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Short Communication

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Relationship between triglycerides and diabetic retinopathy at patients with diabetes mellitus type 2 in metabolic syndrome

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Introduction

Diabetic retinopathy (DR) is a major micro vascular complication of diabetes. It is the most common cause of blindness in the working-age population in developed countries.[1,2] Nearly 70-80% of the population with diabetes mellitus is diagnosed with metabolic syndrome (MS), which consists of central obesity, glucose intolerance, hyper insulinemia, low high-density lipoproteins, high triglycerides and hypertension.[3-5] MS clearly associated with macro vascular complications, but its association with micro vascular disease as retinopathy is unclear. Dyslipidemia, a major systemic disorder, is one of the most important risk factors for cardiovascular disease. Patients with diabetes have an increased risk of suffering from dyslipidemia concurrently. High serum lipid levels have also been proposed as a risk factor for DR. Large clinical studies showed a discrepancy about the association of serum lipids with the severity of DR or diabetic macular edema (DME). In ETDRS report, high total cholesterol and LDL levels were associated with retinal hard exudates; in the Chennai Urban Rural Epidemiology Study, serum lipids were higher in patients with DR than those without DR.[6,7] On the other hand, those findings were not confirmed by other large studies such as Multi-Ethnic Study of Atherosclerosis and the Australian Diabetes, Obesity, and Lifestyle Study.[8,9] Furthermore, in Singapore Malay Eye study, it was reported that higher cholesterol levels were protective of any retinopathy.[10] Despite intensive study of this problem, up to now it has not been established whether dyslipidemia is the cause of diabetic retinopathy in patients suffering from diabetes mellitus type 2 with metabolic syndrome.

Aim: To investigate the relationship between triglycerides and diabetic retinopathy (DR) at patients with diabetes mellitus type 2 (DM2) in metabolic syndrome (MS).

Methods: 115patients with DM 2 in presence of MS (Group 1) and 45 patients with DM2 in absence of MS (Group 2) were included into investigation. In all cases age and duration of DM 2 were registered. Total cholesterol (TCh), HDL-cholesterol (HDL), triglycerides (TG) levels were measured. Definition of MS was based on WHO recommendations. Eyes examination included vision acuity, tonometry, biomicroscopy, ophthalmoscopy and fluoresce in angiography. 42 patients of Group 1 and 17 patients of Group 2 had different forms of DR.

Results and discussion: Data on age, duration, total cholesterol, HDL-cholesterol, triglycerides in two groups are shown in Table 1.

Table 1 The characteristics of study groups

Parameter	Group 1	Group 2	p
The age of patients	53.6±8.37 years	47.5±8.36 years	p<0.05
Duration of DM 2	6.0±6.08 years vs	5.6±4.69 years	p>0.05
Total cholesterol	221.3±75.00 mg/dl	205.6±57.46 mg/dl	p>0.05
HDL-cholesterol	44.0±6.98 mg/dl	44.1±6.98mg/dl	p>0.05
Triglycerides	248.2±151.23mg/dl	221.8±114.94 mg/dl	p>0.05

The age of patients was higher in Group 1, than in Group 2 (53.6±8.37 years vs 47.5±8.36 years; p<0.05). There was no statistical difference in Group 1 and Group 2 (in all cases p>0.05) between duration of DM 2 (6.0±6.08 years vs 5.6±4.69 years respectively), TCh (221.3±75.00 mg/dl vs 205.6±57.46 mg/dl respectively), HDL (44.0±6.98 mg/dl vs 44.1±6.98mg/dl respectively), TG (248.2±151.23 mg/dl vs 221.8±114.94 mg/dl respectively). There was significant correlation between prevalence of DR and levels of TG in Group 1(r_{bs}=0.18; p<0.05), but not the same in Group 2 (r_{bs}=0.18; p>0.05).

Conclusion

Improvements in diabetes care and management are crucial to decrease the incidence and severity of DR. Nevertheless, DR remains the most common cause of legal blindness in adults in developed countries. TG involves into the process of DR development at patients with MS, but not at patients suffering from diabetes mellitus type 2 without MS and points out the importance of TG as a risk factor of diabetic retinopathy at patients suffering from DM 2 with MS. The study showed the different pathogenesis mechanisms in development of DR in patients with and without metabolic syndrome. In our study, we found out a significant correlation between prevalence of DR

and levels of TG in patients with metabolic syndrome, but there was no association prevalence of DR and levels of TG in patients with metabolic syndrome at patients suffering from diabetes mellitus type 2 without MS. The lack of association of lipid profile with severity of DR in this study is compatible with previous data from the Multi-Ethnic Study of Atherosclerosis, which show no association between serum lipids and DR and the Australian Diabetes, Obesity, and Lifestyle Study.[10-12]

Similarly, Hove et al[13] reported no significant association between DR, triglycerides, HDL and total cholesterol in diabetic population in Denmark. Miljanovic et al[14] reported no lipid profile association with progression of DR or with PDR. In another study, there was no association between DR and lipid profile, however, clinically significant ME was found to be associated with serum lipids.[12] Moreover, Singapore Malay Eye study showed that higher cholesterol levels were protective of any retinopathy.[15]

