDR	Sev NPDR	Focal Laser	Focal Laser
45	Kasturi	62/F	27488	20yrs	irregular	7.6	217/335	2+	6/36	CF-2m	6/24	NI	12.2	14.6	normal	normal	normal	Pterigium	normal	normal	normal	normal	Normal	PSC	Mod NPDR	Mod NPDR	Mod NPDR	Pterygium+Mod NPDR	Med mag	Med Mag
46	Mallikarjun	45/M	339252	10yrs	Regular	8.4	196/268	1+	6/36	6/6	6/18	6/6	10.2	11.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Severe NPDR	Very Sev NPDR	Sev NPDR	Very Sev NPDR	PRP	PRP
47	Rajashekha	65/M	34682	5yrs	Regular	8.8	140/266	Nil	6/12	6/12	6/6	6/6	13.4	18.3	Xanthelesma	Xanthelesma	normal	normal	normal	normal	normal	normal	Normal	normal	Normal	Normal	Normal	ARMD	Med mag	Med Mag
48	Shivaputra	60/M	325647	1yr	Regular	6.2	116/225	Nil	6/60	6/60	6/24	6/12	15.9	14.6	normal	normal	normal	normal	normal	normal	normal	normal	Normal	NS3	Normal	Normal	Normal	Normal	Med mag	Med Mag
49	Hanumant	55/M	3524	5yrs	Regular	8.2	233/298	1+	6/60	6/36	6/24	6/36	14.6	17.3	Blepharitis	Blepharitis	normal	normal	normal	normal	normal	normal	cortical cataract	cortical cataract	Mod NPDR	Mod NPDR	Cortical cataract with Mod NP	Cortical cataract with Mod NPDR	Med mag	Med Mag
50	Mallappa E	65/M	3641	4yrs	Regular	6.5	160/290	Nil	6/12	6/12	6/9	6/6	17.3	17.3	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Normal	Normal	Mild NPDR	Mild NPDR	Med mag	Med Mag
51	Parvathi M	76/F	100049	20yrs	irregular	7.8	123/189	1+	CF- 3m	6/36	6/36	6/12	12.2	14.6	normal	normal	normal	normal	normal	normal	normal	normal	cortical cataract	Cortical cataract	Mod NPDR	Mod NPDR	Cortical cataract with Mod NP	Cortical cataract with Mod NPDR	Med mag	Med Mag
52	Lalita	59/F	6914	2yrs	Regular	6	113/140	Nil	6/24	6/24	6/9	6/9	12.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	CRVO	Normal	CRVO	Normal	Med mag	Med mag
53	Gurappa Ja	70/M	312549	22yrs	irregular	9.2	196/256	2+	PL	6/18	NI	6/18	15.9	15.9	normal	normal	normal	normal	normal	normal	normal	normal	Pearly white	PseudoP	Normal	Very Sev NPDR	PSC	PseudoP with Very sev NPDR	Med mag	Focal Laser
54	Basappa Bi	55/F	28701	6yrs	irregular	8.2	261/296	Nil	6/24	6/24	6/18	6/18	18.9	15.4	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Mod NPDR	Mod NPDR	Mod NPDR	Mod NPDR	Focal Laser	Focal Laser
55	Mohan Sin	52/M	8884	6yrs	Regular	7.8	254/373	Nil	6/36	6/24	6/24	6/24	15.9	15.9	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Normal	Normal	Mod NPDR	Mod NPDR	Med mag	Med Mag
56	S C Pattar	63/M	103852	5.5yrs	Regular	6.4	90/124	Nil	6/24	6/9	6/6	6/6	12.2	14.6	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Normal	Normal	Mild NPDR	Mild NPDR	Med mag	Med Mag
57	Yallappa	41/M	103948	1 yr	Regular	6	96/126	Nil	6/6	6/6	6/6	6/6	12.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
58	B S Biradar	80/M	103793	20yrs	Regular	6.3	95/110	1+	6/24	6/24	6/9	6/9	15.9	15.9	Xanthelesma	Xanthelesma	normal	normal	normal	normal	normal	normal	Normal	normal	Normal	Normal	Mild NPDR	Mild NPDR	Med mag	Med Mag
59	Nagappa	45/M	7958	9yrs	irregular	6.3	156/256	1+	CF- 3m	CF-2M	NI	NI	14.6	13.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	Mild NPDR	Sev NPDR	Mild NPDR	Sev NPDR	Med mag	Med Mag
60	Sugandha J	60/F	329227	2yrs	Regular	6	120/136	Nil	6/6	6/9	6/6	6/6	12.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
61	Shama Ma	65/F	30673	4yrs	Regular	6	190/230	Nil	6/18	6/18	6/12	6/12	13.4	14.6	Xanthelesma	Xanthelesma	normal	normal	normal	normal	normal	normal	Normal	normal	Normal	Normal	Xanthelesma with Mild NPDR	Xanthelesma	Med mag	Med Mag
62	Neelamma	66/F	330005	4yrs	Regular	6.3	214/355	Nil	6/24	6/12	6/9	6/9	17.4	14.6	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Mod NPDR	Mod NPDR	Normal	Normal	Med mag	Med Mag
63	Parvathi	60/F	24578	2yrs	Regular	6	140/248	Nil	6/18	6/18	6/6	6/6	14.6	15.9	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
64	Ramesh	41/M	18259	1yr	Regular	7.8	245/460	Nil	6/9	6/18	6/9	6/9	13.4	14.6	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Normal	Normal	Mod NPDR	Mod NPDR	Med mag	Med Mag
65	Shankar Ar	56/M	2478	1.5yrs	Regular	6.2	149/273	Nil	6/12	6/12	6/9	6/9	10.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
66	Basavaraj A	56/M	13726	12yrs	irregular	6.2	150/222	Nil	6/36	6/24	6/36	6/36	15.9	17.3	normal	normal	normal	normal	normal	normal	normal	normal	cortical cataract	Cortical cataract	Normal	Normal	Cortical Cataract	Cortical Cataract	Med mag	Med Mag
67	Basanna B	60/M	13656	4yrs	irregular	6	97/139	Nil	6/36	6/36	6/6	6/6	10.2	15.9	Blepharitis	Blepharitis	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Blepharitis	Blepharitis	Med mag	Med Mag
68	Bhagiratba	80/F	18316	6yrs	irregular	8.2	130/216	Nil	6/60	6/36	CF-3m	6/60	10.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	Mod NPDR	Mod NPDR	Mod NPDR	Mod NPDR	Med mag	Med Mag
69	Sujata Kan	68/F	2496	4yrs	Regular	6.1	130/251	Nil	6/12	6/18	6/6	6/6	17.3	14.6	normal	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
70	M S Birada	70/M	363000	20yrs	irregular	6.6	90/142	2+	6/18	6/18	6/9	6/9	13.4	12.2	Xanthelesma	Xanthelesma	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Xanthelesma	Xanthelesma	Med mag	Med Mag
71	Basavaraj H	36/M	49199	3yrs	Regular	6.1	140/220	Nil	6/6	6/6	6/6	6/6	15.9	13.4	normal	normal	normal	normal	normal	normal	normal	normal	Cortical	normal	Normal	Normal	Cortical	Normal	Med mag	Med Mag
72	Vithal Telli	61/M	35276	5yrs	Regular	6.1	150/185	Nil	CF-2m	CF-3m	NI	NI	17.3	14.6	normal	normal	normal	normal	normal	normal	normal	normal	cortical cataract	cortical cataract	Normal	Normal	cortical cataract	cortical cataract	Med mag	Med Mag
73	Mallikarjun	67/M	254366	11yrs	Regular	6.1	108/202	1+	6/9	6/9	6/6	6/6	14.6	13.4	Blepharitis	Chr Dacr	normal	normal	normal	normal	normal	normal	Normal	Normal	Mild NPDR	Mild NPDR	Blepharitis with Mild NPDR	Chr Dacr+Mild NPDR	Med mag	Med Mag
74	Rudrappa I	74/M	2637	20yrs	Regular	6.2	169/196	2+	6/36	CF-2m	6/18	CF-3m	15.9	14.6	normal	normal	normal	normal	normal	normal	normal	normal	PSC	Greyish white	Normal	Normal	PSC	Cortical cataract	Med mag	Med Mag
75	Rafiq	56/M	33563	5yrs	Regular	6.2	116/176	Nil	6/60	6/36	6/36	6/24	14.6	13.4	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
76	Yamanapp	65/M	329893	3yrs	Regular	6.8	308/423	Nil	6/18	6/18	6/9	6/9	12.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag

77	Appasahet	66/M	330302	1yr	Regular	6.3	150/188	Nil	CF-2m	CF-2M	6/18	6/18	14.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	NS2	NS2	Normal	Normal	Cataract NS2	Cataract NS2	Med mag	Med Mag
78	Kalappa Ba	48/M	29756	4yrs	Regular	6	166/189	Nil	6/9	6/12	6/9	6/9	13.2	15.9	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
79	Ramesh Ar	25/M	29647	New	Regular	7	200/330	Nil	6/9	6/9	6/6	6/6	12.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
80	Paradappa	65/M	29846	4yrs	Regular	6.5	180/220	1+	6/60	6/60	6/18	6/18	14.2	14.2	Xanthelesma	Xanthelesma	normal	normal	normal	normal	normal	normal	Nuclear cataract	Nuclear cataract	Normal	Normal	Xanthelesma with Nuclear cat	Xanthelesma with Nuclear cataract	Med mag	Med Mag
81	B B Budhih	51/M	44964	10yrs	Regular	8.8	160/220	1+	6/18	6/9	6/6	6/6	13.4	14.2	normal	normal	normal	normal	normal	normal	normal	normal	cortical cataract	cortical cataract	Sev NPDR	Severe NPDR	Cortical cataract with sev NPD	Cortical cataract with sev NPDR	PRP	PRP
82	Rabiya Inar	55/F	40730	1.5yrs	Regular	6	112/180	Nil	6/6	6/6	6/6	6/6	12.2	13.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
