Cardiovascular diseases risk evaluation in newly diagnosed type-2 diabetics: An association of novel biomarkers apo-proteins and C-peptide

Sir,
Cardiovascular diseases (CVD) such as coronary heart disease (CHD) and stroke are the largest causes of death in developing countries and are one of the main contributors to the disease burden.[1,2] With an ever-increasing incidence of both, type-2 diabetes mellitus (DM) and CVD in most urban populations, there has been a demand for newer techniques that could help in the early detection of the risk of this disease complex. Premature cardiovascular morbidity and mortality is reportedly high in diabetic subjects.[3] Control of the cardiovascular diseases will require modification of risk factors that have two characteristics:

1. The risk factor must have high attributable risk or high prevalence or both
2. Most or all of the risks must be cost-effectively reversible[4]

The primary cause of CVD is the atherosclerosis observed either due to genetic predisposition or secondary to a disease like diabetes mellitus; > 80% of deaths in diabetic subjects are due to CVDs (two-third of which are due to coronary artery disease (CAD).[8] Various studies have reported the development of atherosclerosis-related complications in type-2 DM due to hyperinsulinemia, insulin resistance, and raised C-peptide levels.[6,7] The basal C-peptide level is reportedly a surrogate marker of subclinical atherosclerosis in type-2 diabetic patients, owing to a positive correlation between basal C-peptide and intima-media thickness (IMT). Type-2 DM has an increased conversion of low-density lipoprotein (LDL) to smaller, more atherogenic lipoproteins, termed as ‘small dense LDL.’ This pattern has been reported in insulin-resistant pre-diabetics as well.[9]

A deranged lipid profile is one of the major risk factors for CVDs, which the physicians have been focusing on. The newly diagnosed diabetic patients may or may not present with a severely deranged lipid profile. However, such patients too are at a high risk of CVDs. Different markers have been used for evaluating the risk of CVD in different studies. However, there is still no gold standard biochemical marker for evaluating the risk, and the search is still on for a marker that will help in an early detection of CVD risk.

In newly diagnosed type-2 diabetics, serum apo-proteins, especially cardio protective apo-A1 and apo-B (of LDL and Very-low-density lipoprotein (VLDL) can prove to be of great significance in assessing the CVD risk, as there is a strong association of C-peptide with the CVD risk ratio, apo-B / apo-A1, and also with apo-B. Diabetic dyslipidemia, complexed with raised atherogenic apo-protein, apo-B, and reduced levels of cardio protective high density lipoprotein cholesterol (HDLc) and its apo-protein, apo-A1, increases the risk of atherogenic complications of DM. Similarly, an association of blood pressure and C-peptide further contributes to CVD risk evaluation and reduction, as hypertension is a controllable disease.

Thus, type-2 diabetic patients, at the time of diagnosis, should be evaluated for serum C-peptide levels, as it would hint at the possibility of CVD, owing to a strong association with both traditional risk factors (serum lipid profile and hypertension) and novel markers like apo-proteins.

Purvi Purohit
Department of Biochemistry, Reader, Faculty of Medicine and Health, Jodhpur National University, Jodhpur, India

Corresponding Author: Dr. Purvi Purohit, Department of Biochemistry, Reader, Faculty of Medicine and Health, Jodhpur National University, Jodhpur, India. E-mail: dr.purvipurohit@gmail.com

REFERENCES
1. World Health Organization. Preventing chronic diseases:


doi: 10.4103/2230-8210.103051
A vital investment. WHO, Geneva, Switzerland: World Health Organization; 2005.

2. Gaziano T, Reddy KS, Paccaud F, Horton S, Chaturvedi V. Cardiovascular disease. In: Jamison DT, Breman JG, Measham AR, Alleyne G, Cleason M, Evans DB, Jha P, Mills A, Musgrove P, editors. Disease Control Priorities in Developing World. 2nd ed. Oxford: Oxford University Press; 2006. p. 645-62.

3. Swerdlow AJ, Jones ME. Mortality during 25 year follow up of a cohort with diabetes. Int J Epidemiol 1996; 25: 1250-61.

4. Gupta R, Gupta VP. Hypertension epidemiology in India: Lessons from Jaipur Heart Watch. Curr. Sci 2009; 97:349-54.

5. Dawson KG, Gomes D, Gerstein H, Blanchard JF, Kahler KH. The economic cost of diabetes in Canada, 1998. Diabetes Care 2002;25:1303-7.

6. Kim ST, Kim BJ, Lim DM, Song JG, Jung JH, Lee KW, et al. Basal C-peptide level as a surrogate marker of subclinical atherosclerosis in type 2 diabetes patients. Diabetes Metab J 2011; 35:41-9.

7. Barakat HA, Carpenter JW, McLendon VD, Khazanie P, Leggett N, Heath J, et al. Influence of obesity, impaired glucose tolerance, and NIDDM on LDL structure and composition. Possible link between hyperinsulinemia and atherosclerosis. Diabetes 1990;39:1527-33.

8. Goldberg IJ. Clinical review 124: Diabetic dyslipidemia: Causes and consequences. J Clin Endocrinol Metabol 2001;86:965-71.