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A Correlational study to assess the relation between Mannose-Binding Lectin and Diabetic Retinopathy among Diabetic patients admitted at selected Hospitals in Indore.

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Introduction

Diabetes is one of the most serious worldwide health crises of the twenty-first century, ranking among the top ten causes of death with cardiovascular disease (CVD), respiratory illness, and cancer. According to the World Health Organization (WHO), noncommunicable diseases (NCDs) accounted for 74% of global fatalities in 2019, with diabetes accounting for 1.6 million deaths, making it the tenth biggest cause of death worldwide. Diabetes is expected to kill about 592 million people by 2035. Type 2 diabetes, which accounts for 90% of all diabetes occurrences, was once thought to be a disease of rich "Western" nations, but has now expanded internationally and become a significant cause of disability and mortality impacting increasingly younger age groups. [Diabetes has become widespread in many emerging countries, including China and India. Diabetes is becoming more common in low- and middle-income nations, according to the WHO. Rapid socioeconomic change, together with urbanisation and industrialization, are the primary causes of the worldwide diabetes pandemic, with additional risk factors such as population expansion, bad eating habits, and a sedentary lifestyle also playing a part.

Diabetes is a progressive disease that causes major complications that raise the expenses to the family, society, and healthcare system. Uncontrolled diabetes increases the risk of vascular disease, and macrovascular (cardiovascular (CV), cerebrovascular, and peripheral artery disease) and microvascular (diabetic retinopathy, nephropathy, and neuropathy) consequences account for the majority of the type 2 diabetes burden.

MBL (mannose-binding lectin) is a C-type lectin produced by hepatocytes (7). Its carbohydrate recognition domains attach to carbohydrate residue patterns

found on bacteria in a calcium-dependent manner. MBL is important in the innate immune system, and many studies have shown that decreased MBL levels affect the outcome of infectious infections, critical illness, and kidney transplant survival. Paradoxically, whereas high levels of MBL give protection against invading microorganisms, they may have biological consequences in other situations. MBL may worsen local and systemic inflammation by activating complement and regulating the generation of proinflammatory cytokines.

Elevated serum MBL levels in diabetes were associated with poor diabetes control and disease progression, as well as the possibility of diabetic nephropathy; however, another study discovered that log MBL levels were not associated with the occurrence of cardiovascular events in an Indian population with type 2 diabetes. Moreover, diabetics exhibited higher median MBL concentrations than healthy control subjects, which was linked to diabetic vascular issues. There is presently no evidence to suggest a relationship between MBL and diabetic retinopathy in diabetics. We evaluated blood MBL levels in diabetics with and without diabetic retinopathy in this study.

Methodology

The study was carried out at a few hospitals in Indore. The observational design was used. For the investigation, simple random sampling was performed. The sample size was 250 diabetes patients and 250 healthy controls. Individual participant data on the presence and severity of DR, DME status, age, gender, ethnicity, diabetes type and duration, HbA1c, systolic and diastolic blood pressure, cigarette smoking status, BMI, and current use of diabetes, antihypertensive, and lipid-lowering medications were collected at the outset. The Diabetic Retinopathy Study (ETDRS) grading criteria are employed. MBL was determined using a time-resolved immune-fluorometric assay on serum samples. Data analysed using Univariate data on demographic and clinical variables were compared using the Mann-Whitney U test or 2 test, as applicable. The Spearman rank correlation coefficient was used to evaluate correlations between continuous variables.

Results

The results revealed that serum MBL levels in diabetes patients were significantly higher than in healthy controls. Interestingly, MBL serum levels were significantly higher (P = 0.009) in type 1 diabetes than in type 2 diabetes. The amount of MBL in the blood was shown to be related to the severity of diabetic retinopathy. The median values among patients with non-DR, moderate DR, and severe DR were 2,466 and 3,452, respectively. Serum MBL levels increased in tandem with poor diabetes treatment as indicated by HbA1c levels. When the groups with and without diabetic retinopathy (r = 0.38, P 0.0001) were assessed individually, there was a slight positive relationship between MBL and HbA1c (r = 0.33, P 0.0001). Similarly, when type 1 diabetes (r = 0.34, P 0.0001) and type 2 diabetes (r = 0.26, P 0.0001) groups were assessed separately, there was still a somewhat favourable relationship between MBL and HbA1c levels.

MBL levels also revealed a significant, although minor, positive relationship with hs-CRP (r = 0.17, P 0.0001). Comparable results were observed when the groups with diabetic retinopathy (r = 0.20, P = 0.0001) and without diabetic retinopathy (r = 0.18, P = 0.006) were analysed separately. There was a positive relationship between MBL and hs-CRP levels whether groups with type 1 diabetes (r = 0.23, P = 0.0001) or type 2 diabetes (r = 0.155, P = 0.006) were analysed individually. Moreover, no correlation was found between blood MBL levels and other parameters such as gender, age, creatinine, triglyceride, cholesterol, LDL and HDL, diabetes duration, or daily insulin dose in all patients.

Conclusion

Researchers found that those with diabetes had considerably greater amounts of MBL in their bloodstream compared to participants with normal blood sugar levels. Greater MBL levels are linked with diabetic retinopathy and VTDR, as well as adding significant new predictive information to diabetes duration. This suggests that MBL may play a role in the pathogenesis of DR issues in diabetes. Our findings are significant because they show that higher MBL levels are linked with diabetic retinopathy and VTDR. Likewise, MBL concentrations are much higher in individuals with type 1 diabetes, which suggests that MBL may have a role in the genesis of diabetes-related renovascular problems. In patients with type 2 diabetes, assessments of MBL, either by themselves or in combination with CRP, may give information that is predictive of mortality and the development of albuminuria. It is possible that MBL plays a part in the

progression of micro- and macrovascular problems that are associated with type 1 diabetes.