83	Mallangou	55/M	41024	4yrs	Regular	6	113/186	Nil	6/6	CF-F	6/6	NI	14.2	15.9	stye	normal	normal	normal	normal	normal	normal	normal	Normal	Cortical Cataract	Normal	Normal	Stye	Cortical cataract	Med Mag	Med Mag
84	M S Patil	55/M	41062	4yrs	Regular	6.2	136/180	Nil	CF-3M	CF-2M	6/60	CF-3M	14.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	Cortical cataract	Cortical cataract	Normal	Normal	Cortical cataract	Cortical cataract	Med mag	Med Mag
85	Appanna	80/M	37309	10yrs	irregular	8.8	188/218	1+	6/24	6/36	6/18	6/24	18.9	20.6	normal	normal	normal	normal	normal	normal	normal	normal	Cortical cataract	Cortical cataract	CSME	CSME	Cortical cataract with CSME	Cortical Cataract wuth CSME	PRP	PRP
86	G H Matti	62/M	44893	3yrs	Regular	6	115/158	Nil	6/6	6/12	6/6	6/9	12.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
87	Appa sahel	60/M	4545	10yrs	irregular	7.9	96/170	Nil	6/18	6/12	6/9	6/9	14.6	14.6	normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	PseudoP	Mod NPDR	Mod NPDR	Pseudo P with Mod NPDR	Pseudo P with Mod NPDR	Med mag	Med Mag
88	Basappa K	66/M	2252	10yrs	Regular	8.6	230/330	1+	6/24	6/24	6/18	6/18	16.2	15.9	normal	normal	normal	normal	normal	normal	normal	normal	Cortical cataract	Cortical cataract	Early PDR	Early PDR	Cortical cataract with PDR	Cortical cataract with PDR	Med mag	Med Mag
89	Siddappa	64/M	21358	4yrs	Regular	6	137/157	Nil	6/12	6/18	6/9	6/12	12.2	14.2	chalazion	Chalazion	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Chalazion	Chalazion	Med mag	Med Mag
90	Basavraj t	47/M	4148	4 mont	Regular	8.3	137/190	Nil	6/6	6/6	6/5	6/5	13.9	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Cortical cataract		Normal	Normal	Cortical cataract	Cortical cataract	Med mag	Med Mag
91	Vishalaxmi	50/F	4046	14yrs	irregular	9	110/210	Nil	6/60	6/60	6/36	6/36	14.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	normal	Early PDR	Early PDR	PDR	PDR	Med mag	Med Mag
92	Krishna	50/M	34221	8yrs	Regular	9.7	170/224	Nil	6/6	6/18	6/6	6/9	13.9	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Sev NPDR with CSME	Sev NPDR with CSME	Sev NPDR with CSME	Sev NPDR with CSME	Focal Laser	Focal Laser
93	Awarappa	60/M	22118	1yr	Regular	6	123/156	Nil	6/6	6/6	6/6	6/6	12.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
94	Digambaba	65/F	17061	12yrs	irregular	6.4	167/210	Nil	6/18	CF-3m	6/9	6/60	13.9	13.9	normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Cortical cataract	Normal	Normal	Pseudo P	Cortical Cataract	Med mag	Med Mag
95	Mahadevi	68/F	9581	3yrs	Regular	8.8	126/180	Nil	6/18	6/18	6/9	6/9	14.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Normal	Normal	PSC	PSC	Med mag	Med Mag
96	S Muliman	48/M	34619	2yrs	Regular	8.5	136/196	Nil	6/6	6/6	6/6	6/6	14.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Sev NPDR with CSME	Sev NPDR with CSME	Sev NPDR with CSME	Sev NPDR with CSME	Focal Laser	Focal Laser
97	Savithri	37/F	24733	6yrs	Regular	7.6	126/172	Nil	6/12	6/12	6/6	6/6	15.9	15.9	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Cortical	PDR	Normal	PDR	Cortical	Med mag	Med Mag
98	Shivanand	58/M	19790	13yrs	Regular	8.2	260/310	Nil	6/12	6/24	6/9	6/18	18.2	18.2	normal	normal	normal	normal	normal	normal	Irregular co	Pin point	Pseudo P	Pseudo P	PDR with CSME	Early PDR	Pseudo P with PDR with CSME	Pseudo P with PDR	Focal Laser	Focal Laser
99	Anand	47/M	5037	2yrs	Regular	6.8	160/250	Nil	6/36	6/36	6/24	6/24	14.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Cortical cataract	Normal	Normal	Normal	CC	Focal Laser	Focal Laser
100	Sushadevi	60/M	20537	2yrs	Regular	7.2	110/168	Nil	6/24	6/24	6/12	6/12	14.2	15.9	normal	normal	normal	normal	normal	normal	normal	normal	Cortical witj NSII	Cortical with NS	Myopic fundus	Myopic fundus	Cortical witj NSII	Cortical witj NSII	Med mag	Med Mag
101	GURULING	80/f	230761	1.5yrs	regular	7	116/156	Nil	6/9	6/18	6/9	6/9	12.2	12.2	Act Dacr	normal	normal	normal	normal	Ulcer	normal	normal	Pseudo P	Pseudo P	Normal	Normal	Act Dacr	Cor Ulcer	Med mag	Med Mag
102	M B Patted	74/M	36258	12yrs	irregular	6.9	121/143	2+	6/60	6/36	6/24	6/18	18.9	18.9	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mild NPDR	Mild NPDR	Mild NPDR	Mild NPDR	Med mag	Med Mag
103	Shashikala	35/F	26970	2yrs	Regular	6	122/180	Nil	6/6	6/6	6/6	6/6	14.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	Cortical	Normal	Normal	Normal	Cortical	Normal	Med mag	Med Mag
104	Sanabai Pa	70/F	268812	2yrs	Regular	6.3	101//150	Nil	6/60	6/60	6/18	6/18	12.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Choroidal atrophy	Normal	Choroidal atrophy	Med mag	Med Mag
105	Sidangoud	50/F	270108	5yrs	regular	6	115/170	Nil	6/6	6/6	6/6	6/6	12.2	10.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
106	Sumashi G	47/F	238663	11yrs	Regular	10.2	80/220	Nil	CF-3m	CF-3m	6/9	6/9	15.9	15.9	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Vitreous hemorrhage	Vitreous hemorrhage	Focal Laser	Focal Laser
107	Annapurna	60/F	223043	2yrs	Regular	7.1	86/200	Nil	CF-2m	cf-1.5m	NI	6/60	13.2	13.2	normal	normal	normal	normal	normal	normal	normal	normal	Cortical cataract	Cortical cataract	Normal	Normal	Cortical cataract	Cortical cataract	Med mag	Med Mag
108	Heeranna	60/M	19817	1.5yrs	Regular	6	90/123	Nil	6/60	6/60	6/36	6/36	10.9	10.9	normal	normal	Conjunctivitis	Conjunctiviti	normal	normal	normal	normal	SIMC	SIMC	Normal	Normal	Conjunc+SIMC	Conjunc+SIMC	Med mag	Med Mag
109	Rajaram	75/M	19290	5yrs	Regular	6	104/140	Nil	6/6	6/6	6/6	6/6	10.9	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
110	Geeta Patil	43/F	215514	New		6.6	183/225	Nil	6/6	6/6	6/6	6/6	10.3	10.3	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
111	Annsuyaba	58/F	215507	4yrs	irregular	6.3	124/217	Nil	6/9	6/9	6/6	6/6	12.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
112	Paramanna	80/M	18547	14yrs	irregular	8.9	103/140	Nil	6/9	6/9	6/6	6/9	18.9	15.9	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mod NPDR	Mod NPDR	Mod NPDR	Mod NPDR	Med mag	Med Mag
113	Basamma (	70/F	215524	6yrs	irregular	6.8	126/186	1+	CF-3M	CF-3m	6/60	6/60	12.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
114	Bhimappa	65/M	19563	7yrs	Regular	6	116/166	Nil	6/60	6/60	6/60	6/60	18.9	18.9	normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Mild NPDR	Mild NPDR	PSC	PSC	Med mag	Med Mag
115	Drakshaya	55/F	215560	2yrs	regular	6.4	145/222	Nil	6/12	6/9	6/6	6/6	13.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
116	Shrinivas D	83/M	215522	14yrs	Regular	6.1	146/286	2+	6/12	6/9	6/6	6/6	15.9	15.9	normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Normal	Normal	PSC	PSC	Med mag	Med Mag
117	Shantappa	73/M	21549	2yrs	Regular	6	95/116	Nil	6/24	6/24	6/9	6/6	13.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	Cortical + PSC	Cortical cataract	Normal	Normal	Cortical + PSC	Cortical cataract	Med mag	Med Mag
118	Siddhango	50/M	21573	1yr	Regular	6	96/159	Nil	6/6	6/6	6/6	6/6	14.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
119	S M Birada	50/M	19855	5yrs	Regular	6	108/150	Nil	6/6	6/6	6/6	6/6	10.3	10.3	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	CRAO	Normal	Med mag	Med Mag
120	Siddlingap	45/M	230777	4yrs	Regular	6.2	100/156	Nil	6/6	6/6	6/6	6/6	14.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mild NPDR	Normal	Mild NPDR	Normal	Med mag	Med Mag
121	Lakshmiba	55/F	231130	3yrs	Regular	6.2	116/178	Nil	6/18	6/12	6/9	6/9	10.3	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