On the contrary, in the Chennai Urban Rural Epidemiology Study, Rema et al[16] showed that mean cholesterol, triglyceride and non-HDL levels were higher in patients with DR compared to those without DR. However, only triglycerides were independently associated with.[16] Similarly, Ebeling and Koivisto reported that duration, age, and triglyceride level explained nearly half of the variation in the severity of retinopathy.[17] Significant associations between DR and total cholesterol was found in patients in Sweden.[18]

In conclusion, we found out a significant correlation between prevalence of DR and levels of TG in patients with metabolic syndrome however, there was no significant association at patients suffering from diabetes mellitus type 2 without MS. The large multi-centric prospective studies are needed about this subject, especially to explain the effect of the lipids levels on the development and progression diabetic retinopathy in patients with metabolic syndrome deeply.

References

1. Cheung N, Mitchell P, Wong YT. Diabetic retinopathy. *Lancet*. 2010; 376(9735):124–136.
2. Klein R, Klein BE. Are individuals with diabetes seeing better?-a long-term epidemiological perspective. *Diabetes*. 2010;59(8):1853–1860.
3. Marchesini G, Forlani G, Cerrelli F, et al. WHO and ATPIII proposals for the definition of the metabolic syndrome in patients with Type 2 diabetes. *Diabet Med*. 2004;21(4):383–387.
4. Bonora E, Kiechl S, Willeit J, et al. Prevalence of insulin resistance in metabolic disorders: the Bruneck Study. *Diabetes*. 1998;47(10):1643–1649.
5. Alexander C, Landsman PB, Teutsch SM, et al. NCEP-defined metabolic syndrome, diabetes, and prevalence of coronary heart disease among NHANES III participants age 50 years and older. *Diabetes*. 2003;52(5):1210–1214.
6. Klein R, Klein BE, Moss SE, et al. The Wisconsin Epidemiologic Study of Diabetic Retinopathy: XVII. The 14-year incidence and progression of diabetic retinopathy and associated risk factors in type 1 diabetes. *Ophthalmology*. 1998;105(10):1801–1815.
7. Wong TY, Klein R, Islam FM, et al. Diabetic retinopathy in a multi-ethnic cohort in the United States. *Am J Ophthalmol*. 2006;141(3):446–455.
8. Mohamed Q, Gillies MC, Wong TY. Management of diabetic retinopathy. A systemic review. *JAMA*. 2007;298(8):902–916.
9. Toussaint D, Cogan D, Kuwabara T. Extravascular lesions of diabetic retinopathy. *Arch Ophthalmol*. 1962;67(1):42–47.
10. Stamler J, Daviglus ML, Garside DB, et al. Relationship of baseline serum cholesterol levels in 3 large cohorts of younger men to long-term coronary, cardiovascular, and all-cause mortality and to longevity. *JAMA*. 2000;284(3):311–318.
11. Wong TY, Klein R, Islam FM, et al. Diabetic retinopathy in a multi-ethnic cohort in the United States. *Am J Ophthalmol*. 2006;141(3):446–455.
12. Tapp RJ, Shaw JE, Harper CA, et al. The prevalence of and factors associated with diabetic retinopathy in the Australian population. *Diabetes Care*. 2003;26 (6):1731–1737.
13. Benarous R, Sasongko MB, Qureshi S, et al. Differential association of serum lipids with diabetic retinopathy and diabetic macular edema. *Invest Ophthalmol Vis Sci*. 2011;52(10):7464–7469.
14. Hove MN, Kristensen JK, Lauritzen T, et al. The prevalence of retinopathy in an unselected population of type 2 diabetes patients from Arhus County, Denmark. Acta Ophthalmol Scand. 2004;82(4):443–438.
15. Miljanovic B, Glynn RJ, Nathan DM, et al. A prospective study of serum lipids and risk of diabetic macular edema in type 1 diabetes. *Diabetes*. 2004;53(11):2883 –2892.
16. Stamler J, Daviglus ML, Garside DB, et al. Relationship of baseline serum cholesterol levels in 3 large cohorts of younger men to long-term coronary, cardiovascular, and all-cause mortality and to longevity. *JAMA*. 2000;284(3):311–318.
17. Rema M, Srivastava BK, Anitha B, et al. Association of serum lipids with diabetic retinopathy in urban South Indians-the Chennai Urban Rural Epidemiology Study (CURES) Eye Study-2. *Diabet Med*. 2006;23(9):1029–1036.
18. Ebeling P, Koivisto VA. Occurrence and interrelationships of complications in insulin-dependent diabetes in Finland. *Acta Diabetol*. 1997;34(1):33–38.
19. Larsson LI, Alm A, Lithner F, et al. The association of hyperlipidemia with retinopathy in diabetic patients aged 15-50 years in the county of Umeå. *Acta Ophthalmol Scand*. 1999;77(5):585–591.