

Systemic Comorbidities In Patients With Diabetic Macular Edema

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Abstract

Background:

The most prevalent and dangerous side effect of diabetes is diabetic macular oedema, which is also the main cause of vision impairment. Patients with DME often accompanied by various systemic comorbidities associated with DM that complicate treatment and its prognosis. This study aims to determine the most common systemic comorbidities associated with DME in patients with Diabetic Retinopathy. A retrospective study was conducted on 89 patients aged between 20 to 85 years, with confirmed history of diabetes. Data were collected from medical records based on demographics, types of diabetes and duration, diabetic retinopathy and presence of systemic comorbidities. Descriptive statistical analysis was performed. Result: The descriptive analysis showed that 53.7% of 54 patients were male and 46.3% are females. Among all the confirmed DME patients, it was found that 70.3% patients had HTN, 14.8% had dyslipidaemia, 14.8% had CVD, 7.4% had TSH, 5.5% had CKD and 1.8% had arthritis. The final outcomes revealed that all patients with DM had at least one associated comorbidity and the systemic comorbidities were associated more with T2DM. Patients with DME frequently suffer from multiple systemic comorbidities. The article reveals the high extensiveness of HTN in patients having diabetic macular edema and the low prevalence of arthritis.

Dyslipidaemia also a common systemic condition with another high prevalence in diabetic macular edema patients. This study showed that the prevalence of type II diabetes was more than type I diabetes.

Keywords: Diabetic macular edema, diabetic retinopathy, visual outcomes, systemic comorbidities, hypertension, dyslipidaemia

Introduction

The prevalence of diabetes among people in India is currently around 10%. Males are more likely than females to have this predominance, which develops with age. Studies have found that in India, 136 million individuals have pre-diabetes, 315 million have high blood pressure, and 101 million have diabetes. These show that 11.4% of the population of the country's population is living with diabetes.^[1]

DM is a metabolism-related disease that significantly increases the risk of various systemic comorbidities, including cardiovascular diseases, kidney disease, and neuropathy. It is a significant and widespread health problem in India. It can cause so many complications of the eye, such as diabetic retinopathy, diabetic macular edema, etc.

Diabetic retinopathy is an eye condition which causes loss of vision and impairments. It affects the retinal blood vessels and damage tiny vessels which may leak fluid and deposit under the macula. It causes swelling of the macula, known as diabetic macular edema (DME).^[2] Studies on the predominance of diabetic retinopathy in India shows the prevalence for diabetic retinopathy is 12.5%, people with known diabetes having the prevalence of 15.5%.^[3] Diabetes has vision-threatening forms of DR and DME. One of the main causes of vision impairment in diabetics is diabetic macular edema.^[4] The disease is marked by accumulation of fluid due to blood vessel leaking in the macula, the centre region of the retina that provides crisp, central vision. DME specifically impacts the eyes, leading to vision loss if not adequately managed. Given the systemic nature of diabetes, DME often presents with multiple concurrent comorbid conditions, which can complicate treatment and prognosis.^[5]

The other systemic comorbidities are associated with diabetes-related diseases. So that those comorbidities have impacts on DR and DME patients. Intravitreal treatment with steroids or VEGF inhibitors has also considerably improved the functional long-term result of DME patients. The intended therapeutic outcome is not always attained, even with extensive therapy. This could be because of additional systemic comorbidities including hypertension, dyslipidaemia, cardiovascular conditions, kidney illnesses, etc.^[6] After being diagnosed with diabetes, about 60–70% of people have at least one comorbidity, and 25–30% have more than two.^[7] So those systemic comorbidities have an impact on DR and DME.^[8]

Understanding the prevalence of systemic comorbidities in patients with DME is important because of-

- The effective management of DME requires a comprehensive approach that considers the patient's overall health and other diabetic-related diseases.
- The presence of systemic comorbidities influences the progression and treatment outcomes of DME.^[9]
- Identifying the common comorbidities can help in treatment plans.

Methodology

This is a retrospective study. The study was conducted according to the guidelines. A verbal approval was taken from the hospital authorities.

Study Participants:

Patients were included into the study from November 2023 to May 2024. The patients included must fall under the following criteria: (1) Age should be between 20 to 85 years; (2) Both male and female patients; (3) Confirmed diagnosis of diabetes mellitus type 1 or type 2 and DME patients and (4) DM and DME patients with other confirmed systemic comorbidities were included. The patients having other significant retinal diseases, such as ARMD, BRVO, and CRVO patients or who have undergone intraocular surgery within the last three

months or have severe systemic diseases such as advanced malignancies and severe heart failure were excluded from the study.

Methodology:

In this study, a total of 150 medical records from the last year were screened at ASG Eye Hospital, BT Road, Kolkata. Among 150 patients, 54 were diagnosed with DME. Among these 54 patients, the prevalence of systemic comorbidities such as HTN, CVD, CKD, dyslipidaemia, etc. was assessed.