122	Siddappa	49/M	27842	4yrs	Regular	6.6	93/201	Nil	CF-2m	CF-2M	6/12	6/18	14.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Normal	Normal	PSC	PSC	Med mag	Med Mag
123	Neermala (	51/F	208120	12yrs	irregular	6.6	131/208	1+	6/6	6/6	6/6	6/6	18.9	15.9	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
124	Sharanapp	71/M	207843	5yrs	Regular	8.6	188/227	Nil	6/24	6/36	6/12	6/12	13.2	15.9	normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	PSC + Cortical C	Sev NPDR	Sev NPDR	Pseudo P with sev NPDR	PSC + Cortical cataract with Sev NPDR	Focal Laser	Focal Laser
125	Hazarthi Ch	60/F	18167	New		6.2	90/180	Nil	6/9	6/9	6/6	6/6	10.3	12.2	Stye	stye	normal	normal	normal	normal	normal	normal	Normal	Normal	Mild NPDR + Microane	Mild NPDR	Stye + Mild NPDR	Stye + Mild NPDR	Med mag	Med Mag
126	Sharanapp	65/M	17692	1yr	irregular	6.9	178/340	Nil	CF-3M	CF-3m	6/60	6/60	14.2	15.9	normal	normal	normal	normal	normal	normal	normal	normal	Cortical cataract	cortical cataract	Normal	Normal	Cortical cataract	Cortical cataract	Med mag	Med Mag
127	Shantabai (	60/F	211153	2yrs	Regular	6.2	110/178	Nil	6/6	6/6	6/6	6/6	10.9	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
128	Basavraj H	47/F	210226	1yr	Regular	6.2	121/205	Nil	6/6	6/6	6/6	6/6	12.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
129	Mallikarjur	55/M	17378	New		8.6	230/319	Nil	6/36	6/24	6/24	6/18	17.3	24.6	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	POAG	Med mag	Med Mag
130	Sangappa (	75/M	19090	8yrs	irregular	7.2	230/345	1+	6/36	6/60	6/24	6/36	15.9	18.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Mod NPDR	Mod NPDR	Med mag	Med Mag
131	Laxmibai D	54/F	215487	7yrs	Regular	6.2	110/160	1+	CF-3M	6/24	CF-1m	6/12	15.9	13.6	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	CRVO	Normal	CRVO	Med mag	Med Mag
132	Shatawaj	54/M	215527	6mon	Regular	6.6	120/190	Nil	6/24	6/12	6/9	6/6	14.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Mild NPDR	Mild NPDR	Med mag	Med Mag
133	Shankar Ha	55/M	215516	12yrs	Regular	9.4	171/310	1+	6/6	6/6	6/6	6/6	18.9	15.9	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Sev NPDR	Sev NPDR	Focal Laser	Focal Laser
134	Shatawaji S	64/M	215527	20yrs	irregular	6.6	165/215	2+	6/24	6/12	6/9	6/6	18.9	18.9	Xanthelesma	Xanthelesma	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Xanthelesma	Xanthelesma	Med mag	Med Mag
135	Shivappa	55/M	21455	5yrs	Regular	7.5	210/346	Nil	6/18	6/6	6/6	6/6	10.3	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Mod NPDR	Mod NPDR	Med mag	Med Mag
136	Jagdeesh	57/M	253484	9.5Yrs	irregular	8.8	130/235	N1+	6/9	HM	6/6	NI	14.2	14.2	Blepharitis	Blepharitis	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Blepharitis	Blepharitis with PDR	Med mag	PRP
137	Mallikarjur	50/M	299298	11 yrs	irregular	8.8	115/230	Nil	6/18	6/18	6/9	6/9	15.9	14.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mild NPDR	Mild NPDR	Mild NPDR	Mild NPDR	Med mag	Med Mag
138	Saydamma	50/F	24468	5yrs	Regular	6.2	110/160	Nil	6/6	6/6	6/6	6/6	13.2	13.2	Stye	Stye	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Stye	Stye	Med mag	Med Mag
139	Kamalabai	60/F	299337	11yrs	irregular	11.2	120/180	1+	6/9	6/6	6/6	6/6	15.9	13.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Sev NPDR	Sev NPDR	Sev NPDR	Sev NPDR	Focal Laser	Focal Laser
140	Y Y Kabade	68/M	301104	3yrs	Regular	8.9	100/148	Nil	6/36	6/24	6/12	6/12	10.3	10.3	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	PDR	PDR	PDR	PDR	Med mag	Med Mag
141	Parimala	58/F	296026	2yrs	Regular	6	69/113	Nil	6/12	6/9	6/6	6/6	13.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Cortical cataract	Cortical cataract	Normal	Normal	Cortical cataract	Cortical cataract	Med mag	Med Mag
142	B G Stavarı	49/M	306900	4.5Yrs	Regular	6	115/196	Nil	6/6	6/9	6/6	6/6	15.9	15.9	Blepharitis	Blepharitis	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Blepharitis	Blepharitis	Med mag	Med Mag
143	Sonabai Ra	70/F	306917	1yr	irregular	8	101/136	Nil	6/60	6/60	6/24	6/24	18.9	17.3	normal	normal	normal	normal	normal	normal	normal	normal	Greyish white	Greyish white	Normal	Normal	Normal	Normal	Med mag	Med Mag
144	S Y Malinn	48/M	306900	New	irregular	9.6	200/290	Nil	6/6	6/6	6/6	6/6	10.3	12.2	stye	Chr Dacr	normal	normal	normal	normal	normal	normal	Normal	Normal	Sev NPDR	sev NPDR	Stye with Sev NPDR	Chr Dacr+Sev NPDR	Focal Laser	Focal Laser
145	S A Nadagc	50/M	305403	6yrs	Regular	6.1	140/190	Nil	6/12	6/12	6/6	6/6	10.3	10.3	normal	normal	normal	normal	Ulcer	normal	normal	normal	Normal	Normal	Normal	Normal	Ulcer	Normal	Med mag	Med Mag
146	Shrisashma	65/M	306994	3yrs	Regular	6.9	100/156	Nil	CF-3M	CF-2m	6/36	NI	15.9	13.2	normal	normal	normal	normal	normal	normal	normal	normal	Cortical Cataract	Cortical Cataract	Mild NPDR	Mild NPDR	Cortical cataract with Mild NP	Cortical Cataract with Mild NPDR	Med mag	Med Mag
147	Sangamesh	45/M	26507	2yrs	Regular	6.4	96/160	Nil	6/6	6/6	6/6	6/6	15.9	12.2	normal	Xanthelesma	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Xanthelesma	Med mag	Med Mag
148	Madiwalar	50/F	27219	11yrs	Regular	6	100/164	Nil	6/36	6/60	6/24	6/12	10.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
149	Chandraka	50/M	310965	9yrs	Regular	8.4	160/260	1+	6/12	6/9	6/6	6/6	17.9	18.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Vitreous Hemorrhage with Ea	Early PDR	PRP	PRP
150	Rajendra P	58/M	21339	4yrs	irregular	8.3	220/360	Nil	6/6	6/6	6/6	6/6	10.3	12.2	normal	Recurrent stye	Pterigium	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Pterygium	Recurrent Styes	Med mag	Med Mag
151	Siddappa	70/M	22675	4yrs	Regular	6.3	103/201	Nil	CF-3M	CF-2M	6/18	6/18	18.9	17.3	Blepharitis	normal	normal	Pterigium	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Blepharitis	Pterygium	Med mag	Med Mag
152	Geetabai	50/F	313297	1yr	Regular	6.1	110/176	Nil	6/24	6/12	6/12	6/9	10.3	12.2	normal	Normal	Pterigium	normal	normal	Perforation	normal	normal	Normal	Normal	Normal	Normal	Pterygium	Perforation	Med mag	Keratoplasty
153	Narmada P	67/F	313658	7yrs	Regular	6.7	116/200	Nil	6/9	6/9	6/9	6/9	17.9	15.9	normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Normal	Mild NPDR	Normal	Normal	Normal	PP	Focal Laser
154	R B Hadagl	54/F	312004	10yrs	irregular	8.2	160/260	1+	6/12	6/12	6/6	6/6	15.9	14.2	Normal	normal	normal	Pterigium	normal	normal	normal	normal	Normal	Normal	Mod NPDR	Mod NPDR	Mod NPDR with 3rd CN palsy	Pterygium + Mod NPDR + 3rd Cn Palsy	Med mag	Med Mag
155	Sumithra	59/F	28453	New		6.8	96/146	Nil	6/6	6/6	6/6	6/6	12.2	14.2	normal	Xanthelesma	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Xanthelesma	Med mag	Med Mag
156	Gurappa Ja	70/M	312549	2yrs	Regular	8.8	116/176	Nil	PL	6/18	NI	6/18	18.9	17.2	normal	normal	normal	normal	normal	normal	normal	normal	Mature cataract	Normal	Normal	Sev PDR with CSME	Mature cataract	Sev PDR with CSME	Med mag	PRP
157	Sunanda	50/F	296825	10yrs	Regular	7	140/240	1+	6/12	6/12	6/6	6/12	14.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
158	Channappa	48/M	299955	1yr	Regular	8.6	223/289	1+	6/24	6/24	6/18	6/18	10.3	14.2	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Sev NPDR + CSME	Sev NPDR + CSME	Sev NPDR + CSME	Sev NPDR + CSME	Focal Laser	Focal Laser

159	Madivalem	50/F	27219	13yrs	irregular	7.4	166/238	2+	6/36	6/60	6/24	6/12	15.9	15.9	stye	Stye	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Stye	Med mag	Med Mag
