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Improvement of Appetite Responded to Testosterone Enanthate Injection in an Elderly Diabetic Inpatient with Chronic Inflammation and Anorexia

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Abstract **Case Report**

Andropause or late-onset hypogonadism (LOH) is characterized by particular symptoms and a low level of serum testosterone with advancing age, which has been documented in patients with type 2 diabetes. An 89-year-old man with slowly progressive insulin-dependent diabetes mellitus was admitted due to malnutrition and respiratory tract infection. After the treatment with antibiotics, he was diagnosed with active rheumatoid arthritis and was treated with prednisolone. The treatment with prednisolone was effective on the improvement of the levels of C-reactive protein, albumin and hemoglobin, while the improvement of the patient's appetite loss was slow and limited. Since his serum free testosterone level was found to be as low as 2.2 pg/ml, 125 mg of testosterone enanthate was injected intramuscularly. Shortly after the injection, his appetite loss was improved and he obviously became active in receiving physical therapy. The second injection was less effective. It is thus suggested that the combination therapy of prednisolone and testosterone can be effective for elderly patients with chronic inflammation and LOH. It should be advised to proactively measure the testosterone levels in elderly patients, and more appropriate supplementation of testosterone for LOH as seen in the present case may be needed.

Keywords: Andropause, late-onset hypogonadism, testosterone enanthate, appetite, chronic inflammation, elderly patients.

INTRODUCTION

During ageing, physiological functions including hormonal activity gradually decline, leading to age-related disability called frailty [1, 2]. Taking menopause for women into account, andropause or late-onset hypogonadism (LOH) for men is regarded as a clinical and biochemical state characterized by particular symptoms (fatigue, decreased libido, memory problems, etc.) and a low level of serum testosterone with advancing age [3, 4]. In recent years, LOH has been documented in patients with type 2 diabetes [5-7]. In this case report, it is demonstrated that the treatment of testosterone enanthate was effective on anorexia in an elderly diabetic patient with rheumatoid arthritis and a low serum testosterone level.

CASE REPORT

An 89-year-old man with slowly progressive insulin-dependent diabetes mellitus (duration of diabetes, 12 years) was admitted to our hospital due to difficulty in body movement and anorexia. On admission, the patient was approximately 167 cm in height and 50 kg in weight. The patient's white blood cell count was 18,040/μl, hemoglobin was 10.2 g/dl, and platelet count was 179,000/μl. The levels of serum total protein, albumin, urea nitrogen, creatinine, sodium, potassium and C-reactive protein were 5.8 g/dl, 1.9 g/dl, 43 mg/dl, 1.35 mg/dl, 138 mEq/l, 4.1 mEq/l and 27.31 mg/dl, respectively. His HbA1c level was increased to 10.3 % despite his appetite loss. Computed tomography of the chest revealed slight infiltration shadows and pleural effusion. He was diagnosed with dehydration, malnutrition and respiratory tract infection, and the administration of antibiotics and peripheral parenteral nutrition were started. Since the inflammation and malnutrition were not well improved after the treatment with antibiotics, further examinations were performed, leading to a diagnosis of rheumatoid arthritis due to being positive for anti-cyclic citrullinated peptide antibody (110 U/ml) and active sternoclavicular arthritis.

As shown in Figure 1, the treatment with prednisolone starting from 15 mg/day on the 16th hospital day was effective on the improvement of the levels of C-reactive protein, albumin and hemoglobin, while the improvement of the patient's appetite loss (reflected by daily eating rate of served meals calculated using his medical records) was slow and

limited. When the dose of prednisolone was reduced to less than 10 mg/day, his appetite appeared to decrease along with an increase in the C-reactive protein level. Since his serum free testosterone level on the 66th hospital day was found to be as low as 2.2 pg/ml (reference range for more than 70-year-old men, 4.6 - 16.9 pg/ml), 125 mg of testosterone enanthate was injected intramuscularly on the 83rd hospital day. His serum prostate specific antigen level was within normal limits at 1.3 ng/ml. Shortly after the injection, his appetite loss was improved and he obviously became active in receiving physical therapy. However, his appetite and willingness tended to decrease again (free testosterone, 2.3 pg/ml on the 110th hospital day), and the second injection of 125 mg testosterone enanthate was done on the 116th hospital day. The effect of the second injection was not as good as the first one, and his serum albumin level remained low while usually eating more than 50 % of 1600 kcal meals for patients with mild dysphagia. His HbA1c level had been improved at 7.4 % by adjusting insulin dose to blood glucose levels and the amount of foods eaten. Finally, he was transferred to another hospital to continue the treatment for him.

