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Fasting plasma ghrelin levels in subtypes of anorexia nervosa

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Abstract

Ghrelin has a role in regulating eating behavior and energy metabolism in the central nervous system, and has been reported to play an important role in the pathophysiology of anorexia nervosa (AN). The aim of the present study was to compare fasting plasma ghrelin levels in different subtypes of untreated AN patients. The subjects included 39 female AN patients and 11 female controls. The patients were then divided into two subtypes as follows: 19 AN patients with restricting (AN-R) and 20 AN patients with binge-eating/purging (AN-BP) form of the illness. Blood samples from subjects after an overnight fast were used to analyze plasma ghrelin concentrations. Plasma ghrelin concentrations in both AN-R and AN-BP were negatively correlated with body mass index (BMI). The mean plasma ghrelin levels in both AN-R and AN-BP were significantly higher than that in controls. The mean ghrelin level in AN-BP was significantly higher than that in AN-R. However, mean BMI and serum potassium in both groups were not significantly different. These results suggest that both BMI and the presence of binge-eating/purging may have some influence on fasting plasma ghrelin levels in patients with AN.

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Keywords: Ghrelin; Body mass index; Anorexia nervosa; Restricting; Habitual binge-eating/purging

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1. Introduction

Ghrelin was originally discovered in the rat and human stomach (Kojima et al., 1999), and increases food intake and body weight when administered centrally and peripherally and stimulates growth hormone secretion in rodents (Tschöp et al., 2000). Ghrelin-producing endocrine cells account for about 20% of the oxyntic gland endocrine cell population (Dornonville de la Couret et al., 2001). This peptide is an orexigenic peptide that increased the hypothalamic neuropeptide Y (NPY) mRNA expression and abolished leptin-induced feeding reduction (Shintani et al., 2001). Antibodies and antagonists of NPY and agouti-related protein (AGRP) blocked ghrelin-induced feeding (Nakazato et al., 2001). These findings suggest a role for ghrelin in the regulation of feeding behavior and energy metabolism in the central nervous system. Additionally, it has been reported that fasting plasma ghrelin concentrations in humans are negatively correlated with BMI (Shiyya et al., 2002), and fasting leptin concentrations (Tschöp et al., 2001).

Alterations in the release of gastrointestinal peptides (Baranowska et al., 2000) and increased fasting plasma ghrelin levels (Otto et al., 2001) have been reported in patients with anorexia nervosa (AN). AN is subdivided into two subtypes: the restricting form, characterized by dietary restriction, and the binge-eating/purging form, which includes the presence of binge-eating and/or purging, according to the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV; American Psychiatric Association, 1994). Research examining the interactions between appetite control mechanisms and AN subtype may assist in our understanding of the diagnosis and treatment of these illnesses. Thus in this study, we measured the fasting plasma concentrations of ghrelin from AN patients and compared the mean ghrelin levels among the subtypes of AN to sex- and age-matched healthy controls.

2. Methods

2.1. Subjects

Nineteen female AN-R patients (20.1 ± 4.9 years, mean age \pm SD) and twenty female AN-BP patients (21.9 ± 4.7 years) defined in DSM-IV and eleven healthy female volunteers (control) (21.0 ± 1.9 years) were the subjects in this study. The mean values of BMI in the subjects were as follows: AN-R (13.6 ± 1.5 kg/m², mean \pm SD); AN-BP (13.7 ± 1.9 kg/m²); control (21.4 ± 1.2 kg/m²). Duration of illness was as follows: AN-R (2.5 ± 1.5 years, mean \pm SD); AN-BP (3.3 ± 3.1 years). Controls had no history of psychiatric illness. Patients were excluded if they had a history of alcohol or drug abuse, or gastrointestinal disease and were assayed before the initiation of active treatment. AN-BP patients had a history of binge-eating/ purging at least twice a week over the preceding 3 months. The Institutional Committee of Kagoshima University approved the protocol, and all subjects provided written informed consent before participation.

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