160	Kasturibai	65/F	305407	14 yrs	Regular	7.2	136/196	1+	6/24	6/24	6/9	6/9	13.2	14.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Mod NPDR	Mod NPDR	Pseudo P + Mod NPDR	Pseudo P + Mod NPDR	Med mag	Med Mag
161	Annaraj	65/M	19404	5yrs	Regular	6.9	110/170	Nil	CF-1m	cf-1.5m	6/60	6/60	18.9	15.9	normal	normal	normal	normal	normal	normal	normal	normal	normal	PSC+NSII Cataract	PSC+NSII Catara	Mild NPDR	Mild NPDR	PSC+NSII+Mild NPDR	PSC+NSII+Mild NPDR	Med mag	Med Mag
162	Vishwanat	41/M	139603	5yrs	Regular	7	116/160	Nil	6/9	6/9	6/6	6/6	13.2	10.3	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
163	Shantabai	60/F	139639	6yrs	irregular	6.7	183/410	Nil	CF-3M	CF-3m	NI	NI	14.2	15.9	Normal	Stye	normal	normal	normal	normal	normal	normal	normal	Cortical cataract	Cortical catarac	Mild NPDR	Mild NPDR	Cortical Cataract+Mild NPDR	Stye+Cortical cataract+Mild NPDR	Med mag	Med Mag
164	Mallappa T	55/M	139470	4yrs	irregular	8.6	170/280	Nil	6/36	6/18	6/9	6/9	13.4	14.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Cortical cataract	Cortical catarac	Normal	Normal	Cortical cataract	Cortical cataract	Med mag	Med Mag
165	Danakka B	57/F	155196	8mon	Regular	6.6	170/204	Nil	6/9	6/9	6/6	6/6	15.9	14.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
166	Sadashiv	55/M	265431	4yrs	Regular	6.6	186/240	Nil	6/36	6/36	6/9	6/12	18.9	15.9	Blepharitis	Blepharitis	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Blepharitis	Blepharitis	Med mag	Med Mag
167	Ashok	48/M	274335	6yrs	irregular	8	120/168	Nil	6/9	6/9	6/6	6/6	10.3	10.3	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
168	Sangappa I	53/M	274317	7yrs	irregular	8.2	160/266	Nil	6/24	CF-3m	6/18	6/6	15.9	14.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Cortical Cataract	Cortical Catarac	Early PDR	Early PDR+CSME	Cortical cataract+Early PDR	Cortical cataract+PDE+CSME	PRP	PRP
169	Sharada	51/F	272777	6yrs	irregular	6.6	171/290	Nil	6/6	6/6	6/6	6/6	10.3	13.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mild NPDR	Mild NPDR	Mild NPDR	Mild NPDR	Med mag	Med Mag
170	Shettappa	50/M	36354	2yrs	Regular	6.8	110/156	Nil	6/24	6/18	6/9	6/6	14.2	14.2	Blepharitis	Xanthelesma	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Blepharitis	Xanthelesma	Med mag	Med Mag
171	Prakash Ra	37/M	313289	2yrs	Regular	7.8	100/146	Nil	6/36	6/24	6/9	6/9	15.9	14.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Cortical	Normal	Normal	Normal	Cortical	Med mag	Med Mag
172	Shankargo	56/M	313763	12yrs	Regular	7.6	103/235	Nil	CF-2m	6/9	CF-2m	6/6	10.3	13.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mod NPDR	Mod NPDR	Mod NPDR	Mod NPDR	Med mag	Med Mag
173	Gurupadap	61/M	313328	1.5yrs	Regular	6.3	118/179	Nil	6/12	6/12	6/6	6/6	13.2	13.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
174	Bhagirathi	69/F	254120	8yrs	Regular	6	106/180	Nil	6/24	6/6	6/9	6/6	15.9	17.9	Stye	normal	normal	normal	normal	normal	normal	normal	normal	Cortical cataract	PSC	Normal	Normal	Stye+Cortical cataract	PSC	Med mag	Med Mag
175	Raju Dalaw	47/M	313290	11yrs	Regular	6.9	112/216	Nil	6/6	6/6	6/6	6/6	18.9	15.9	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mild NPDR	Mild NPDR+CSME	Mild NPDR	Mild NPDR+CSME	Med mag	PRP
176	Paravathi	60/F	28492	7yrs	irregular	10.7	200/366	Nil	6/6	HM	6/6	NI	15.9	14.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Brownish NSII	Mod NPDR	Glow absent	Pseudo P + Mod NPDR	NSII cataract	Med mag	Med Mag
177	Ranganna	48/M	313286	1.5yrs	irregular	6.4	108/168	Nil	6/9	6/9	6/6	6/6	13.2	14.4	normal	Normal	Pterigium	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Pterygium	Normal	Med mag	Med Mag
178	Neelkanth	66/M	304791	26yrs	Regular	7.4	209/253	2+	6/12	6/12	6/9	6/9	17.9	15.9	normal	normal	normal	normal	normal	normal	normal	normal	normal	PSC+ NSII	PSC+NSII Catara	Mod NPDR	Mod NPDR+CSME	PSC+NSII+Mod NPDR	PSC+NSII+Mod NPDR+CSME	Med mag	Focal Laser
179	Siddappa B	45/M	17582	New		8.4	190/296	Nil	6/6	6/6	6/6	6/6	10.3	12.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Dry ARMD	Dry ARMD	Dry ARMD	Dry ARMD	Med mag	Med Mag
180	Bangarawv	80/F	18635	9yrs	irregular	6.3	187/260	1+	CF-3M	CF-1m	CF-1M	NI	14.2	12.2	Pterygium	Normal	Pterigium	normal	normal	normal	normal	normal	normal	NS-III Cataract	NS III cataract	Mild NPDR	Mild NPDR	Pterygium+NS III +Mild NPDR	NS III +Mild NPDR	Med mag	Med Mag
181	Hanu Chav	62/M	18898	4yrs	irregular	6.9	180/280	Nil	6/6	6/6	6/6	6/6	15.9	14.2	Xanthelesma	Xanthelesma	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Xanthelesma	Xanthelesma	Med mag	Med Mag
182	Gangamma	Terdal	223496	4yrs	Regular	6.8	140/240	Nil	6/24	6/24	6/18	6/24	10.3	12.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Early ARMD	Early ARMD	Early ARMD	Early ARMD	Med mag	Med Mag
183	Ramappa F	54/M	223029	4yrs	Regular	7	90/175	Nil	6/6	6/6	6/6	6/6	14.2	15.9	Stye	normal	normal	normal	normal	ulcer	normal	normal	normal	Normal	Normal	Normal	Normal	Stye	Cor ulcer	Med mag	Med Mag
184	Huvanna A	72/M	234456	1.5yrs	Regular	6.6	128/178	Nil	6/9	6/9	6/6	6/6	18.9	15.9	Blepharitis		normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Blepharitis	Normal	Med mag	Med Mag
185	Arjun Vand	58/M	10818	6 yrs	Regular	6.4	106/160	Nil	6/6	6/6	6/6	6/6	13.2	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
186	Pandappa	60/M	7859	9yrs	irregular	7.2	118/178	Nil	CF-3M	CF-3M	6/60	6/60	15.9	10.3	normal	normal	normal	normal	normal	normal	normal	normal	normal	Cortical+NSII	Subluxated -inj	Mod NPDR	Mod NPDR	Cortical+NSII + Mod NPDR	Subluxated lens+Mod NPDR	Med mag	Med Mag
187	G K Biradar	72/M	81444	2yrs	Regular	7	102/156	Nil	6/6	6/6	6/6	6/6	10.3	10.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
188	Vishal Bida	50/M	43543	5.5yrs	Regular	7	114/166	Nil	6/6	6/6	6/6	6/6	18.9	15.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
189	Hanumant	61/M	37324	4.5Yrs	Regular	10.2	166/256	1+	6/60	CF-1M	6/24	NI	14.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Cortical catarac	Sev NPDR	Sev NPDR	Sev NPDR	Cortical+PSC + Sev NPDR	PRP	PRP
190	Ravindrana	50/M	153274	8yrs	Regular	6.4	180/280	Nil	6/9	6/6	6/6	6/6	15.9	14.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
191	Shankar Hi	60/M	153356	6yrs	irregular	7.8	260/340	Nil	6/24	6/24	6/9	6/9	10.3	12.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mod NPDR	Mod NPDR	Mod NPDR	Mod NPDR	Med mag	Med Mag
192	Rajendra K	51/M	10995	6.5yrs	Regular	6.4	96/146	Nil	6/6	6/6	6/6	6/6	10.3	15.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
193	Ashok Nara	45/M	156767	6mon	Regular	6.4	130/200	Nil	6/6	6/6	6/6	6/6	15.9	15.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	BRAO	Normal	BRAO	Normal	Med mag	Med Mag
194	Shrishail	70/M	9406	11yrs	Regular	6.4	92/158	Nil	6/60	6/60	6/24	6/24	18.9	15.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mild NPDR	Mild NPDR	Mild NPDR	Mild NPDR	Med mag	Med Mag
195	Laxman Hd	57/M	36565	1yr	Regular	7.4	145/287	Nil	6/60	6/60	6/60	6/24	15.9	13.4	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mod NPDR	Mod NPDR	Mod NPDR	Mod NPDR	Med mag	Med Mag
196	S R Narale	80/M	35566	15yrs	irregular	7.4	134/190	2+	6/18	6/24	6/18	6/18	17.3	15.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Normal	Normal	Pseudo P	Pseudo P	Med mag	Med Mag
197	Arjun Bida	55/M	34365	15yrs	irregular	7.2	140/240	1+	6/6	6/6	6/6	6/6	17.3	13.4	normal	normal	normal	normal	normal	normal	normal	normal	normal	Cruciform Catara	Cruciform Cata	Mod NPDR	Mod NPDR	Cruciform cataract+ Mod NPD	Cruciform cataract+ Mod NPDR	Vitrectomy	Vitrectomy