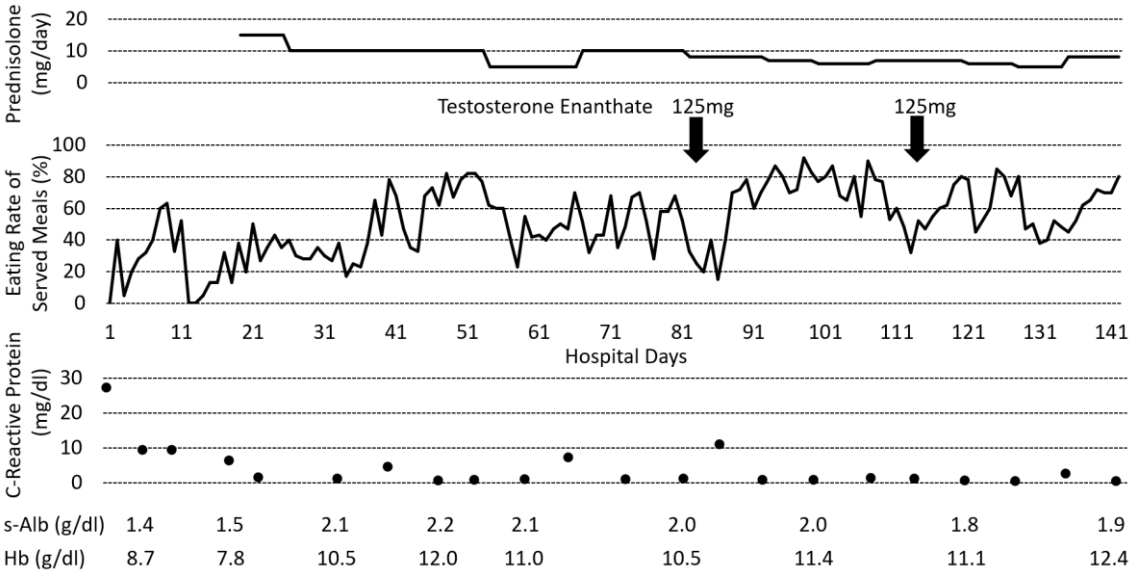

Fig-1: Clinical course of the patient in the hospital. See text for explanation. s-Alb, serum albumin level; Hb, hemoglobin level

DISCUSSION

In the present case of an elderly diabetic man with LOH, testosterone supplementation could improve appetite loss caused by chronic inflammation due to rheumatoid arthritis further to the effect of prednisolone. It is known that chronic inflammatory systemic diseases like rheumatoid arthritis can uniformly cause general symptoms such as fatigue, anorexia, malnutrition and disturbances of the hypothalamic-pituitary-gonadal axis [8]. His having rheumatoid arthritis is suggested to be involved in a low free testosterone level in addition to anorexia. In rats and mice, orchiectomy decreases food intake by decreasing meal frequency, which is reversed by testosterone treatment [9]. Testosterone can stimulates appetite and may induce accumulation of abdominal fat and insulin resistance in women, whereas larger depots of abdominal fat are associated with lower testosterone levels in men [10]. Obesity and LOH can be regarded as the main clinical factors underlying metabolic diseases such as obese type 2 diabetes [11], which seems to be often seen in middle-aged men with early-onset type 2 diabetes [12]. As to the present case, his LOH is presumed to be attributable to ageing and chronic inflammation.

It was impressive that the patient's appetite and willingness were obviously increased by testosterone supplementation even after the effect of prednisolone on chronic inflammation was obtained. After the inflammatory reaction and anemia were improved by the prednisolone treatment, it was realized that the patient's testosterone level remained low. It is thus suggested that the combination therapy of prednisolone and testosterone can be effective for elderly patients with chronic inflammation and LOH. It should be advised to proactively measure the testosterone levels in elderly patients, and more appropriate supplementation of testosterone for LOH as seen in the present case may be needed.

CONCLUSION

In the present case of an elderly diabetic man with LOH, testosterone supplementation could improve appetite loss caused by chronic inflammation due to rheumatoid arthritis further to the effect of prednisolone. It should be advised to proactively measure the testosterone levels in elderly patients, and more appropriate supplementation of testosterone may be needed.

Conflict of Interest

The authors declare that they have no conflicts of interest regarding the publication of this paper.

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