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The Effect of HCG and Testosterone Treatment on Bone Densitometry in Men with Hypogonadism

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ABSTRACT

***Objective:** Testosterone deficiency in men with hypogonadism is adversely affected by secondary bone metabolism. The aim of this study was to evaluate the effect of hCG and testosterone on bone densitometry in hypogonadic men.*

***Materials and Methods:** 46 male patients with hypogonadism in January 2017 and December 2018 were evaluated. The patients who had any osteoporosis other than hypogonadism would have been excluded from the study. Z score of bone densitometry was evaluated before and 1 year after treatment patients with hypogonadism.*

***Results:** The mean age of 46 patients was 29.2 ± 9.3 (min: 18, max: 51). 18 patients with Z score of ≤-2 were started on intramuscular testosterone therapy every 21 days and 17 patients were started subcutaneously 4500 IU choriogonadotropin alpha (HCG) weekly. Two patients who received Choriogonadotropin alpha (HCG) in the bone densitometry taken 1 year after the treatment improved their Z score and no change was observed in the testosterone group .*

***Conclusion:** In the treatment of decreased BMD in men with hypogonanadism, hCG administration responded well to testosterone administration*

Keywords: *Hypogonanadism, hCG, testosterone, osteoporosis*

INTRODUCTION

Hypogonadism; gametogenezis or gonadal hormone secretion of the secretion of one or both may occur as a result of the lack of both. Gonadal functions are under control of hypothalamic GnRH and pituitary FSH and LH hormones. Pituitary FSH stimulates spermatogenesis while stimulating testosterone production from the testis with pituitary LH stimulation. Hypogonadism secondary to hypophyseal hormonal deficiency is called hypogonadism or hypogonadotropic hypogonadism. Direct loss of gonad function is called primary hypogonadism or hypergonadotropic hypogonadism (1,2). Hypogonadism is the common cause of osteoporosis in men. Several studies have shown that testosterone replacement increases BMD in young men with hypogonadism (3,4). The aim of this study was to evaluate the effect of testosterone and choriogonadotropin alpha (HCG) on bone density (BMD) and the difference between the two treatments.

MATERIALS AND METHODS

We evaluated the clinical, biochemical and bone densitometry Z scores of 46 patients who were followed for hypogonadism between January 2017 and December 2018 before treatment and 1 year after treatment. Apart from hypogonadism, patients with disease or drug use that disrupt bone turnover were excluded from the study. Patients who were on target at the third month, sixth month and twelfth month who were treated with regular hypogonadism at the level of serum testosterone were included this study. BMD was adjusted by age (Z-score). The Z-score is the comparison of the BMD of the patient with their peers. The Z score is considered to be below the expected range for the age expected to be -2 or less (5).

RESULTS

The mean age of 46 patients was 29.2 ± 9.3 (min: 18, max: 51).The mean age of 24 patients with testosterone therapy was 31.9 ± 10.1 (min: 18, max: 51).The mean age of 22 patients with choriogonadotropin alpha (HCG) was 26.9 ± 7.6 (min: 18 + max: 46). Z score was ≤ -2 in 11 (23.9%) and Z score was> -2 in 25 (76.1%) patients with bone densitometry.18 patients with Z score of ≤ -2 were started on intramuscular testosterone therapy every 21 days and 17 patients were started subcutaneously 4500 IU choriogonadotropin alpha (HCG) weekly. Two patients who received Choriogonadotropin alpha (HCG) in the bone densitometry taken 1 year after the treatment improved their Z score and no change was observed in the testosterone group (table 1, table 2, figure 1).

Table1. *Z score in bone densitometry of pre-treatment patients with hypogonadism*

Treatment	Pre-treatment Z score		Total
	≤ -2	> -2	
Testosterone (n, %)	18 (75%)	6 (25%)	24
Choriogonadotropin alfa (HCG) (n, %)	17(77.3%)	5 (22.7%)	22
Total	35 (76.1%)	11 (23.9 %)	46

Table2. *Z score in bone densitometry of patients after treatment with hypogonadism*

Treatment	Post-treatment Z score		Total
	≤ -2	> -2	
Testosterone (n, %)	18 (75%)	6 (25%)	24
Choriogonadotropin alfa (HCG) (n, %)	15(68.2%)	7 (31.8%)	22
Total	33 (71.7%)	13 (28.9%)	46

