Original Article

Retinal Damage in Type II Diabetic Patients in First Ocular Examination – An Observational Study

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Abstract

Introduction: Diabetes is a life-threatening disease and is also associated with other complications. Diabetic retinopathy is a condition that may result in serious visual disturbances or even vision loss. The complications of DR are best treatable when diagnosed early.

Aim: The aim of the study was to assess the incidence of DR and the extent of retinal damage at the time of first ocular examination in diabetic patients.

Materials and Methods: An observational study was carried out in the Department of Ophthalmology, Dindigul Medical College Hospital from July 2019 to December 2019, among 25 outpatients who had type II diabetes mellitus.

Results: About 28% of the patients had DM >5 years and 72 had DM <5 years. The mean age of the patients was 64.52 years. About 16% (4 patients) of the diabetic patients had symptoms of retinopathy at the time of the first ocular examination.

Conclusion: Incidence of type II DM related DR is 16% and the duration of DM plays an important role in the occurrence of DR. Periodic screening can prevent the disease progression and prevent any complications. About 12% of the patients had early retinal damage at the time of first ocular examination and lifestyle changes must be made for better glycemic control. Awareness must be spread among ophthalmologists to do an eye examination when the patient is diagnosed with DM.

Key words: Diabetes mellitus, Ocular surface changes, Proliferative retinopathy, Retinal damage, Retinopathy

INTRODUCTION

Diabetes mellitus (DM) has epitomized worldwide and more than 69.1 million cases of diabetes have been reported in India, according to a 2015 report. The International Diabetes Federation (IDF) and World Health Organization (WHO) estimate that this rate may cross one billion in the near future.[1] Diabetic retinopathy (DR) is a specific complication of type I and type II diabetes and studies show that around one-third of the patients present with DR at the time of diagnosis of type II DM. DR is a neurovascular complication that is most frequently associated with blindness in patients of age group 20–74.[2]

DR often presents with no early signs or symptoms and it is mandatory that patients diagnosed with type II DM must undergo an initial comprehensive eye examination by an ophthalmologist to diagnose any disease at an early stage to avoid progression and complications.[3]

Diabetes is a condition where the body is unable to use and store glucose. This leads to hyperglycemia and causes damage to all the organs, including eyes. With time, the small blood vessels of the retina are damaged and they leak blood and other fluids, causing the retinal tissue to swell, ultimately ending up in blurred and cloudy vision.[4] Two types of DR exist proliferative diabetic retinopathy (PDR) and non-proliferative diabetic retinopathy (NPDR). NPDR is the initial disease stage where the symptoms are mild or non-existent. PDR is the advanced disease stage where the retina is deprived of oxygen and neovascularization takes place in the retina and vitreous that clouds the vision.[5,6]

Poor glycemic control can profoundly inflict the development and progression of DR by stimulating the

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polyol pathway, glycation of enzymes, hemodynamic changes, and activation of renin-angiotensin aldosterone pathway.[7] This observational study was conducted to assess the incidence of DR and the extent of retinal damage at the time of first ocular examination in diabetic patients.

Aim

The aim of the study was to assess the incidence of DR and the extent of retinal damage at the time of first ocular examination in diabetic patients.

MATERIALS AND METHODS

This hospital-based observational study was conducted Department of Ophthalmology, Dindigul Medical College Hospital, from July 2019 to December 2019. All patients registered in eye OPD with DM were taken into consideration for evaluation and 25 patients were selected for purposive sampling. The patients were divided into two groups, the first group who had <5 years of diabetes and group 2 who had more than 5 years of diabetes. All patients above age 20 and with Type II DM were included in the study and examined by an ophthalmologist. Patients not willing to participate in the study and patients with DM and who were not examined by the ophthalmologist were excluded from the study. All ophthalmological findings recorded by the ophthalmologist were documented as:
1. Mild NPDR,
2. Moderate NPDR, and
3. Severe NPDR.

The collected information was tabulated and analyzed using statistical software.

RESULTS

The medical records of 25 study patients were viewed and the patients were divided into two groups. Eighteen patients (72%) were in the first group and had <5 years of diabetes and group 2 had 7 patients (28%) with more than 5 years of diabetes. The mean age of the patients was 64.52 years. Figure 1 depicts the incidence of DR among the study participants. About 16% (4 patients) of the diabetic patients had symptoms of retinopathy at the time of first ocular examination and 84% of the patients had no DR [Figure 2]. With regards to disease staging, 3 patients (12%) had mild non-proliferative DR and 1 patient (4%) had moderate NPDR. There were no patients with severe NPDR [Figure 3]. Therefore, 16% of the patients with more than 5 years of type II diabetes and with a mean age of 64.52 years have DR at the time of first ocular examination.
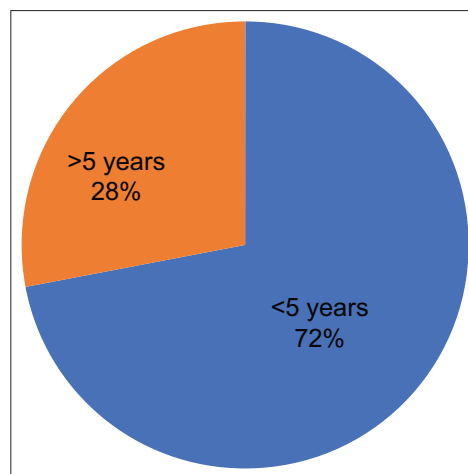

