Serum leptin levels are strongly associated with body fat mass but not with cardio-metabolic risk factors or insulin resistance with androgen deficiency in Georgian study

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Abstract

Metabolic syndrome and obesity may be a chronic disease that concerns over a billion people everywhere the planet . Adipose tissue could also be an area of synthesis of several metabolically active proteins, called adipokines. One of such adipokines is leptin. Aim: The aim of present study was to seek out correlation between leptin and risk factors of cardio-metabolic disease and androgen deficiency. Materials & Methods: The case-control study was conducted in a group of Georgian people. A total of 186 participants aged 20-70 were included for the study. The subjects who were overweight or obese were enrolled within the study group, whereas the themes with normal weight were enrolled within the control group. The control group consisted of 20 subjects with normal weight. In both groups, following measurements were done: assessment of height, weight, BMI, waist circumference and vital sign . Venus blood sample was obtained for plasma leptin, insulin, glucose and lipid profile analysis. The risk of disorder was calculated consistent with the Framingham heart risk calculator. Body fat distribution was measured using Dual Energy X-ray Absorptiometry. Statistical analyses were performed using the SPSS 19.0 software package (SPSS, Inc., Chicago, IL). Results: Our study revealed that there was a correlation between serum leptin and anthropometric characteristics within the whole study population, but when the population was divided into groups the correlation was lost. The direct correlation was with every region of the body in whole study population and in patients with obesity I and II degree. The correlation wasn't seen in patients with normal weight, over weight and morbidly obese patients. The correlation between leptin and cardio-metabolic risk factors wasn't detected. Conclusion: In our study, serum leptin levels are dependent totally on body fat percentage and body fat mass. Serum leptin levels didn't accompany cardio-metabolic risk factors.

Leptin may be a 167-amino-acid protein released by white fat and encoded by the obese gene. It has a role as a negative regulator of appetite control through sending a satiety signal to act on receptors within the hypothalamus. At normal levels, leptin can exert its effects on weight regulation consistent with white fat mass, induce sodium excretion, maintain vascular tone, and repair the myocardium. Beyond these effects, elevated serum leptin levels have been implicated in the pathogenesis of metabolic syndrome, diabetes mellitus, hypertension, and multiple cardiovascular diseases. In addition, hyperleptinemia had been reported to contribute to renal diseases through multiple mechanisms leading to glomerulopathy presenting with a decreased glomerular filtration rate, increased albuminuria, and related clinical symptoms, which are pathophysiological features of chronic kidney disease. Because these cardiovascular and metabolic disorders are great challenges for physicians, understanding the related pathophysiological association with leptin might become a valuable aid in handling patients in daily clinical practice. This review will discuss the roles of leptin within the regulation of biological functions of multiple organs beyond the upkeep of feeding and metabolism.

Adipose tissue has several functions. It is related to lipid metabolism including storage of triglycerides and release of carboxylic acid . Then, it catabolizes triglycerides to release glycerol and fatty acids that participate in glucose metabolism in the liver and other tissues. Moreover, adipocytes secrete adipokines, like leptin, to manage feeding behavior and cause satiety [1]. It is essential for healthy people to take care of a traditional amount and distribution of fat . However, an imbalance might end in aberrant release of adipokines or an abnormal percentage of free morpheme circulating within the blood which may cause diseases [2]. Leptin was discovered in 1994. It is a 16-kDa product of the obese gene mainly produced by white adipose tissue and functions as a major secretory and endocrine organ involved in a wide range of functions beyond fat storage. It reaches the hypothalamus through the blood–brain barrier and acts to scale back food intake and increase metabolism [3]. The classic effects of leptin include decreasing appetite, increasing energy expenditure, and regulating glucose homeostasis independent of insulin involvement. The serum concentration correlates with body fat content, and there are markedly elevated serum leptin concentrations and obese mRNA expression within the

adipocytes of obese patients [4,5]. In humans, congenital leptin deficiency has been related to severe obesity, glucose intolerance, and insulin resistance, and these disturbances are often reversed by leptin administration, which indicates an association between leptin and insulin [5]. Elevated concentrations of serum leptin are often induced by increased secretion of leptin including free fatty acids, insulin stimulation, estrogen, tumor necrosis factor-α, or impaired renal clearance [6,7]. High leptin levels have been implicated in association with metabolic, inflammatory, and homeostatic factors involved in the pathophysiological processes of metabolic syndrome (MetS), hypertension (HTN), and other cardiovascular diseases (CVD), and a relationship between leptin and kidney diseases has been found [8,9,10]. This present review will highlight the pleiotropic actions of leptin that are potentially relevant not only to the control of satiety but also metabolic, CV, and renal disorders. Figure 1 shows the multiple physiological and pathophysiological roles of leptin in humans

Biography

Salome Kalandadze, MD is an Endocrinologist at National Institute of Endocrinology; Endocrinologists at the Department of Endocrinology and Metabolism of "New Hospitals"; Dietetics at "La Belle Esthetic Center"; She is also a Member of various associations such as Georgian Young Association for the Study Diabetes and Metabolic Disorder, European Association For The Study Of Obesity, Study Group For The Insulin Resistance, European Association For The Study Of Diabetes. She is also a reviewer for Georgian Journal "Aversi Magazine" She has participated and presented at several international conferences. She is a researcher in several clinical trials, author of more than 7 publications & lecturer in Endocrinology and Nutrition.

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