

Peculiarities of Adiponectin Changes with Gastroesophageal Disease in Young Patients with Overweight and Obesity

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Abstract

To date, the results of studies concerning changes in the level of adiponectin in GERD in overweight and obese individuals are few, conducted in older age groups, their results are contradictory, and therefore this study was conducted. The study included 62 patients with GERD of young age (from 21 to 44 years old inclusive): the study group (SG), consisting of 31 GERD patients with BMI ≥ 25 kg/m² and the clinical comparison group (CCG), consisting of 31 GERD patients with BMI < 25 kg/m². With a decrease in the serum adiponectin level, the severity of heartburn increases, the final score of the GerdQ questionnaire and the final indicator DeMeester of the 24-hour pH-metry increase in young GERD patients with overweight and obesity. The level of adiponectin is reduced in the group of young GERD patients with BMI ≥ 25 kg/m² compared with that in patients with GERD and BMI < 25 kg/m². In the erosive form of GERD, the adiponectin level is significantly lower than in the NERD group. There were no gender differences in adiponectin levels in young GERD patients. In the pathogenesis of GERD in young patients with a BMI ≥ 25 kg/m², in addition to reflux of stomach contents into the esophagus, a significant factor is chronic systemic inflammation, which is explained by a reduced level of adiponectin in these patients.

Keywords: Gerd; Adiponectin; Young Adults; Erosive Esophagitis; Obesity; Overweight

Abbreviations

GERD: Gastroesophageal Reflux Disease; BMI: Body Mass Index; SG: the study group; CCG: The Clinical Comparison Group; NERD: Non-Erosive Reflux Disease; ERD: Erosive Reflux Disease; Me: Mediana; WC: Waist Circumference; HC: Hip Circumference

Introduction

One of the risk factors for the development of GERD is overweight or obesity. Obesity can affect the pathogenesis of GERD due to adipocytokines, as well as acid reflux [1,2]. Adiponectin is a peptide secreted mainly by visceral adipocytes [1,2].

Currently, there are few works devoted to the study of the level of adiponectin in GERD [1-8] in older age groups. To date, the results of studies concerning the features of the course of GERD in overweight and obese individuals are contradictory, and in young people they have been little studied, which was the basis for this study.

Materials and Methods

We examined 62 young patients with GERD (from 21 to 44 years old, inclusive), from which they formed: the study group (SG) and the clinical comparison group (CCG). The SG included 31 patients with GERD with BMI ≥ 25 kg/m², The median (Me) age was 38 years. The CCG included 31 patients with GERD with a BMI < 25 kg/m² The median (Me) age was 32 years. The determination of the concentration of adiponectin in the blood serum was carried out by the method of competitive enzyme-linked immunosorbent assay.

The differences in indicators between the two groups (SG and CCG) and the relationship between the severity of clinical manifestations of GERD according to the GerdQ questionnaire, anthropometric data of patients, endoscopic picture, features of lesions of the esophageal mucosa, pH-metric data, adiponectin level in blood serum were determined. Methods for statistical processing of the results obtained included descriptive statistics, comparative and correlation analyzes. In the statistical analysis of the data, the differences in the compared indicators were considered significant at $p < 0.05$.

Results and Discussion

Me level of adiponectin in SG was significantly lower compared to CCG and amounted to 5.82 pg/ml ($p = 0.0078$) (Table 1).

Number group	Group	Adiponectin, pg/ml	P
1	SG (n = 31)	5,82 [4,11; 20,81]	$p_{1-4} = 0,0078$
2	SG with BMI = 25-30 kg/m ² (n = 16)	18,54 [11,25; 27,90]	$p_{2-3} = 0,0063$
3	SG BMI ≥ 30 kg/m ² (n = 15)	4,22 [0,00; 5,01]	$p_{2-3} = 0,0063$
4	CCG (n = 31)	17,1 [8,19; 25,8]	$p_{1-4} = 0,0078$

Table 1: Serum adiponectin levels in young GERD patients depending on BMI

Me values (upper quartile; lower quartile).

Note: *p* - the statistical significance of the differences between the groups (Mann-Whitney test).

It was shown that with an increase in BMI ($r = -0.68$, $p < 0.05$) and WC/HC ($r = -0.53$, $p < 0.05$), the level of adiponectin decreased. Similar data were obtained in a study involving 110 patients with GERD [3]. According to another study of 182 patients, the adiponectin level decreased with abdominal obesity and with increasing age [6].

A negative relationship was found between the level of adiponectin and the severity of heartburn in SG ($r = -0.7$, $p < 0.05$). Also, in the main group, there was a negative relationship between the level of adiponectin and the final score of the GerdQ questionnaire ($r = -0.68$, $p < 0.05$). In a study by P.H. Tseng showed that the level of adiponectin was not associated with the severity of symptoms of GERD, in contrast to the level of ghrelin (Me age = 45.6 years, Me BMI = 22.4 kg/m²) [7].

In GERD patients with overweight, with a decrease in adiponectin levels, the final indicator DeMeester of the 24-hour pH-metry increased ($r = -0.61$, $p < 0.05$), while in the group with normal body weight such a relationship was not found. There were no similar studies in the literature available to us.

In young patients with erosive GERD, the adiponectin level (Me = 7.5 pg/ml) was significantly lower than that in the group with NERD (Me = 19.7 pg/ml) ($p = 0.012$).

The results of our study can be explained by the negative effect of increased visceral fat mass on adiponectin levels in patients with reflux esophagitis [2,3]. At the same time, in patients over 64 years of age with a normal BMI (Me = 22 kg/m²), low serum adiponectin values are associated with an increased risk of developing erosive esophagitis in men [7]. Researchers from Korea have demonstrated that low levels of adiponectin are involved in the pathogenesis of obesity-related erosive esophagitis in men but not in women [4].

In contrast, O.M. Thompson has shown that a decrease in adiponectin levels increases the risk of developing erosive forms and Barrett's esophagus in women aged 20 to 80 years (Me = 55.8 years) with a BMI > 27 kg/m² [8].

In our study, no significant difference was found between the levels of adiponectin in men and women ($p > 0.05$). It should be noted that with a decrease in the level of adiponectin in the SG, the degree of hyperplasia of the basal layer ($r = -0.35$, $p < 0.05$) and the severity of inflammation ($r = -0.45$, $p < 0.05$) in the esophageal mucosa progressed. In the group of patients with a reduced value of serum adiponectin (less than 8.19 pg/ml, which corresponds to the lower quartile of the indicator in the GCS), there were statistically significant: an increased final score of the GerdQ questionnaire, an increase in the DeMeester indicator according to 24-hour pH-metry and the severity of inflammation of the mucous membrane esophagus.

Conclusion

Thus, with a decrease in the level of adiponectin, an increase in the severity of clinical symptoms of GERD, indicators of acid reflux according to the data of daily pH-metry and the severity of inflammation in the mucous membrane of the esophagus is observed, which emphasizes the great importance of humoral mechanisms in the formation of GERD in young people with overweight. There were no gender differences in adiponectin levels. The regularity of the identified relationships shows the importance of a decrease in adiponectin in the pathogenesis of GERD in young people with overweight and obesity.

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