SHORT COMMUNICATION

Insulin levels in Gipsy minority

Krajcovicova-Kudlackova M, Blazicek P, Ginter E, Spustova V

Institute of Preventive and Clinical Medicine, Bratislava, Slovakia. **Kudlackova@upkm.sk**

Abstract

Hyperinsulinemia and other associated metabolic factors, including hyperglycemia, dyslipidemia, hypertension, and central obesity lead to increased cardiovascular risk and indicate a metabolic syndrome. Levels of fasting insulin were measured in an ethnic Gipsy minority group (n=149) and compared to the majority Slovak population (n=197). The average insulin level was significantly increased in the minority group with a 21 % risk value vs 5 %. Hyperglycemia was equal in both groups (17 % in Gipsy group, 16 % in majority group). The incidence of other risk factors for cardiovascular disease and metabolic syndrome is greater in the Gipsy group (47 % vs 38 % – hypertriacylglycerolemia, 62 % vs 46 % – HDL-cholesterol level below safety limit, 16 % vs 10 % – systolic hypertension, 20 % vs 11 % – diastolic hypertension, 36 % vs 22 % – obesity). The results of hyperinsulinemia, hypertriacylglycerolemia, hypo-HDL-cholesterolemia, hypertension and obesity indicate, that the Gipsy population is at higher risk for cardiovascular disease. (Tab. 1, Fig. 1, Ref. 12.)
Key words: insulin, Gipsy population, majority population.

A number of newer "nontraditional" cardiovascular risk factors have been identified based on recent studies of the pathogenesis of atherosclerosis and atherothrombotic cardiovascular events. Insulin represents a group of non-lipid risk factors (Oparil and Oberman, 1999). Hyperinsulinemia and insulin resistance are commonly observed in subjects with hypertension and related cardiovascular disease (Ferrannini et al, 1987) and together with other laboratory and clinical findings, such as hyperglycemia, dyslipidemia, obesity, refer to a metabolic syndrome or syndrome X (Reaven et al, 1996).

This study evaluated the insulin fasting levels and other cardiovascular risk factors in the Gipsy minority group in comparison to majority Slovak population.

Material and methods

Group of volunteers consisted of 149 healthy Gipsy probands and 197 subjects of majority population from western Slovakia (Gbely region). Western Slovakia is a region with higher density of Romanies. Both groups were randomly selected from age span 19–60 years with the same number of probands in every age decade. Subjects with cardiovascular diseases, cancer, diabetes, renal diseases and thyroid gland disease were excluded. The study was done in cooperation with the district physician. Group characteristics are presented in Table 1.

Blood samples were collected in the standard way. EDTA was used as an anticoagulant. Serum insulin values were detected by electrochemiluminiscence immunoassay (Elecsys Insulin test, Roche). Levels of triacylglycerols, HDL-cholesterol and glucose were assessed by automatic analyzer Vitros 250 (Johnson & Johnson) by standard laboratory methods. C-reactive protein values were detected by immunoturbidimetric method using high sensitivity test (Randox). Plasma total homocysteine levels were measured by HPLC method with fluorescence detection and SBD-F as the derivation agent (Vester and Rasmussen, 1991).