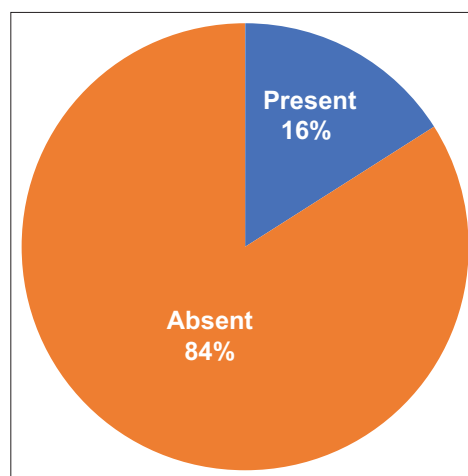**Figure 1: Distribution of duration of diabetes**

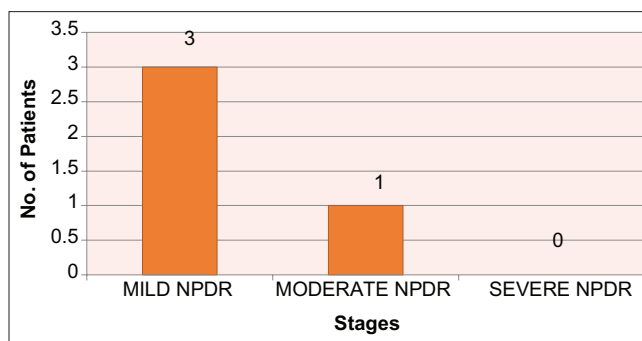**Figure 2: Incidence of retinopathy**

Figure 3: Stages of retinopathy

DISCUSSION

Diabetes is a potentially dangerous and life-threatening disease and it is also associated with other complications. Diabetic retinopathy is one such condition what the patients may not even realize and it may result in serious visual disturbances or even vision loss. The complications of DR are best treatable when diagnosed early.[8,9] The

retina is the light-sensitive inner lining of the back of the eye and an increase in blood glucose level could damage the retina's blood vessels. The blood vessels thicken, leading to blood and fluid leaks and finally lead to vision loss.[3] The incidence of DR is continuously increasing in the South Indian population and the prevalence is estimated to be from 12% to 22.4%. According to this study, the incidence of DR in patients with type II DM at the time of first ocular examination is 16%, which correlates with the study report by the National Urban Diabetic Society and AIOS DR eye screening study conducted in the year 2014.[10]

The prevalence of diabetes is also more among patients with age >60 years and the prevalence of DR increases from age 40. The prevalence of DR varies worldwide between countries; it may range from 17% in Switzerland to 52% in the United Kingdom.[11] The duration of diabetes is an important predictor of the extent of retinal damage and the risk of DR increases with the number of years the patient has lived with DM. Several studies have confirmed that the duration of the disease is the strongest factor for the development of DR.[12,13] In our study, too, the symptoms of retinopathy were observed in patients who have had diabetes for >5 years. Hence, patients diagnosed with type II DM must also be screened for signs of retinal damage as they fall under high-risk category. Proliferative and non-proliferative types are the two classifications of DR. In NPDR, microaneurysms cause a fluid leak into the retina leading to swelling of the macula. In PDR, there is retinal ischemia and neovascularization, which causes to cloud the vision. There can also be retinal detachment and scar tissue formation ending up in glaucoma.[14]

The ocular surface changes associated with type II DM may be reduced tear production, damage to corneal epithelium, poor tear film quality, and degeneration of corneal nerve fibers. In our study, the patients were diagnosed with early-stage non-proliferative DR at their first ocular examination. About 12% of the patients had mild NPDR and 4% had moderate NPDR. According to our study results, early screening is essential to prevent the complications of DR. The number of cases of DM is increasing in recent years due to changes in lifestyle and lack of awareness. Proper awareness among the patients and doctors can help to prevent the progression of the disease and also reduce the burden of DM related retinopathy.

CONCLUSION

Incidence of type II DM related DR is 16% and the duration of DM plays an important role in the occurrence of DR. Periodic screening can prevent the disease progression and prevent any complications. About 12% of the patients had early retinal damage at the time of first ocular examination and lifestyle changes must be made for better glycemic control. Awareness must be spread among ophthalmologists to do an eye examination when the patient is diagnosed with DM.

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