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Clinical Evaluation of Diabetic Retinopathy at a Tertiary Eye Care Centre in Central India: A Retrospective Study

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I. INTRODUCTION

The global prevalence of diabetes mellitus is predicted to increase dramatically in the coming decades, from an estimated 382 million in 2013 to 592 million by 2035 [1, 2]. Diabetes Mellitus (DM) is a metabolic disorder caused by chronic hyperglycemia that results in a number of pathologies including microvascular and macrovascular complications such as retinopathy, neuropathy, nephropathy, ischemic heart disease, cerebrovascular disease and peripheral vascular diseases[3,4]. Classically, DM has two etiopathological variant, that are classified as either type 1 or type 2. The hyperglycemia in type 1 DM is a direct result of destruction of the pancreatic beta cells; whereas, the hyperglycemia seen in type 2 DM is a result of insulin resistance and subsequent pancreatic beta cell dysfunction[5,6].

Type 2 diabetes (T2D) in particular has already attained epidemic levels, while type 1 diabetes (T1D) is increasing in incidence [7]. Patients with diabetes suffer many life-limiting and life-threatening complications, including macrovascular-related stroke, ischemic heart disease, and peripheral artery disease and/or microvascular-related retinopathy, neuropathy, and nephropathy. Diabetic retinopathy (DR) is the most common microvascular complication of diabetes [8]. Although some reports suggest that the incidence of visual impairment from DR has decreased in recent years in the US largely due to improvements in systemic control [9], DR is a burgeoning problem globally. DR currently affects almost 100 million people worldwide and is set to become an ever-increasing health burden, with estimates between 1990 and 2010 showing that DR-related visual impairment and blindness increased by 64% and 27%, respectively [10].

II. MATERIALS AND METHODS

A total of 252 diabetic patient'sdatabase were included in the study. We documentedvisual acuity,significant slit lamp examination findings if anyand posterior segment disease. The patients with media opacities (corneal and lenticular) precluding detailed fundus examination were excluded from the study. Diabetic retinopathy in patients was graded using the ICDR classification for diabetic retinopathy. DR was appropriately managed bypan retinal photocoagulation (PRP), intravitreal injection of anti-vascular endothelial growth factors (anti-VEGF),vitrectomy or retinal surgeries and counselling for blood sugar control accordingly.

Patients with diabetic retinopathy were graded using the ICDR classification for diabetic retinopathy. Mild to moderate retinopathy patients were counselled for strict blood sugar control and advised regular follow up. Severe non-proliferative diabetic retinopathy (NPDR) and proliferative diabetic retinopathy (PDR) patients were treated using pan retinal photocoagulation and intravitreal anti VEGFs were given along with counselling for strict blood sugar control.

Patients presenting with Vitreous haemorrhage (VH) were taken for Vitrectomy with endolaserfor early rehabilitation.

Patients with retinal detachment underwent vitrectomy followed by retinal reattachment surgery with retinal endolaser.

All patients were followed up regularly and advised blood sugar control post operatively.