The survey was carried out in Spring. Anthropometric characteristics (body mass index = weight/height^2) and a lifestyle
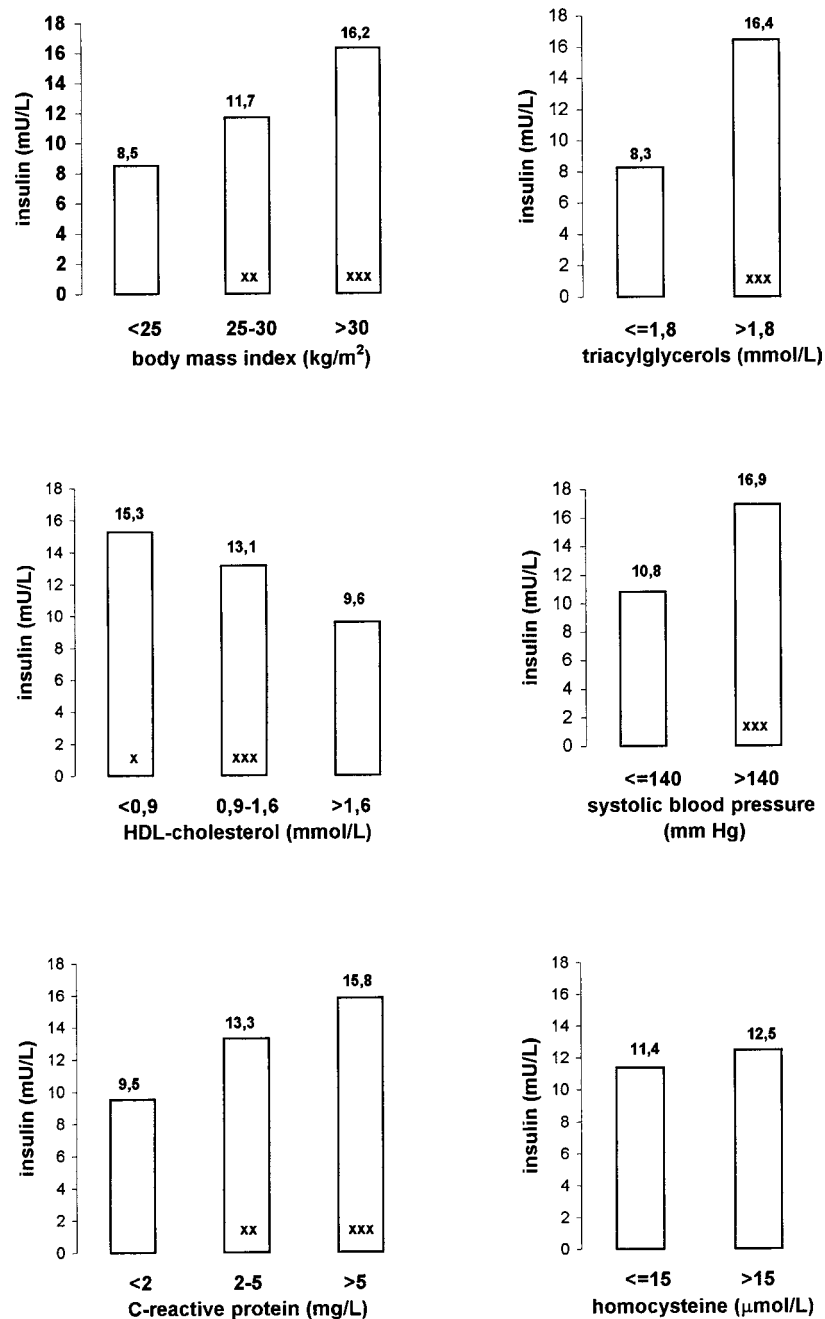
Fig. 1. Insulin levels at normal and elevated risk values of body mass index, triacylglycerols, HDL-cholesterol, systolic blood pressure, C-reactive protein, and homocysteine in the majority and Gipsy population (x $p<0.05$; xx $p<0.01$; xxx $p<0.001$).

questionnaire were assessed. The Chi-square test was used for final statistic evaluation.

Results and discussion

The strength of the association of hyperinsulinemia and cardiovascular disease was recently assessed in a meta-analysis of prospective population-based cohort studies and nested case--control studies (Ruige et al, 1998). These studies suggested that

elevated insulin levels per se may lead to hypertension and atherosclerotic vascular disease (Ferrannini et al, 1987; He et al, 1999). Other metabolic factors, including hyperglycemia and dyslipidemia, may account for the increased risk of cardiovascular disease in subjects with insulin resistance. The insulin resistance syndrome was defined as the presence of insulin resistance in combination with at least two of the following conditions: hyperglycemia, hypertension, dyslipidemia or central body obesity.

Tab. 1. Group characteristics, insulin levels, incidence of risk values of glucose, insulin, triacylglycerols, HDL-cholesterol, blood pressure, C-reactive protein and homocysteine.

	Majority group	Gipsy group
n (m+w)	197 (96+101)	149 (57+92)
age span (y)	19-60	20-60
average age (y)	40.7±0.8	40.1±1.0
body mass index (kg/m²)	26.2±0.4	28.4±0.6***
>30	22 %	36 %
>35	6 %	14 %
smokers	20 %	50 %
insulin (mU/L)	9.9±0.5	13.7±1.0***
>20	5 %	21 %
glucose (>6.1 mmol/L)	16 %	17 %
triacylglycerols (<1.8 mmol/L)	38 %	47 %
HDL-cholesterol (>1.6 mmol/L)	46 %	62 %
systolic blood pressure (>140 mmHg)	10 %	16 %
diastolic blood pressure (>90 mmHg)	11 %	20 %
C-reactive protein (>2 mg/L)	40 %	47 %
(>5 mg/L)	11 %	19 %
homocysteine (>15 µmol/L)	14 %	13 %