198	Mallikarjur	58/M	231211	2yrs	Regular	6.4	110/160	Nil	6/18	6/18	6/6	6/6	17.3	17.3	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Sev NPDR	Sev NPDR	Sev NPDR + Asteroid H	Sev NPDR + Asteroid H	Med mag	Med Mag
199	Chandappa	60/M	274670	5.5yrs	Regular	8.8	80/128	Nil	6/36	CF-3M	6/12	6/60	14.6	17.3	normal	normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	PSC + Nuclear I	Sev NPDR	Sev NPDR	Sev NPDR+PP	Sev NPDR+PSC	Med mag	Med Mag
200	N R Jadhav	84/M	300387	25yrs	irregular	7	164/250	2+	CF-3M	6/24	NI	6/18	12.2	13.4	normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Wet AMD	Dry ARMD	Wet ARMD	Dry ARMD	Med mag	Med Mag
201	Tarabai Ra	62/F	291778	1yr	Regular	6.8	159/264	Nil	6/12	CF-3m	6/9	NI	10.3	14.6	normal	normal	normal	normal	normal	normal	normal	normal	normal	Mature cataract	NSII cataract	Normal	Normal	Normal	NSII cataract	Med mag	Med Mag
202	Shreedevi	28/F	291898	1mon	Regular	8.2	139/380	Nil	6/6	6/6	6/6	6/6	14.6	15.9	normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
203	Vishnu Gau	50/M	26537	3yrs	Regular	6.9	116/138	Nil	6/6	6/6	6/6	6/6	10.3	14.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
204	Khajisab	65/M	25518	10yrs	irregular	7.4	148/261	1+	6/60	CF-3M	6/36	NI	18.9	17.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	NS II Cataract	Normal	Normal	Normal	NSII cataract	Med mag	Med Mag
205	Mallawwa	59/M	29176	11yrs	irregular	7.2	113/215	1+	6/18	6/9	6/9	6/6	12.2	14.2	normal	normal	Pterigium	Pterigium	normal	normal	normal	normal	normal	PSC	PSC	Normal	Normal	PSC	PSC	Med mag	Med Mag
206	Subhas	42/M	22125	3yrs	Regular	8	146/296	Nil	6/12	6/9	6/6	6/6	17.3	15.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mod NPDR	Mod NPDR	Mod NPDR	MOd NPDR	Med mag	Med Mag
207	Mallapa	66/M	23990	6yrs	Regular	6.8	118/168	Nil	6/24	CF-3M	6/18	CF-2M	18.9	17.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	NS II Cataract	NS III cataract	Normal	Normal	NS II Cataract	NS III cataract	Med mag	Med Mag
208	Gangamma	50/F	24236	2yrs	Regular	8	170/270	Nil	6/6	6/6	6/6	6/6	10.3	10.3	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	mod with csme	mod with csme	Normal	Normal	prp	prp
209	Rajendra	68/M	21339	3yrs	irregular	8.2	130/220	Nil	CF-3M	CF-2M	6/60	6/36	15.9	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Normal	Normal	PSC	PSC	Med mag	Med Mag
210	Mahadevi	50/F	2014315	4yrs	Regular	8.2	256/307	Nil	6/6	6/6	6/6	6/6	13.2	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
211	Mallamma	52/F	9856	2yrs	Regular	6.6	96/120	Nil	6/6	6/6	6/6	6/6	11.3	17.3	Normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
212	Siddhamm	72/F	21044	3yrs	Regular	6.4	108/239	Nil	PL	cf-1.5m	NI	NI	17.3	17.3	normal	normal	normal	normal	normal	normal	normal	normal	normal	Mature cataract	Intemuscent Ca	Normal	Normal	Mature cataract	Intemuscent Cataract	Med mag	Med Mag
213	Devendrap	36/M	2014412	2yrs	Regular	7.6	250/310	Nil	6/36	6/36	6/18	6/18	14.6	14.6	Normal	normal	normal	normal	normal	normal	normal	normal	normal	Cortical	Normal	High risk PDR	High risk PDR	High risk PDR	PDR+Cortical	PRP	PRP
214	Madevi	49/F	49955	9yrs	irregular	7	86/168	1+	6/24	6/24	6/24	6/24	10.3	12.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
215	Shantidevi	70/F	50429	3yrs	Regular	6.4	156/260	Nil	6/12	6/12	NI	NI	15.9	14.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
216	Yamanapp	60/M	2014519	New		7.8	140/256	Nil	6/6	6/6	6/6	6/6	12.2	12.2	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
217	Siddhawwa	40/F	1253	1yr	Regular	6.6	94/176	Nil	6/12	6/12	6/6	6/6	17.3	15.9	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
218	Dnyaneshv	35y/F	7568	3mon	Regular	9	94/114	Nil	6/6	6/6	6/6	6/6	14.6	17.3	normal	normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
219	Kashibai D	55/F	529	4yrs	Regular	7.1	98/110	Nil	6/6	6/6	6/6	6/6	10.3	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Sev NPDR	Sev NPDR	Sev NPDR	Sev NPDR	Focal Laser	Focal Laser
220	M H Utama	52/M	13697	5.5yrs	Regular	6.8	136/206	Nil	6/24	6/24	6/12	6/12	12.2	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
221	Basavraj	44/M	12218	9yrs	Regular	7.2	210/286	Nil	6/24	6/24	6/9	6/9	14.6	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mod NPDR	Mod NPDR	Mod NPDR	Mod NPDR	Med mag	Med Mag
222	Savithri	48/F	40386	3yrs	Regular	7.2	200/290	Nil	6/24	6/6	6/6	6/6	15.9	15.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
223	Kaushibai V	66/F	1489	2yrs	irregular	6.4	170/229	Nil	6/6	6/6	6/6	6/6	13.2	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
224	Shantabai	75/F	3137	2.5yrs	irregular	7	160/198	1+	6/18	6/18	6/9	6/9	18.9	15.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	mod	mod	Pseudo P	Pseudo P	Med mag	Med Mag
225	Chandappa	65/M	46719	5yrs	Regular	8.6	220/310	Nil	6/24	PL	6/18	NI	14.2	10.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Aphakia	Mature catarac	Sev NPDR	Sev NPDR	Aphakia + Sev NPDR	Mature cataract+Sev NPDR	PRP	Med Mag
226	Gundappa	61/M	1323	11 yrs	Regular	6.8	120/180	Nil	6/60	6/36	6/24	6/9	14.2	12.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Mild NPDR	Mild NPDR	Pseudo P +mild NPDR	Pseudo P + mild NPDR	Med mag	Med Mag
227	Parvathiba	60/F	36346	4yrs	Regular	6.2	116/176	Nil	6/12	6/6	NI	6/6	15.9	15.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	NSII cataract	Normal	Normal	Pseudo P	NSII cataract	Med mag	Med Mag
228	Gurunath C	75/M	331338	8yrs	Regular	6	126/176	Nil	6/36	6/36	6/9	6/9	14.6	15.9	Blepharitis	Blepharitis	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Normal	Normal	Blepharitis + Pseudo P	Blepharitis + Pseudo P	Med mag	Med Mag
229	Shankar	62/M	331449	12 yrs	Regular	6.8	114/200	Nil	6/24	6/6	6/9	6/6	18.9	15.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	mild	mild	PSC	PSC	Med mag	Med Mag
230	Mahadevi	48/F	291813	2yrs	Regular	6	187/222	Nil	6/6	6/6	6/6	6/6	10.3	10.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	CRAO	Normal	CRAO	Normal	Med mag	Med Mag
231	Parvathi	65/F	291848	4yrs	irregular	8.4	190/320	Nil	6/24	6/36	6/9	6/9	15.9	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Cortical Cataract	Cortical Catarac	Normal	Normal	Cortical Cataract	Cortical Cataract	Med mag	Med Mag
232	Bagappa	85/M	21880	11yrs	Regular	6.9	126/196	1+	6/36	CF-3M	6/18	6/36	14.2	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Cortical Catarac	Normal	Normal	Normal	Cortical Cataract	Med mag	Med Mag
233	Shankar Ha	50/M	205235	13 yrs	Regular	7.4	170/3110	Nil	6/6	6/6	6/6	6/6	12.2	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mod NPDr	Mod NPDR	Mod NPDR	Mod NPDR	Med mag	Med Mag
234	S K Kalli	58/M	18646	11yrs	irregular	9.3	180/230	1+	6/9	6/9	6/9	6/9	14.2	10.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Sev NPDR	Sev NPDR	Sev NPDR	Sev NPDR	Focal Laser	Focal Laser
235	Madevva S	45/F	207142	3yrs	Regular	6	100/146	Nil	6/24	6/18	6/12	6/9	14.2	15.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
236	Ratnabai	60/F	207626	9mon	Regular	7.6	170/260	Nil	6/60	6/60	6/18	6/36	14.2	12.2	Normal	Dropping	normal	normal	normal	normal	normal	normal	normal	Cortical Cataract	Cortical Catarac	Normal	Normal	Cortical Cataract	3rd CN palsy + Cortical cataract	Med mag	Med Mag
237	Nirmala De	48/F	229222	4mon	Regular	6.5	100/150	Nil	6/6	6/6	6/6	6/6	12.2	12.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
238	Ramappa F	54/M	192208	14 yrs	Regular	6.6	87/185	Nil	6/9	6/9	6/6	6/6	10.3	10.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	mod	mod	Normal	Normal	Med mag	Med Mag