For confirmation of DME, OCT was assessed. Among 54 patients, systemic comorbidities such as HTN, CVD, CKD, and dyslipidaemia were assessed. The systemic comorbidities were confirmed after seeing the supportive documents.

Data Collection:

Demographic data as well as general, medical and ophthalmological history were collected at study enrolment. In addition, a comprehensive clinical examination (OCT) was performed for confirm diagnosis of DME and DR.

Statistical Analysis:

The demographic and clinical data were collected, coded and entered in Microsoft Excel Sheet. Statistical analysis was performed using Primer of Biostatistics Version 7.0 and result was represented in tabular and graphical format using descriptive analysis.





Results

Data on 89 subjects were listed among the 150 searched subjects in the age range of 20 to 85 years old were collected from the medical records. The mean $\pm$ SD of age is 60.28 ± 9.319 years. Among the 89 participants, 35 were excluded as they had no DME. Among the 54 subjects, 29 were males (53.7%) and 25 were females (46.3%) [fig. 1]. 35.2% of patients were diagnosed with type I diabetes, whereas 64.8% had type II diabetes. Hence, the prevalence of type II diabetes was seen to be higher than that of type I. HbA1c values $>6.5\%$ were seen in 18 patients (33.33%), 5.7 to 6.5% were seen in 28 patients (51%), and $<5.7\%$ were seen in 8 patients (14.8%) [fig.2]. Among the subjects, all the patients had a diagnosis of DME. Descriptive analysis was performed [table 1], and

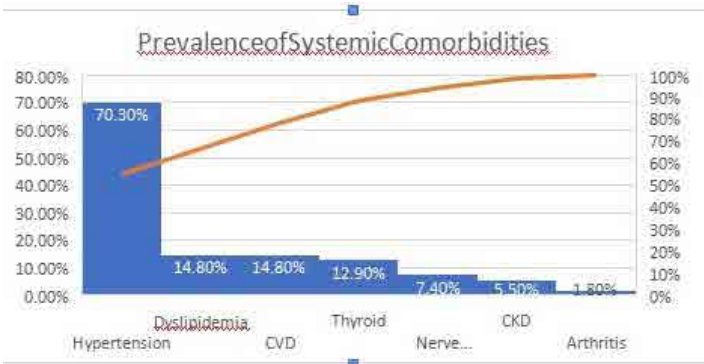


Fig. 2: HbA1c distribution 54 patients

it was found that 70.3% (38 patients) had HTN, 14.8% (8 patients) had dyslipidaemia, 14.8% (8

patients) had CVD, 12.9% (7 patients) had TSH, 5.5% (3 patients) had CKD, and 7.4% (4 patients) faced with nerve-related problems, and arthritis was 1.8%.

Systemic Comorbidities	No. Of Patients	Percentage Of Patients (%)
HTN	38	70.3
Dyslipidaemia	8	14.8
CVD	8	14.8
TSH	7	12.9
Neurological Problem	4	7.4
Arthritis	4	7.4
CKD	3	5.5

Table 1 : Descriptive analysis of systemic comorbidities patients associated with DM

All patients with DM had at least one associated comorbidity, and 35% had more than one associated comorbidity. It was seen that systemic comorbidities are associated more with type II diabetes.

Discussion

Patients with DME frequently suffer from multiple systemic comorbidities, which complicate their overall health and the management of their eye condition. A study based on 'Current epidemiology of diabetic retinopathy and diabetic macular edema' by Jie Ding found that diabetic retinopathy (DR) affects one-third of diabetic patients, with prevalence increasing with diabetes duration, hyperglycaemia, and hypertension, a common risk factors. Dyslipidaemia is a more significant risk factor for DME, impacting up to 7% of diabetics.^[5] And our study is revealed the high prevalence of HTN in patients with diabetic macular edema and the low prevalence of arthritis. And this study also shows that dyslipidaemia is also a common systemic condition with a high prevalence in diabetic macular edema patients. Our study revealed that all

patients with DM had at least one associated comorbidity, and 35% had more than one comorbidity. A study by Kristy Lglay et al. revealed that majority of patients with T2DM always associated with multiple comorbidities.^[8] Also, a lancet study showed that T2DM is most common factor that associated with other systemic comorbidities.^[1] Infect, our study is also showed that the prevalence of type II diabetes is higher than that of type I diabetes. It was seen that systemic comorbidities were associated more with T2DM.

Conclusion

Diabetes mellitus significantly impacts patients with diabetic macular edema (DME), leading to systemic comorbidities like cardiovascular disease, hypertension, chronic kidney disease, dyslipidaemia, and neuropathy. This necessitates a multidisciplinary approach to care, addressing both ocular and systemic health issues. Effective control of blood glucose, blood pressure, and lipid levels is crucial, along with regular screening for cardiovascular, renal, and neurological complications. Coordinated care involving ophthalmologists, endocrinologists, cardiologists, and nephrologists can optimize outcomes for DME patients.

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