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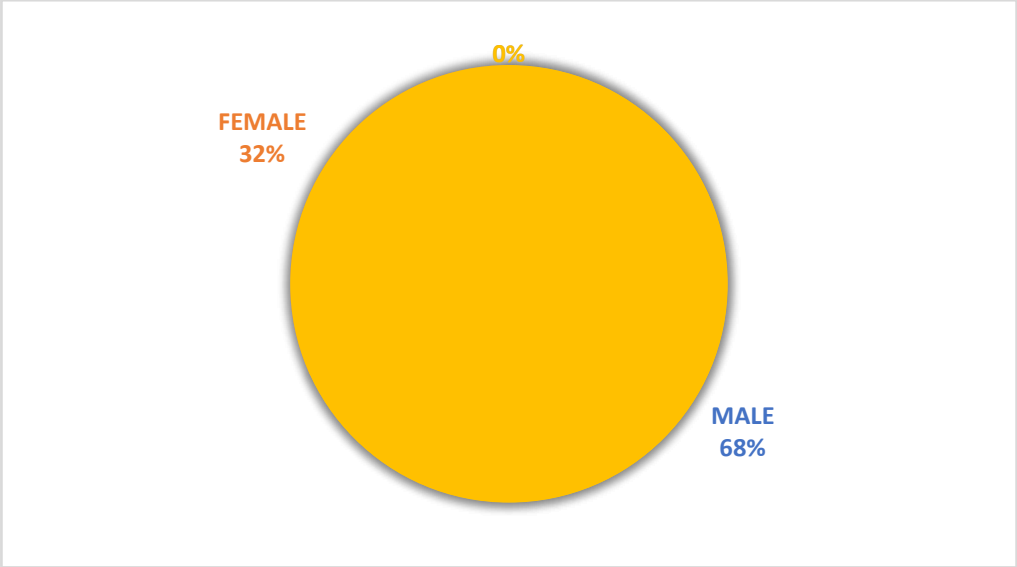
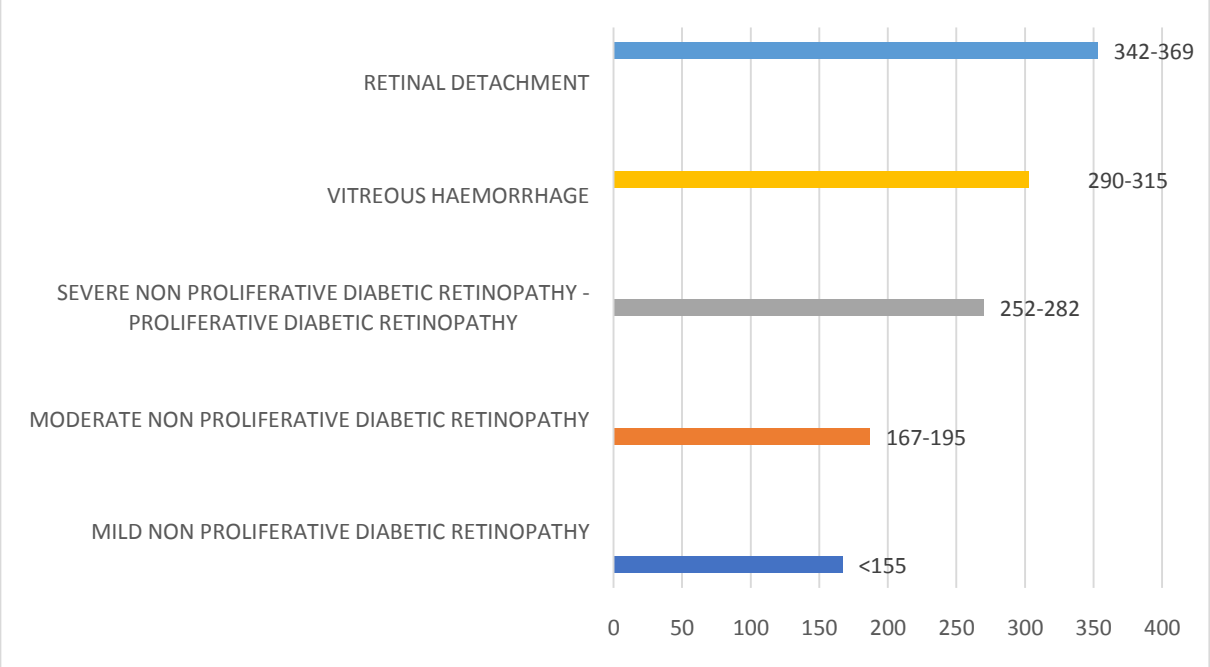
III. OBSERVATIONS