239	A D Bagli	61/M	192235	14yrs	irregular	8.6	313/419	2+	6/36	6/18	6/18	6/9	14.2	15.9	Normal	Stye	normal	normal	normal	normal	normal	normal	normal	PSC	Cortical Catarac	Normal	Normal	PSC	Stye+CC	Med mag	Med Mag
240	A M Kunjal	60/M	176286	11yrs	Regular	7	148/260	1+	6/12	6/12	6/6	6/6	18.9	17.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Cortical Cataract	Cortical+PSC	Normal	Normal	Cortical Cataract	Cortical+PSC	Med mag	Med Mag

241	S R Guraba	50/M	176717	1yr	Regular	7.1	100/145	Nil	6/9	6/12	6/6	6/6	10.3	10.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Cortical Cataract	Cortical Catarac	severe	Severe NPDR	Cortical Cataract	Cortical Cataract	Med mag	Med Mag
242	Sonabee R	70/F	28625	2yrs	irregular	8.6	116/170	Nil	CF-3M	6/24	6/60	6/12	15.3	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	NSII	Cortical catarac	Sev NPDR	Sev NPDR	NS II+ Sev NPDR	CC + Sev NPDR	Med mag	Med Mag
243	Rayappa P	47/M	238619	2yrs	Regular	8.2	100/136	Nil	6/6	6/6	6/6	6/6	18.9	18.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
244	Subhas Jan	42/M	22125	5mon	Regular	7.4	135/200	Nil	6/12	6/9	6/6	6/6	12.2	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Mod PDR	Mod PDR	PSC+Mod PDR	PSC+Mod PDR	Med mag	Med Mag
245	Sidappama	63/M	23975	New		7.6	230/374	Nil	6/18	6/9	6/6	6/6	12.2	12.2	Normal	Blepharitis	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Blepharitis	Med mag	Med Mag
246	Mallappa	60/M	23990	6yrs	Regular	9.4	186/312	Nil	6/24	CF-1M	6/18	6/24	15.9	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	NS III Cataract	NS III Cataract	Mod NPDR	Mod NPDR	NS III Cataract + Mod NPDR	NS III Cataract + Mod NPDR	Med mag	Med Mag
247	Vijaykumar	48/M	22082	8yrs	irregular	9.3	168/222	1+	6/60	6/60	6/24	6/36	14.2	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Sev NPDR +CSME	Sev NPDR +CSME	Pseudo P+ Sev NPDR+CSME	Pseudo P+ Sev NPDR+CSME	PRP	PRP
248	Sayadam k	50/F	24468	12yrs	irregular	6.6	110/170	Nil	6/60	6/60	6/36	6/36	10.3	10.3	Stye	Stye	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Normal	Normal	Stye +PSC	Stye+PSC	Med mag	Med Mag
249	Gurudatt J	62/M	26874	18yrs	Regular	7.8	180/300	2+	CF-2m	6/24	6/60	6/18	14.2	12.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	NS II Cataract	NS II Cataract	Mod PDR	Mod PDR	NSII Cataract+Mod PDR	NSII Cataract+Mod PDR	Med mag	Med Mag
250	Channama	40/M	291800	3yrs	Regular	6	98/148	Nil	6/18	6/18	6/9	6/9	12.2	12.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
251	Allabaksha	51/M	238639	11yrs	Regular	6.4	118/168	Nil	6/6	6/6	6/6	6/6	10.3	12.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Severe NPDR	Severe NPDR	Normal	Normal	Med mag	Med Mag
252	Siddhappa	45/M	17582	1mon	Regular	6.7	138/181	Nil	6/9	6/6	6/6	6/6	13.3	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
253	Siddhaww	60/F	20791	1mon	irregular	7.4	116/189	Nil	6/60	6/36	6/24	6/36	18.9	17.6	Normal	Stye	normal	normal	normal	normal	normal	normal	normal	Cortical cataract	Normal	Normal	Normal	Cortical cataract	Stye	Med mag	Med Mag
254	Shantabai (	45/F	22847	1.5yrs	irregular	7.4	146/246	1+	6/36	6/24	6/24	6/18	12.2	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mod NPDR	Mod NPDR	Mod NPDR	Mod NPDR	Med mag	Med Mag
255	Meradmm	61/F	20789	4yrs	Regular	8.2	110/150	Nil	6/9	6/9	6/6	6/6	12.2	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Normal	Normal	PSC	PSC	Med mag	Med Mag
256	Shreemant	50/F	21212	New		6.2	100/150	Nil	6/6	6/6	6/6	6/6	14.2	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
257	Ananaya	45/F	253545	4yrs	irregular	9.4	110/200	Nil	6/60	6/60	6/36	6/36	17.6	18.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	PSC + NSII catarad	PSC + NSII catar	Sev NPDR	Sev NPDR	PSC+ Sev NPDR	PSC+ Sev NPDR	Med mag	Med Mag
258	Mohan	50/M	22972	12yrs	irregular	8.4	278/358	2+	6/6	6/6	6/6	6/6	12.2	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mod NPDR	Mod NPDR	Mod NPDR	Mod NPDR	Med mag	Med Mag
259	M B Pattar	66/M	276999	20yrs	irregular	6.4	110/170	1+	6/6	6/6	6/6	6/6	14.2	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mild NPDr	Mild NPDR	Mild NPDR	Mild NPDR	Med mag	Med Mag
260	Shanteppa	50/M	272165	2yrs	Regular	7.4	180/280	Nil	6/6	6/6	6/6	6/6	10.3	10.3	Normal	Normal	Pterigium	Pterigium	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Pterygium	Pterygium	Med mag	Med Mag
261	Kamalabai	56/F	28352	12yrs	Regular	7.5	186/239	1+	6/36	6/36	6/24	6/24	12.2	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
262	Mahadevi	58/F	317248	9yrs	Regular	7.4	340/572	Nil	6/36	CF-3M	6/9	6/12	12.2	14.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	PSC+NSII Catar	Mod NPDR	Mod NPDR	Pseudo P +Mod NPDR	PSC+NSII+Mod NPDR+CSME	Med mag	Med Mag
263	Gurappa H	78/M	318318	2yrs	Regular	6.4	126/186	Nil	6/24	6/18	6/18	6/18	18.9	17.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Normal	Normal	Pseudo P	Pseudo P	Med mag	Med Mag
264	Tarabai	70/F	317634	15yrs	Regular	7.6	138/206	1+	6/36	6/36	6/12	6/12	14.6	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Cortical Cataract	Cortical Catarad	Normal	Normal	Cortical Cataract	Cortical Cataract	Med mag	Med Mag
265	Shankar K	58/M	29136	18yrs	irregular	6.7	168/260	1+	6/36	6/60	6/24	NI	10.3	10.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	PSC	Mild NPDR	Mild NPDR	Pseudo P+ Mild NPDr	PSC+ Mild NPDR	Med mag	Med Mag
266	Ishwarapp	65/M	28884	11yrs	irregular	8.8	180/266	1+	6/60	6/24	6/24	6/18	12.2	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Cortical Cataract	Cortical Catarad	Sev NPDR	Sev NPDR+Macular ed	Cortical cataract+Sev NPDR	Cortical Cataract+Sev NPDR+Mac.edem	PRP	PRP
267	Adarsh Ad	35/M	318668	2yrs	Regular	7	106/156	Nil	6/6	6/6	6/6	6/6	14.6	14.6	Normal	Normal	normal	Conjunctiviti	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Conjunctivitis	Med mag	Med Mag
268	Kushal Gal	65/M	223070	13yrs	irregular	7.3	315/536	Nil	6/12	6/24	6/9	6/12	10.3	12.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Cortical + PSC	Normal	Normal	Pseudo P	Cortical + PSC	Med mag	Med Mag
269	Darmanna	50/M	200200	12yrs	irregular	6.5	170/254	Nil	6/18	6/6	6/6	6/6	15.9	15.9	Stye	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	mild	mild	Stye	Normal	Med mag	Med Mag
270	Mohan ch	53/M	313517	9yrs	Regular	6.5	129/196	Nil	6/12	6/9	6/6	6/6	12.2	12.2	Normal	Normal	Pterigium	Pterigium	normal	normal	normal	normal	normal	Normal	Normal	Mild NPDR	Mild NPDR	Pterygium+Mild NPDR	Pterygium+Mild NPDR	Med mag	Med Mag
271	Renuka K	33/F	29515	1yr	Regular	6.5	124/156	Nil	6/6	6/6	6/6	6/6	14.6	17.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
272	Parvati Pat	60/F	28592	6yrs	Regular	7	152/220	Nil	6/18	HM	6/9	NI	14.6	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	NSII	NSII	Normal	Normal	NS II	NS II	Med mag	Med Mag
273	Shalini Har	62/F	323274	12yrs	Regular	7.8	160/230	Nil	6/36	6/60	6/9	6/9	10.3	10.3	Xanthelesma	Xanthelesma	normal	normal	normal	normal	normal	normal	normal	psc	psc	Mod NPDR	Mod NPDR	Xan+PSC+Mod NPDR	Xan+PSC+Mod NPDR	Med mag	Med Mag
274	Gurappa	50/M	192233	8yrs	Regular	7.4	290/479	Nil	CF-2m	6/60	6/60	6/24	12.2	12.2	Normal	Normal	Pterigium	Pterigium	normal	normal	normal	normal	normal	Cortical cataract	Cortical catarad	Mod NPDR	Mod NPDR	Pterygium+Cortical cataract+	Pterygium+Cortical cataract+Mod NPDF	Med mag	Med Mag
275	Sushilabai	60/F	176574	4yrs	Regular	8.3	158/284	Nil	6/24	6/24	6/9	6/9	26.6	24.4	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Normal	Normal	POAG+Pseudo P	POAG+Pseudo P	Med mag	Med Mag
