

RELATIONSHIP BETWEEN BMI AND CYSTATIN-C LEVELS IN PATIENTS WITH EARLY STAGES OF INSULIN RESISTANCE

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Abstract : In 2016, WHO estimated that more than 1.9 billion adults over the age of 18 were overweight. Of these, more than 650 million were obese (WHO 2021). Therefore, obesity can be considered the new non-infectious "epidemic" of our time. Early preclinical markers of structural and functional changes in the kidneys are being actively sought. As such markers, along with traditional methods of early diagnosis of type 2 DM, determination of plasma concentration or excretion of N-acetyl-D-glucosaminidase (NAG), retinol-binding protein, p-2 microglobulin, specific cells (macrophages, podocytes, etc.), subcalixin, nephrin, type IV collagen, growth factors (including vascular endothelial growth factor -VEGF), cytokines are proposed. In addition to creatinine, new markers for the determination of GFR, e.g. cystatin C, have been proposed.

Keywords : Cystatin C, diabetes mellitus, obesity, cytokines

Introduction. Cystatin C is a low molecular weight protein of 13.4 kDa and belongs to the family of inhibitors of cysteine proteinases. Elevated serum cystatin C levels are seen with decreased renal filtration function, and increased urinary excretion indicates proximal tubule cell dysfunction. Cystatin C as a marker of GFR is able to diagnose the earliest changes of GFR - hyperfiltration (including arterial hypertension) and the early stages of hypofiltration, monitor rapid changes of GFR in acute renal pathology, accurately assess renal function in pediatric and geriatric patients, predict cardiovascular complications of renal dysfunction. Cystatin C gives a more accurate measure of GFR than creatinine: the correlation coefficient between cystatin C concentration and actual measured GFR was 0.92 versus 0.74 for creatinine.

Purpose of the study: To investigate BMI and cystatin-C levels in patients in the early stages of insulin resistance.

A total of 60 subjects aged 25-44 years with varying degrees of obesity and 30 healthy subjects of normal body mass index (BMI) were examined. After measuring the degree of obesity by BMI calculation, we analysed cystatin-C and blood sugar levels, which indicated changes in renal function and insulin resistance in the early stages of type 2 diabetes mellitus respectively and also calculated GFR by measuring blood creatinine levels with Cockcroft-Gold formula.

Results: Cys-C levels were higher in obese patients than in those with normal body weight. There was also a direct association between changes in blood sugar and cystatin-C levels. Interestingly, calculations of glomerular filtration rate (GFR) with Cockcroft-Gold formula and those based on serum cys-C showed a difference.

Conclusion: Reduced renal function in obese patients at the onset of type 2 diabetes mellitus, even in the early stage of insulin resistance, as indicated by elevated serum cystatin-C and blood sugar levels. These two biomarkers correlate with increased BMI. However, no changes in rCG based on creatinine levels can be detected. Therefore, serum cystatin-C can be considered a reliable marker of decreased renal function in the early stages of insulin resistance. This allows for the prevention of nephropathy in patients with varying degrees of obesity in the initial stages of type 2 diabetes mellitus.

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