± - standard error of mean *** $p<0.001$

The average level of insulin was significantly increased in the minority group with an incidence of risk values of 21 % of Romanies vs 5 % of majority subjects (Tab. 1). The incidence of hyperglycemia is equal in both groups (Tab. 1). The Gipsy group had a higher frequency of systolic and diastolic blood pressure above the normal limit (16 % vs 10 % – systolic, 20 % vs 11 % – diastolic). The occurrence of dyslipidemia was higher in the Gipsy group (Tab. 1), which is in agreement to our previous study (Krajcovicova-Kudlackova et al, 2002). Risk triacylglycerol values were found in 47 % of Gipsy group vs 38 % of majority population. HDL-cholesterol levels indicating a reduced risk were found in 54 % of majority subjects vs only 38 % of Gipsy subjects. Body mass index in obesity range was observed in 36 % of Romanies vs 22 % of the majority group. The results are shown in Figure 1. The Figure shows the significantly increased insulin levels with risk values of body mass index, triacylglycerols, HDL-cholesterol, systolic blood pressure, but also C-reactive protein and nonsignificantly higher insulin level with elevated homocysteine values. The hyperinsulinemia, hypertriacylglycerolemia, hypo-HDL-cholesterolemia, hypertension, and obesity indicate, that the Gipsy population group is at higher risk for cardiovascular disease and metabolic syndrome.

Similar findings were described in Asian Indians. The Gipsy population is genetically related with Asian Indians because Romanies belong to the Indo-European race and their original home was Central Northern India (Ginter et al, 2001). In the study of Raji et al (2001) showed that Indians are insulin resistant and at high risk for developing diabetes and coronary heart disease. Despite similar fasting plasma glucose levels, Indians exhibited fasting hyperinsulinemia, higher glucose and insulin

levels during the oral glucose tolerance test, lower HDL-cholesterol, and greater total abdominal and visceral fat in comparison to Caucasians. Indians had greater central obesity and insulin resistance in comparison to European whites (Chambers et al, 2001). The literature findings and our results confirmed this also for American Romanies (Sutherland, 1992). Ethnic origin differences for the incidence of insulin resistance and metabolic syndrome were observed also in black and white nondiabetic women from South Africa (Merve et al, 2000). Black women demostrate a higher degree of insulin resistance.

References

Chambers JC, Eda S, Bassett P, Karim Y, Thompson SG, Gallimore JR, Pepys MB, Kooner JS. C-reactive protein, insulin resistance, central obesity and coronary heart disease risk in Indian Asians from the United Kingdom compared with European whites. Circulation 2001; 104: 145—150.

Ferrannini E, Buzzigoli G, Bonadonna R, Giorico MA, Oleggini M, Graziadei L, Pedrinelli R, Brandi L, Bevilacqua S. Insulin resistance in essential hypertension. New Engl J Med 1987; 317: 350—357.

Ginter E, Krajcovicova-Kudlackova M, Kacala O, Kovacic V, Valachovicova M. Health status of Romanies (Gypsies) in the Slovak Republic and in the neighbouring countries. Bratisl Lek Listy 2001; 102: 479—484.

He J, Klag MJ, Caballero B, Appel LJ, Charleston J, Whelton PK. Plasma insulin levels and incidence of hypertension in African Americans and whites. Arch Intern Med 1999; 159: 498—503.

Krajcovicova-Kudlackova M, Ginter E, Blazicek P, Spustova V, Valachovicova M, Kovacic V, Kacala O. The risk for atherosclerosis in a group of the ethnic Gipsy minority of southern Slovakia. Cor Vasa 2002; 44: 370—374.

Merve MT, Crowther NJ, Schlaphoff GP, Gray IP, Joffe BI, Lonnroth PN. Evidence for insulin resistance in black women from South Africa. Int J Obes Relat Metab Disord 2000; 24: 1340—1346.

Oparil S, Oberman A. Nontraditional cardiovascular risk factors. Amer J Med Sci 1999; 317: 193—207.

Raji A, Seely EW, Arky RA, Simonson DC. Body fat distribution and insulin resistance in healthy Asian Indians and Caucasians. J Clin Endocrinol Metab 2001; 86: 5366—5371.

Reaven GM, Lithell H, Landsberg L. Hypertension and associated metabolic abnormalities — the role of insulin and the sympathoadrenal system. New Engl J Med 1996; 334: 374—381.

Ruige JB, Assendelft WJJ, Dekker JM, Kostense PJ, Heine RJ, Bouter LM. Insulin and risk of cardiovascular disease: a meta-analysis. Circulation 1998; 97: 996—1001.

Sutherland A. Gypsies and health care. West J Med 1992; 157: 276—280.

Vester B, Rasmussen K. High performance liquid chromatography method for rapid and accurate determination of homocysteine in plasma and serum. Europ J Clin Chem Clin Biochem 1991; 29: 549—554.