276	Tulasappa	65/M	1069	New	Regular	7	120/170	Nil	6/60	CF-2M	6/24	NI	14.6	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	NSIII	Normal	Normal	Dry eye+Pseudo P	Dryeye+NSIII	Med mag	Med Mag
277	Rajshekhar	40/M	28548	3yrs	Regular	6.5	166/190	Nil	6/6	6/6	6/6	6/6	14.6	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
278	Ningappa	80/M	31535	4yrs	irregular	7.5	120/156	Nil	NA	NA	CF-2m	6/60	NA	17.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	NA	PSC	NA	Normal	Pthisis Bulbi	PSC	Med mag	Med Mag
279	Sumitra	60/F	12811	2yrs	irregular	7.3	189/210	Nil	6/9	6/9	6/6	6/6	17.3	17.3	Xanthelesma	Xanthelesma	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Normal	Normal	Xanthelsema+Pseudo P	Xanthelsema+Pseudo P	Med mag	Med Mag
280	Basappa	50/M	46738	10yrs	irregular	6.5	171/230	Nil	6/6	6/6	6/6	6/6	17.3	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	BRAO	Normal	Normal	Normal	Med mag	Med Mag
281	Apaanna	81/M	37309	12 yrs	Regular	7.4	85/188	Nil	6/36	6/36	6/18	6/18	14.6	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Cortical Cataract	Cortical Catarad	Mod NPDR+CSME	Mod NPDR+CSME	Cortical Cataract+Mod NPDR+	Cortical Cataract+Mod NPDR+CSME	Focal Laser	Focal Laser
282	Mahadevi	48/F	17781	2yrs	Regular	8	110/168	Nil	6/24	6/24	6/18	6/18	15.9	15.9	Meibomitis	Chr Dacr	normal	normal	normal	normal	normal	normal	normal	Cortical Cataract	Cortical Catarad	Normal	Normal	Meibomitis+Cortical Cataract	Chr Dacr	Med mag	Med Mag
283	Subhadran	48/F	46110	2yrs	Regular	6.4	120/160	Nil	6/36	6/24	6/24	6/18	14.6	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Normal	Normal	PCS	PSC	Med mag	Med Mag
284	Savithri	62/F	46151	10yrs	Regular	8	170/330	Nil	6/36	6/36	6/24	6/24	13.4	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
285	Sonabai Ra	72/F	268812	2yrs	irregular	8.3	101/150	Nil	6/60	6/60	6/18	6/18	12.2	13.4	N0rmal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mod NPDR	Mod NPDR	Mod NPDR	Mod NPDR	Med mag	Med Mag
286	Kamalabai	53/F	7107	3yrs	irregular	7	140/200	Nil	6/6	6/6	6/6	6/6	17.3	17.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Normal	Normal	Pseudo P	Pseudo P	Med mag	Med Mag
287	Lakshmiba	64/F	6745	6yrs	Regular	6.4	98/138	Nil	6/24	6/24	6/6	6/6	14.6	18.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Normal	Normal	PSC	PSC	Med mag	Med Mag
288	Shivanand	61/M	6754	3mon	Regular		116/200	Nil	6/36	6/36	6/18	6/18	14.6	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Normal	Normal	Pseudo P	Pseudo P	Med mag	Med Mag
289	Kasturibai	50/F	10286	2yrs	irregular	6.3	142/200	Nil	CF-2m	CF-2M	6/60	6/60	20.6	18.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	NSII Cataract	NSII Cataract	Normal	Normal	NS II Cataract	NS II Cataract	Med mag	Med Mag
290	Yallappa	48/M	1027	2yrs	Regular	6.9	230/372	Nil	6/9	6/9	6/6	6/6	17.3	17.3	Normal	Normal	Normal	SCH	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	SCH	Med mag	Med Mag
291	Chandraka	65/M	33159	2yrs	irregular	9.5	110/130	Nil	6/12	6/36	6/6	6/6	14.6	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Cortical Catarad	Sev NPDR+CSME	Sev NPDR+CSME	Pseudo P+Sev NPDR+CSME	Cort.Cataract+Sev NPDR+CSME	PRP	PRP
292	Hulagappa	55/M	30450	3mon	Regular	6.7	110/146	Nil	6/9	6/6	6/6	6/6	17.3	17.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Normal	Normal	PSC	PSC	Med mag	Med Mag
293	Tularabai	65/F	21004	8yrs	irregular	8.3	120/193	Nil	HM	6/60	NI	6/36	12.2	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Normal	Normal	Pseudo P	Pseudo P	Med mag	Med Mag
294	Bagappa	85/M	21880	10yrs	irregular	7.2	132/150	Nil	6/24	6/18	6/18	6/18	18.9	18.9	Normal	Normal	normal	normal	normal	normal	normal	PXF	PXF	Pseudo P	NS II Cataract	Normal	Normal	PXF+Pseudo P	PXF + NSII cataract	Med mag	Med Mag
295	Rajendra	58/M	21339	5yrs	irregular	7.2	148/220	Nil	6/24	6/24	6/18	6/18	22.4	22.4	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Cupping 0.8	Cupping 0.8	POAG	POAG	Med mag	Med Mag
296	Parasappa	50/M	21212	New		7.5	210/341	Nil	6/24	6/24	6/9	6/9	14.6	14.6	Normal	Stye	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Stye	Med mag	Med Mag
297	Basanna	64/M	287871	2yrs	Regular	7.9	116/130	Nil	6/9	6/12	6/6	6/6	10.3	10.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
298	Balu	65/M	21200	6yrs	irregular	6.4	128/148	Nil	6/24	6/24	6/18	6/18	12.2	12.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Mild NPDR	Mild NPDR	PSC+Mild NPDR	PSC+Mild NPDR	Med mag	Med Mag
299	Gangamma	56/F	926	2yrs	Regular	6.4	114/155	Nil	6/24	6/24	6/6	6/6	18.9	18.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Cortical cataract	Cortical catarad	Normal	Normal	Cortical cataract	Cortical cataract	Med mag	Med Mag
300	Sunanda	60/F	329227	6yrs	Regular	7.6	130/180	Nil	6/36	6/36	6/9	6/9	12.2	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
301	Shanta	60/F	331507	5yrs	Regular	6.6	100/140	Nil	6/18	6/18	6/9	6/9	18.9	18.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	mod	BRVO	Normal	BRVO	Med mag	Med Mag
302	Mutthappa	45/M	22129	2yrs	Regular	6.6	108/150	Nil	6/6	6/6	6/6	6/6	15.9	13.4	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
303	Subhadra E	65/F	203122	15yrs	irregular	8.8	221/340	1+	6/9	6/9	6/6	6/6	12.2	12.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
304	L C Hosam	57/M	260509	4yrs	Regular	6.8	90/176	Nil	6/24	6/24	6/18	6/18	14.4	15.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Cortical cataract	Cortical catarad	Normal	Normal	Cortical cataract	Cortical cataract	Med mag	Med Mag
305	Sangappa I	75/M	348011	20yrs	Regular	7	88/200	2+	6/60	6/60	6/24	6/24	14.6	14.6	Normal	Normal	Pterigium	Pterigium	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Normal	Normal	Pterygium+Pseudo P	Pterygium+Pseudo P	Med mag	Med Mag
306	Chandabas	58/M	203162	11yrs	Regular	7.2	160/280	1+	CF-2m	6/9	6/60	6/9	17.3	17.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	PSC+Cuneiform	PSC+Cuneiform	Mod NPDR	Mod NPDR	PSC+Cuneiform+Mod NPDR	PSC+Cuneiform+Mod NPDR	Med mag	Med Mag
307	Yallappa	85/M	214865	6yrs	Regular	7.2	126/186	Nil	6/60	CF-2M	6/18	6/36	17.3	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Pseudo P	Mod NPDR+CSME	Mod NPDR	Mod NPDr+CSME	Pseudo P+Mod NPDR	Focal Laser	Med Mag
308	Chandappa	60/M	330212	5yrs	Regular	6.2	86/169	Nil	6/60	CF-3M	6/36	NI	14.6	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
309	Malakari	60/M	15601	6yrs	irregular	8.6	180/340	Nil	6/60	6/36	6/60	6/24	14.6	17.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Cortical cataract	Cortical catarad	Sev NPDR	Sev NPDR	Cortical cataract+Sev NPDR	Cortical cataract+Sev NPDR	PRP	PRP
310	S P Jangina	71/F	260580	10yrs	Regular	8	167/256	1+	6/24	6/36	6/12	6/24	17.3	17.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Myopia+PVD	Dry ARMD		Dry ARMD	Focal Laser	Focal Laser
311	Gurappa M	76/M	271391	2yrs	Regular	6.6	160/260	Nil	6/36	CF-1M	6/18	NI	17.3	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Cortical cataract+	Normal	Normal	Normal	Cortical + NS II cataract		Med mag	Med Mag
312	S D Shinde	64/M	260569	4yrs	Regular	6.8	160/210	Nil	6/24	6/24	6/12	6/12	17.3	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Early dry AMD	Early dry AMD	Early dry AMD	Early dry AMD	Med mag	Med Mag
313	Gangabai A	58/M	23769	9yrs	Regular	7	180/321	Nil	6/6	6/6	6/6	6/6	17.3	17.3	Stye	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Stye	Normal	Med mag	Med Mag
