Diabetic Retinopathy and its Correlation with Thyroid Profile and Anti Thyroid Antibodies

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Abstract
Introduction: Diabetes mellitus and the eye diseases associated with it comprise a set of complex disorder with multi factorial etiology.[1] Diabetic retinopathy (DR) is the most common complication of DM. It is seen that patients having DR are 25 times more at risk of blindness than an non diabetic individual.[2] Subclinical hypothyroidism (SCH) is a common endocrine disorder and characterized as elevated TSH levels in the presence of serum free thyroxine (FT4) and tri – iodothyronine (T3) levels within reference range.
Purpose Of Study: To diagnose and accurately grade diabetic retinopathy, investigate associations of thyroid hormones and anti thyroid antibodies with diabetic retinopathy.
Method: All patients being referred to the retina clinic, Institute of Ophthalmology, Jawaharlal Nehru Medical College, A.M.U. , Aligarh from Rajiv Gandhi Center for Diabetes and Endocrinology, of the same hospital , which come under the inclusion criteria for the study "Diabetic Retinopathy and its correlation with Thyroid profile and Anti Thyroid antibodies" .
Results: This is an ongoing study and the results due to be published once the study is completed.

I. Article

Diabetes mellitus is reaching potentially epidemic proportions in India. The level of morbidity and mortality due to diabetes and its potential complications are enormous, and pose significant healthcare burdens on both families and society. The reported prevalence of DR in India ranges from 17.6 % to 28.2 %.[3] DR occurs both in type 1 and type 2 diabetes mellitus and has been shown that nearly all type 1 and 75 % of type 2 diabetes mellitus will develop DR after 15 years duration of diabetes as shown in earlier epidemiological studies.[4] Diabetic retinopathy is a disease of the retina caused by diabetes that involves damage to the tiny blood vessels in the back of the eye. Early disease may cause no symptoms. As the disease progresses, it enters its advanced, or proliferative stage. Fragile new blood vessels grow along the retina and in the clear, gel – like vitreous that fills the inside of the eye.[5] Without timely treatment , these new vessels can bleed , cloud vision, and destroy the retina.

The prevalence of SCH has been reported from 4-10% and the risk factors of SCH are baseline TSH level, iodine sufficient, old age, female sex and the presence of thyroid auto antibodies. Current data suggests prevalence of SCH in diabetes varying between 2.2 % to 17 %.[6] Further the thyroid hormone axis has an important role in the development of the retina and contributes to retinal vascular density.

II. Etiopathogenesis

Several mechanisms may be involved in the association between DR and SCH. Firstly, insulin resistance . Several studies have found that fasting hyperinsulinemia or insulin resistance (IR) was associated with SCH,[7,8] and the main mechanism was defective fibrinolysis or impaired vasodilation associated with IR.[9,10]It may be correlated with the reduction of vasodilation ability and fibrosis caused by IR, which led to destruction of retinal vessel and secondary revascularization.[11,12]

Secondly, serum C-reactive protein (CRP). Researches by Christ –Crain et al[13] and Kvetny et al[14] indicated that the level of CRP in patient with SCH was obviously higher than in non – SCH people. DR is a Chronic inflammatory disease, which is correlated with the inflammation – mediated injury of vascular endothelial cell.

The third, the level of serum homocysteine (Hcy) in SCH patients was much higher than non –SCH people. Hcy is areactive amino acid . Looker et al[15] demonstrated that elevated levels of Hcy was the risk factor or DR. The reason may be that Hcy could enhance the lipid peroxidation,[16] which leads to increased levels of oxidized low density lipoprotein (OX-LDL), accelerating the progress of vascular disease.[17] The forth, oxidative stress. The activity of paraoxonase (PON1) and superoxide dismutase (SOD) in the plasma of SCH patients is significantly lower than normal control.[18]

The last, correlation between DR and dyslipidemia has been reported,[19] and the atherogenic disturbances in lipid metabolism have been observed in patients with SCH.[20,21] Thus, dyslipidemia in SCH may be one of the reasons for the association between DR and SCH.

III. Review of literature

Chang han et al,[22] conducted a metaanalysis using Pubmed, EM Bara, Web of Science , Wan Fang , CNKI and VIP databases for literature searches. They obtained studies published between Jan 1 , 1980 to Dec 1, 2014. The adjusted pooled prevalence of SCH in type 2 DM was 10.2 %, meanwhile type 2 DM was associated with a 1.93 fold increase in SCH (95% confidence interval ; 1.66,2.24) ; furthermore , SCH might affect development of diabetic complication with an overall OR of 1.42 (95 % confidence interval ; 1.21, 1.67) for diabetic retinopathy.

Hanne Fleiner et al ,[23] did a cross sectional, population based study of adults in two survey of the Nord Trondolay Health (HUNT) study. In HUNT 2, autoimmune diabetes was associated with a higher age- adjusted prevalence of hypothyroidism among both women (prevalence ratio 1.79) and men (prevalence ratio 2.71) compared with having no diabetes. Autoimmune diabetes, but not type 2 DM, was strongly and gender neutrally associated with increased prevalence of hypothyroidism and hyperthyroidism and the presence of thyroid peroxidase antibodies.

Tajunisah et al,[24] performed a study who attended the eye clinic in the University of Malaya Medical Center. Diabetic Retinopathy changes were seen in 51.4% NIDDM and 57,1% of IDDM patients. They also concluded that prevalence of retinopathy was significantly associated with the onset and duration of diabetes. Presence of concurrent hypertension was also found to be associated with the occurence of retinopathy in these patients. Retinopathy was not significantly associated with ischaemic heart disease, hypercholesterolemia and smoking habits.

Al Khawari et al,[25] conducted a mixed cross sectional study , anti thyroid peroxidase (anti – TPO) and anti thyroglobulin (anti – TG) were measured in 232 subjects, a high prevalence of autoimmune antibodies was found in patients either at onset of type 1 DM or either 4-9 years of follow up.

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