1. Gender Distribution of the sample



2. Correlation of grade of Diabetic Retinopathy (DR) with a range of random blood glucose level in subjects



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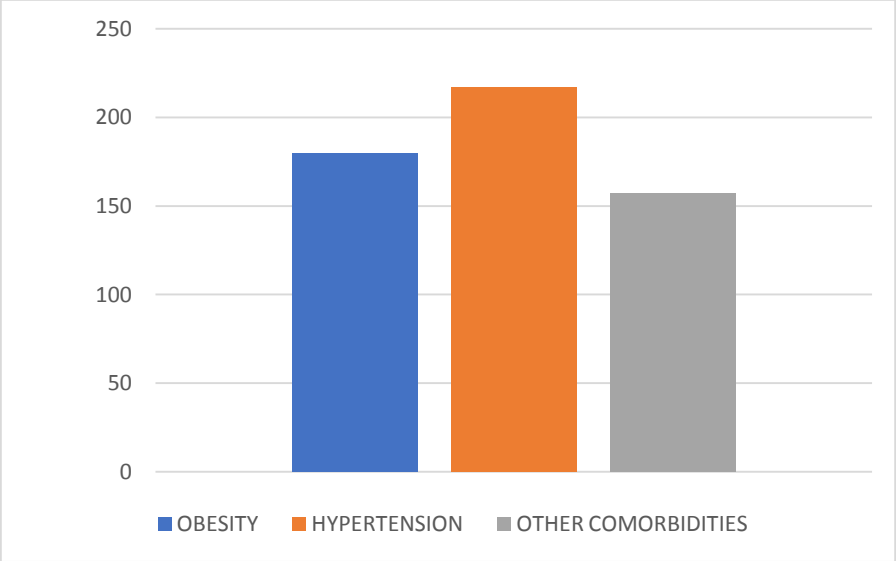
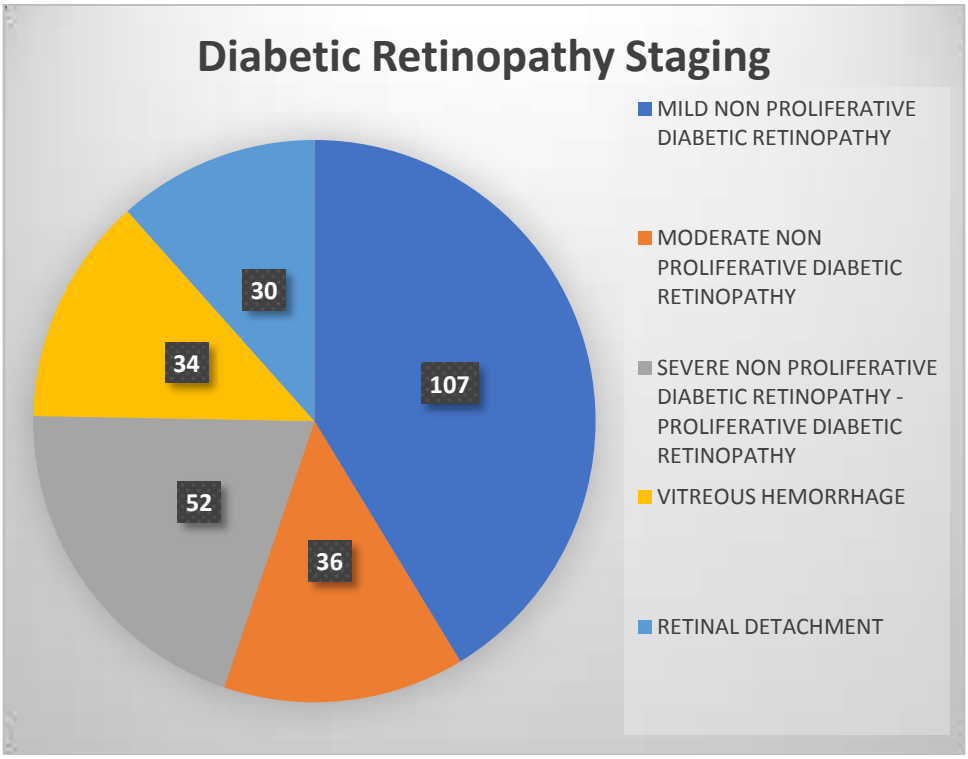
3. Number of Co-morbid patients in presence of Diabetic Retinopathy



1. Distribution of different grades and complications of diabetic retinopathy in the subjects



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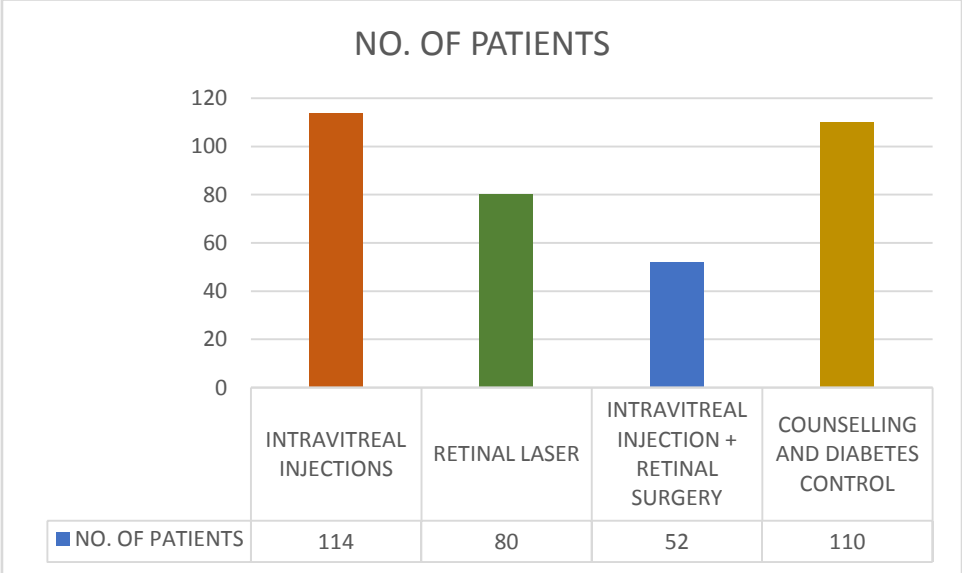
2. Distribution of various management strategies in the subjects



IV. RESULTS

A total of 252 patients were evaluated out of which 172 were males and remaining 80 were females. The average age of the study sample was 51.58 years.