314	M S Gurab	62/M	267681	15yrs	irregular	6.6	98/149	Nil	6/12	6/12	6/9	6/18	15.9	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mild NPDR	Mild NPDR	Mild NPDR	Mild NPDR	Focal Laser	Focal Laser
315	Danakka	65/F	194775	2yrs	Regular	7.5	138/228	Nil	HM	6/60	NI	6/60	10.3	10.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Cortical Cataract	Mild NPDR	Mod NPDR	Mod NPDR+ AION	Cortical Cataract+Mod NPDR	Cortical cataract+Mod NPDr+AION	Med mag	Med Mag
316	B S Masuli	55/M	53608	9yrs	irregular	6.4	96/148	Nil	CF-3M	CF-3M	NI	6/60	14.6	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	PSC+NSIII Catarad	PSC+NSIII Catar	Normal	Normal	PSC+NSIII Cataract	PSC+NSIII Cataract	Med mag	Med Mag
317	Shridhar H	49/M	5081	2yrs	Regular	7.4	169/234	Nil	6/6	6/6	6/6	6/6	12.2	12.2	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
318	Shankarep	60/M	77348	11yrs	irregular	6.4	96/196	1+	6/60	6/60	NI	6/18	10.3	10.3	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Normal	Normal	PSC	PSC	Med mag	Med Mag
319	Kanthabai	65/F	77702	8yrs	Regular	6.2	115/130	Nil	6/36	6/12	NI	6/6	14.6	15.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Cortical Cataract	Cortical Catarad	Normal	Normal	Cortical Cataract	Cortical Cataract	Med mag	Med Mag
320	Ningappa	70/M	77629	12yrs	irregular	10.2	100/186	1+	6/24	CF-2M	6/12	6/36	14.6	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC+Cortical ca	Sev NPDR	Sev NPDR	PSC+Sev NPDR	PSC+Cortical cataract+Sev NPDR	PRP	PRP
321	Khurshid A	58/M	4451	2yrs	irregular	6.4	98/196	Nil	6/18	6/18	6/9	6/9	12.2	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	Early cortical cata	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
322	Lakshmiba	64/F	45439	3yrs	Regular	8.4	220/345	Nil	6/36	6/18	6/9	6/9	18.9	18.9	Normal	Normal	normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Normal	Normal	PSC	PSC	Med mag	Med Mag

323	Nandakum	56/M	47236	2yrs	Regular	7.9	99/125	Nil	6/18	6/18	6/6	6/9	10.3	12.2	Normal	Normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Mod NPDR	Mod NPDR+PVD	PSC+Mod PDR	PSC+PVD	Med mag	Med Mag
324	Janamma	55/F	45813	5yrs	Regular	8.9	126/162	Nil	CF-3M	6/36	CF-2m	6/24	14.6	12.2	Normal	Normal	normal	normal	normal	normal	normal	normal	PSC	PSC	Normal	Normal	PSC	PSC	Med mag	Med Mag
325	Basalingan	68/F	169094	8yrs	Regular	7.3	160/286	Nil	6/36	6/60	6/12	6/18	14.6	15.9	Normal	Normal	normal	normal	normal	normal	normal	normal	Early PSC	Early PSC	Mod NPDR	Mod NPDR	PSC+Mod PDR	PSC+Mod PDR	Med mag	Med Mag
326	Maruti	55/M	169091	6yrs	Regular	7.1	108/170	Nil	6/6	6/6	6/6	6/6	12.2	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
327	Shivanand	50/M	45731	1.5yrs	Regular	6	116/180	Nil	6/9	6/9	6/6	6/6	15.9	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
328	Sharada	60/F	73653	6yrs	Regular	6.2	168/256	Nil	6/9	6/6	6/6	6/6	14.6	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Normal	Normal	Pseudo P	Pseudo P	Med mag	Med Mag
329	Shivanand	49/M	203230	2yrs	Regular	6.4	94/170	Nil	6/6	6/6	6/6	6/6	14.6	20.6	Normal	Normal	Conjunctivitis	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Conjunctivitis	POAG	Med mag	Med Mag
330	Vishnu T	79/m	193138	6yrs	irregular	8.3	116/180	Nil	HM	CF-3M	NI	6/60	15.9	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	High risk PDR+ CSME	High risk PDR	Pseudo P +PDR+CSME	Pseudo P+PDR	PRP	Med Mag
331	Sharanamr	70/F	194215	**11yrs**	irregular	7.6	220/345	Nil	6/24	No PL	6/24	NI	13.3	10.3	Normal	Normal	normal	normal	normal	normal	normal	normal	PSC+ PXF	Complicated ca	Mod NPDR	NA	PSC+PXF+Mod NPDR	Complicated Cataract	Med mag	Med Mag
332	Mamta	56/F	156230	12yrs	Regular	7.3	180/250	Nil	CF-3M	CF-3M	NI	NI	14.6	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	PDR	PDR	Pseudo P+PDR	Pseudo +PDR	PRP	PRP
333	Basavraj	50/M	160902	4yrs	Regular	8.1	214/320	Nil	6/60	CF-3M	6/36	6/60	10.3	10.3	Normal	Normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mod NPDR	Mod NPDR+BRVO	Mod NPDR	Mod NPDR+BRVO	Focal Laser	Focal Laser
334	Meenakshi	70/F	110441	15yrs	Regular	9.2	220/350	1+	CF-3M	HM	6/60	NI	12.2	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	PDR	PDR+VH	Pseudo P+PDR	Pseudo P + PDR+VH	PRP	Vitrectomy
335	Gurupadap	68/M	143659	10yrs	Regular	7.8	173/285	Nil	HM	CF-2M	NI	NI	18.9	18.9	Normal	Normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Mod NPDR+TRD	Mod NPDR	Pseudo P+Mod NPDR+TRD	Pseudo P+Mod NPDR	Vitrectomy	PRP
336	Basavantap	59/M	13328	8yrs	Regular	8.4	198/265	Nil	CF-3M	CF-2M	NI	NI	15.9	15.9	Normal	Normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Early PDR+CSME	Early PDR+CSME	Pseudo P+ PDR+CSME	Pseudo P+ PDR+CSME	PRP	PRP
337	Vishnukala	79/F	143297	11 yrs	Regular	9.4	120/180	Nil	6/60	CF-2M	6/36	NI	14.6	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Mild NPDr	Mild NPDR	PP+Mild NPDR	PP+Mild NPDR	PRP	Vitrectomy
338	Annaray	60/M	143714	6yrs	Regular	8.2	160/230	Nil	6/60	6/60	NI	NI	17.3	17.3	Normal	Normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Sev NPDR+CSME	Mod NPDR+CSME	Pseudo P + mSev NPDR+ CSM	Pseudo p+ Mod NPDR	PRP	Focal Laser
339	Channamn	60/F	144712	10yrs	irregular	6.3	180/240	1+	6/12	6/18	6/9	6/18	16	18	Normal	Normal	normal	normal	normal	normal	normal	normal	PSC+NSI cataract	PSC+NSI Catara	Mild NPDR	Mild NPDR	PSC+NSI Cataract+Mild NPDR	6thCN Palsy+PSC+NSI+Mild NPDr	Med mag	Med Mag
340	Jannubai	44/F	14428	4yrs	irregular	7.2	138/190	Nil	CF-2m	CF-2m	6/60	6/60	12.2	12.2	Normal	Normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Mod NPDr+CSME	Mod NPDr+CSME+Ast	Mod NPDr+CSME	Mod NPDr+CSME+Asteroid hyalosis	PRP	PRP
341	Shankar	55/M	134554	5yrs	irregular	6.2	110/170	Nil	6/6	6/6	6/6	6/6	10.3	12.2	Normal	Normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
342	Shantamm	48/F	102322	5yrs	irregular	9.4	110/160	Nil	6/36	6/36	6/18	6/18	12.2	12.2	Normal	Normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Sev NPDR+CSME	Sev NPDR+CSME	Sev NPDR+CSME	Sev NPDR+CSME	PRP	PRP
343	Parvathi	55/F	77525	8yrs	Regular	6.8	130/190	Nil	6/24	6/36	6/12	6/18	14.6	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
344	Danawwa	65/F	77635	7yrs	Regular	6.6	110/167	Nil	6/6	6/6	6/6	6/6	12.2	12.2	Normal	Normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
345	M M Tuppa	45/M	78199	8yrs	Regular	7.1	108/180	Nil	6/6	6/6	6/6	6/6	18.9	18.9	Normal	Normal	normal	normal	normal	normal	normal	normal	Normal	Normal	PDR	PDR	Normal	Normal	PRP	PRP
346	M V Kattin	68/M	87038	3mon	Regular	6.6	95/136	Nil	CF-3M	CF-3M	6/60	6/60	14.6	10.3	Normal	Normal	normal	normal	normal	normal	normal	normal	PSC+Cortical cata	PSC+Cortical ca	Normal	Normal	PSC+Cortical cataract	PSC+Cortical cataract	Med mag	Med Mag
347	Subai chav	70/F	86917	7yrs	Regular	6.2	98/130	Nil	6/24	6/24	6/18	6/18	14.6	12.2	Normal	Normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag
348	Renuka B	57/F	77858	13yrs	irregular	8.4	190/290	2+	6/36	6/36	6/18	6/18	15.9	15.9	Normal	Normal	normal	normal	normal	normal	normal	normal	Pseudo P	Pseudo P	Mod NPDr+CSME	Mod NPDR + CSME	PseudoP+Mod NPDR + CSME	PseudoP+Mod NPDR + CSME	Med mag	Med Mag
349	Mallawwa	43/F	87407	3mon	Regular	7.2	168/178	Nil	CF-2m	6/36	6/12	6/9	14.6	14.6	Xanthelesma	Xanthelesma	Pterigium	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Xanth+Pterygium	Xanthelesma	Med mag	Med Mag
350	Mallappa R	75/M	193896	4yrs	irregular	6.3	160/246	Nil	CF-3M	6/60	6/60	6/36	15.9	14.6	Normal	Normal	normal	normal	normal	normal	normal	normal	Normal	Normal	Normal	Normal	Normal	Normal	Med mag	Med Mag