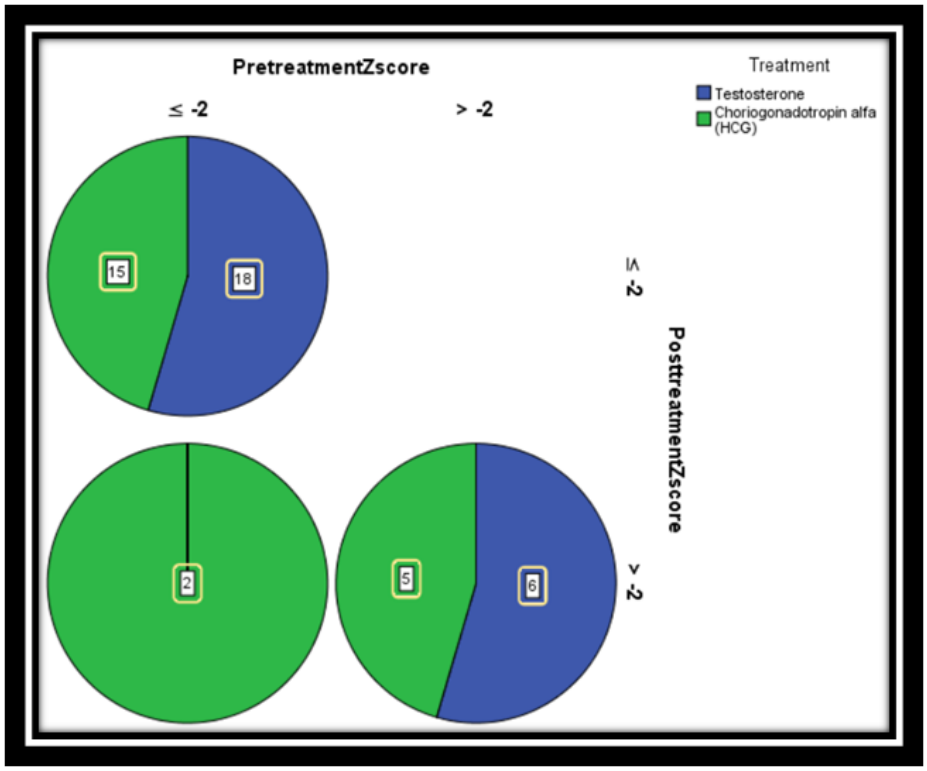

Figure1. *Z score in bone densitometry before and after treatment in patients receiving Testosterone and Choriogonadotropin alpha (HCG)*

DISCUSSION

Osteoporosis is a disease that can be diagnosed without fractures and can prevent the health problems caused by fractures. Osteoporosis is an important cause of morbidity and mortality in advanced ages. Although it is seen less frequently in males than females, the mortality rate associated with fractures is higher in males than females (6-10).The causes of osteoporosis in men are similar to women. A reason in 40-60% of epidemiological studies could be identified. Hypogonadism, glucocorticoid treatment, gastrointestinal diseases, vitamin D deficiency, antiepileptic drugs, hypercalciuria and alcohol abuse are the most common causes

of osteoporosis. A significant proportion of men with spinal osteoporosis have long-term testosterone deficiency. Although it is frequently seen in the 6th decade, symptoms of hypogonadism are present from a young age (11-13). Basurto and et al. 48 hypogonadism patients over 60 years of age were evaluated. 25 of these patients received testosterone and 23 of them were evaluated as control group. Lumbar BMD was statistically higher in the testosterone group and no difference was found between femoral neck BMD in both groups (14). In our study, the age of the patients was under 60 years. Katznelson and et al. 36 patients with hypogonadism and mean age 58 (min 22-max: 69) were compared. Spinal BMD was significantly increased after 12 months of testosterone treatment (15). In our study, there was no change in the group receiving testosterone after 1 year of treatment, whereas in 2 patients with HCG treatment there was a significant increase in spinal BMD. Guo and et al. evaluated under 46 years of age using hCG and testosterone esters in 10 male patients with hypogonadism. They found that BMD was normalized, especially in patients with high hCG doses and who have serum testosterone within normal reference range (16).

CONCLUSION

In the treatment of decreased BMD in men with hypogonanadism, hCG administration responded well to testosterone administration. Estrogen together with androgen may play an important role in normalizing bone turnover in hypogonadotropic men.

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