The most frequent associated co-morbidity was hypertension in 217 patients, obesity in 180 patients followed by other diseases in 157 patientswhich includes chronic kidney disease (CKD), bronchial asthma, arthritis, autoimmune diseases etc. These co-morbidities could be considered as a potential risk factor for developing DR. The average duration of diabetes in the study sample was 8.24 years.

The highest number of patients, 107, were in mild non proliferative diabetic retinopathy NPDR) group followed by 36 patients of moderate NPDR, 52 patients with severe NPDR to early proliferative DR (PDR), 34 patients with vitreous haemorrhage and 30 patients presented with retinal detachment.

The highest random blood glucose level noted for mild NPDR was 137 mg/dl, followed by 183 mg/dl for moderate NPDR. Severe NPDR-PDR had a highest random blood glucose of 267 mg/dl and vitreous haemorrhage and retinal detachment showed values of 303 and 353 mg/dl respectively.

Counselling for blood sugar control and lifestyle modification was advised in all patients. Intravitreal anti VEGFs were given in 114 patients and Retinal lasers weredone in 80 patients. 52 patients were managed by both intravitreal anti VEGFs and retinal surgeries.

V. DISCUSSION

Diabetic retinopathy is a sight threatening disease in neglected cases and poses significant impact on active lifestyle of a patient. The prevalence of diabetic retinopathy in diabetes mellitus patient is variable. Vashist P et al did the detailed survey of large population, pan India for knowing the prevalence of DR among diabetes mellitus patients and found prevalence of DR in 16.9% population,sight threatening DR (STDR) in 3.6% & mild DR in 11.8%.[11]Shah K et al also studied the prevalence of DR in diabetic patients attending Diabetes clinic and found DR in 75.03% patients, 52.41% being non-proliferative DR (NPDR) & remaining 22.61% affected with proliferative DR (PDR).[12] In our study population, we graded patients according to International Clinical Diabetic Retinopathy classification into 5 groups although we could not find any patients with no DR since we are tertiary eye care center.[13]

The patients with diabetic retinopathy are prone to develop a number of complications including vitreous haemorrhage, cataract and retinal detachment.The development of complications in DM is more closely related with the duration of diabetes as compared to the severity of the disease.

A number of comorbidities are associated with the development of diabetic retinopathy.

In our study hypertension was the most frequently associated co morbidity followed by obesity and other comorbidities like hyperlipidaemia and hypercholesterolaemia.

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In our sample of patients majority of patients with good blood sugar control had mild NPDR followed by moderate to severe NPDR and a small number with high blood sugar levels and poor control presented with complications like vitreous haemorrhage and retinal detachments. Counselling and blood sugar control was strictly advised in all patients and the complications were managed using retinal laser, intravitreal anti VEGF injections and vitrectomy as needed.

High lipid levels: Some of the materials that leak from damaged blood vessels into the retina in cases of diabetic retinopathy are lipids (fats). Those with high lipid levels and type 2 diabetes that develops later in life may be at heightened risk of developing diabetic retinopathy.[14]

Elevated serum cholesterol: Some trials have linked high serum cholesterol (part lipid, part protein) to diabetic retinopathy-related vision loss. In one study, those with a cholesterol level of 244 milligrams per deciliter (mg/dL) were more likely to develop severe vision loss than those with cholesterol levels of 228 or lower.[15]

High blood pressure: People with increased systolic (the arterial pressure as your heart beats) blood pressure and type 2 diabetes are at greater risk of developing diabetic retinopathy. This likely is due to increased blood flow putting pressure on damaged blood vessels for those with diabetes.[16]

Obesity The impacts of obesity on carcinomas, cardiovascular, and metabolic systems disorders have been widespread and obese was regarded as a harmful factor in most diseases.[17,18] Considering that there was significant relation between obesity and diabetes risk, it was natural to consider the potential effect of obesity on the incidence of DR. Through a population-based study involving 6499 individuals with a follow-up of 11.1 years, it was found that obesity was associated with an increased risk of diabetes.[19]

Prospective cohort studies indicated that the relation between obesity and diabetes risk was significant[20]. However, inconsistent conclusions on the association between obesity and DR were detected in previous epidemiological studies. In a cross-sectional study including 501 adults with T1DM, it was found that obesity (BMI>30kg/m^2) was the predominant risk factor for retinopathy.[21]

VI. CONCLUSION

Diabetes is a serious, long, progressive multi organ damaging disease with serious sight threatening complications. Early detection, identification of risk factors and timely intervention can provide a good visual outcome for the patient. Blood sugar control and lifestyle modification play a key role in managing the disease. Regular follow ups for dilated fundus examination go a long way in better visual health of patients.

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