

Comparison of Basal Ghrelin Concentration in Type 2 Diabetic with Healthy Men and Association with BMI

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Abstract—Background and Aim: It has been hypothesized that insulin resistance may be the driving factor for changes in ghrelin levels. The objective of this study is comparison serum ghrelin concentration in diabetic and none diabetic males and association with glucose, insulin and BMI. **Material and methods:** Fasting ghrelin, insulin and glucose measured in 30 adult males with type 2 diabetic and 30 none diabetic after 10 to 12 overnight fast. BMI measured with using weight (kg) and height (m). Insulin resistance calculated with using fasting glucose and insulin. Independent T test used determine differences significantly of variables in two groups. Multivariate regression analyze used for determine relationship between ghrelin with other variables. P values smaller than 0.05 were accepted a significant. **Results:** The statistical date showed that serum Ghrelin concentration and insulin resistance in diabetic subjects were significantly higher than normal people ($p=0.021$). In addition, the relationship between ghrelin and insulin resistance is liner but none significantly. **Conclusion:** These findings suggest the involvement of ghrelin in the regulation of fasting glucose and insulin resistance, although it is not related to body mass index in type 2 diabetes patients.

Keywords—diabetes, ghrelin, insulin resistance, glucose

I. INTRODUCTION

Experimental studies demonstrated disorder in secretion of many gastrointestinal parameters in chronic disease. Ghrelin is recently-discovered peptide hormone secreted mainly from the stomach but also produced in a number of other tissues including salivary glands that stimulates food intake, GH secretion, and gastric motility. Experimental studies have suggested that ghrelin plays roles in glucose homeostasis. Plasma ghrelin levels rise shortly before meals and fall shortly after a meal (1). Study findings indicate that ghrelin plays a role in regulating food intake and energy homeostasis. In healthy people, ghrelin concentrations increase progressively before meals and decrease after meal ingestion. Some article stated that ghrelin concentration increased with diabetic (2). During the early stages of diabetes, gastric emptying is often accelerated, rather than delayed. The mechanism of accelerated gastric emptying in diabetes has not been fully studied. A recent study showed that plasma ghrelin levels were elevated in diabetes (3). The plasma ghrelin levels and gastric preproghrelin mRNA expression levels of the diabetic rats is higher than none diabetic rats (4). It has been hypothesized that insulin

resistance may be the driving factor for changes in ghrelin levels. Decreased plasma levels of active ghrelin are significantly associated with abdominal adiposity, hyperinsulinemia and insulin resistance in type 2 diabetic patients. There is a significant correlation between the plasma levels of ghrelin and BMI and serum levels of insulin (5). In the case of ghrelin, most available data suggest a negative association between systemic ghrelin and insulin levels. But the finding of another study showed that ghrelin concentration is independent of BMI in type 2 diabetic (6). In addition another study stated that increase in ghrelin concentration led to increase in insulin secretion of pancreas in diabetic and normal people. The independent role of BMI, glucose and insulin in ghrelin regulation is still controversial. Some finding stated that Ghrelin concentration in diabetic patients is higher than healthy people. In contrast, the findings of a recent study showed that ghrelin secretion is suppressed by long-term hyperglycemia in diabetic patients (7). Therefore, the objective of this study is comparison serum ghrelin concentration in diabetic and none diabetic males and association with glucose, insulin and BMI.

II. METHODS

A total 30 male with type 2 diabetic and 30 none diabetic aged 35 -50 years selected for participation in this study. Fasting ghrelin, insulin and glucose measured in two groups after 10 to 12 overnight fast. BMI measured with using weight (kg) and height (m). Before participation, each subject were informed of the purpose of study and the benefits and probable risks of the investigation and signed an informed consent document to participate in the study. Participations were instructed to don't participate in vigorous exercise the two days before and the day of testing. Insulin resistance calculated with using fasting glucose and insulin. Statistical analysis was performed using SPSS 15.0 for windows software. Independent T test used determine differences significantly of variables in two groups. Multivariate regression analyze used for determine relationship between ghrelin with other variables. P values smaller than 0.05 were accepted a significant.

