ASSOCIATION OF HbA1c LEVEL AND DIABETIC RETINOPATHY AMONG PATIENTS COMING TO OPD OF KATIHAR MEDICAL COLLEGE HOSPITAL AND ITS VISUAL OUTCOME: A RETROSPECTIVE CROSS SECTIONAL STUDY

Ophthalmology

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KEYWORDS

Diabetic retinopathy (DR) is one of the major microvascular complications of diabetes.(5) It is one of the most common cause of preventable blindness in diabetic adults. A study of over 44,000 individuals from 9 countries,7 which evaluated fasting and 2-h postprandial plasma glucose and HbA1c levels found a curvilinear plot of diabetic retinopathy versus HbA1c, and suggested a threshold for the diagnosis of diabetes, based on several different statistical criteria, defined by the presence of diabetes-specific retinopathy in this large population as a function of HbA1c level. The statistical cutoff point for this diagnosis was determined to be an HbA1c threshold of $>6.5\%$, which is the accepted international standard.

AIMS AND OBJECTIVE OF THE STUDY:

- To find out the association between Diabetic Retinopathy (DR) and HbA1c.
- To find out the possible statistical cut off for diagnosing diabetic retinopathy.

Background:

The associations between high glucose levels and diabetic retinopathy have been the basis for the diagnosis of diabetes. We aimed to provide updated data on the relationship between HbA1c and diabetic retinopathy, and to assess the diagnostic accuracy of the proposed HbA1c cutoff for detecting diabetic retinopathy.

MATERIAL AND METHOD:

This retrospective study was conducted in the Ophthalmology Department in Katihar Medical College & Hospital, Katihar, Bihar from 1 January 2018 to 31 December 2019. The study was conducted with the approval of the Institutional Ethics committee with proper consent taken from the patients.

Assessment of Retinopathy

Retinopathy signs were assessed by indirect ophthalmoscopy using 90 D lens and documented by taking fundus photographs taken using a nonmydriatic digital retinal camera corresponding to Early Treatment for Diabetic Retinopathy Study (ETDRS) standard field 1 (centered on the optic disc) and ETDRS standard field 2 (centered on the fovea) obtained from each eye were graded.

Retinopathy was considered to be present if any characteristic lesion as defined by the ETDRS severity scale was present: microaneurysms, hemorrhages, cotton wool spots, intraretinal microvascular abnormalities, hard exudates, venous beading, and new vessels (9).

Measurement of HbA1c

Venous blood samples were collected by the technicians for the diabetic retinopathy diagnosed patients and were sent to laboratory for serum HbA1c assessment.

RESULT

1230 patients with diabetic retinopathy were evaluated in this study. The prevalence of diabetic retinopathy increased with increasing categories of HbA1c (P trend <0.0001). The prevalence of moderate retinopathy started increasing above an HbA1c of 6.0. For example, the prevalence of moderate retinopathy between HbA1c levels 6 and 6.4 was 2% 6.7, moderate or severe retinopathy was 6.8. This study confirmed that HbA1c threshold of 6.5% allowed the proper detection of diabetic retinopathy. Our data support the judicious use of HbA1c for the diagnosis of diabetes and detecting diabetic retinopathy as well.

CONCLUSION

Our study supports the use of HbA1c for diagnosing diabetes in the population of patients attending our OPD. The relationship of HbA1c and retinopathy, a cut-point of 6.5% performs reasonably well in all the patients.(12)

DISCUSSION

The current study, involved 1230 attending our eye OPD with diabetic retinopathy showed some relationship of HbA1c and retinopathy. The prevalence of moderate retinopathy below HbA1c 6.5% was $<1\%$ in all three ethnic groups, and HbA1c of 6.5–7.0% was associated with a higher prevalence of moderate retinopathy as compared to those with HbA1c $<6.5\%$. Our data provide important evidence that the HbA1c is a suitable test for the diagnosis of diabetes.

It is worth mentioning that different levels of exposure to hyperglycemia, and thus different levels of risk for microvascular complications is there in different individuals.

However, retinopathy does not occur overnight when HbA1c reaches 6.5%. In type 1 diabetes, retinopathy takes much longer to develop when the HbA1c levels are usually much higher than 6.5%. Therefore, it is likely that diabetic eye disease starts earlier and at a lower HbA1c in many subjects and that the cut-point of 6.5%, from this perspective, is likely to be very conservative.

It is worth noting that adopting the recommendation to diagnose diabetes in those with HbA1c $\geq 6.5\%$ will result in an increase in the prevalence of diabetes mellitus as compared to the existing diagnostic criterion of FPG ≥ 7.0 mmol/L. This may have implications for the healthcare system because it will increase the resources to manage these patients. In resource-constrained health systems like ours, a slightly higher HbA1c cut-point in the range of 6.7–6.8% could be adopted to maintain the level of sensitivity and specificity without an increase in the prevalence of diabetes.

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