III. RESULTS

The study finding showed that baseline concentration of serum ghrelin and insulin resistances in diabetic patients are higher than healthy males ($p=0.021$). In addition, the

relationship between ghrelin and insulin resistance is linear but none significantly. Also, ghrelin is not related with BMI. And insulin, but the relationship ghrelin versus glucose is high significantly linear (figure 1).

IV. DISCUSSION / CONCLUSION

The evidence indicates that ghrelin plays a role in regulating food intake and glucose homeostasis. Recent evidence has shown that specific gut hormones administered at physiological or pathophysiological concentrations can influence appetite in rodents and humans (8, 9). In healthy subjects, blood ghrelin concentrations increase progressively before meals and decrease after meal ingestion (10). This is not clear whether insulin resistance suppress is related to plasma ghrelin concentration in type 2 diabetic. Some studies suggest that elevated endogenous ghrelin enhances anthropologic coordination, which accelerates gastric emptying in the early stages of diabetes. Our results show that type 2 diabetic patients have ghrelin higher than healthy male and ghrelin level have positive relation with fasting glucose in these patients. This study stated that ghrelin is related with glucose and ghrelin concentration increase with increase in glucose in diabetic patients. Also, our finding demonstrated that serum ghrelin is independent of BMI in these patients. This is consistent with findings reported by Else study (5) on diabetic patients. Studies on the relationship between insulin resistance and ghrelin are conflicting, although there is evidence that ghrelin is significantly reduced in obesity only in the presence of insulin resistance and hyperinsulinemia (11). In this area, our study showed that serum ghrelin concentration has an inverse relation with insulin resistance but no significantly.

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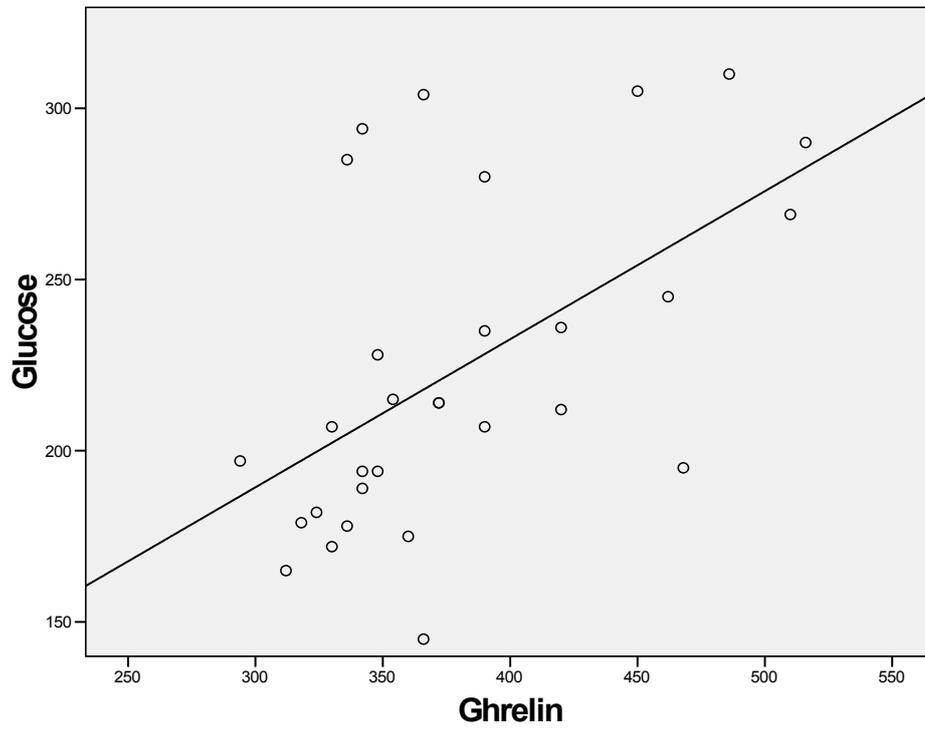


Figure 1. The regression pattern of Ghrelin versus Glucose in type 2 diabetic patients