

ORIGINAL RESEARCH—ENDOCRINOLOGY

Testosterone Levels and Sexual Function Disorders in Depressive Female Patients: Effects of Antidepressant Treatment

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ABSTRACT

Introduction. Women suffer from depression more frequently than men, which indicates that sex hormones might be involved in the etiology of this disease.

Aims. The purpose of this study was to assess the relationship between testosterone and depression pathophysiology in depressive women along with sexual function. We also investigated whether antidepressant treatment causes any change in levels of this hormone or in sexual function.

Methods. Premenopausal female patients aged 25–46 years ($n = 52$) with diagnosed major depression were included in this study as the patient group, and 25- to 46-year-old premenopausal women without depression ($n = 30$) were included as the control group.

Main Outcome Measures. Serum testosterone and sex hormone-binding globulin (SHBG) levels were measured twice, before and after the antidepressant treatment. Bioavailable testosterone (cBT) levels were calculated using the assay results for total testosterone (TT), SHBG, and albumin according to the formulas of Vermeulen et al. Depression severity was measured using the 17-item Hamilton Depression Rating Scale, and sexual function was evaluated with the Arizona Sexual Experience Scale.

Results. The mean TT and cBT levels significantly increased in the patient group after the antidepressant treatment ($P < 0.001$). Pre-treatment TT and cBT levels were significantly lower in the patient group than in the control group ($P < 0.001$). Similar results were obtained for post-treatment serum TT and cBT levels in the patient and control groups ($P > 0.05$). There were no significant differences among the groups in terms of SHBG level.

Conclusion. The low testosterone levels in depressed women compared with women in the control group and the elevated levels post-pharmacotherapy suggest that testosterone may be involved in depression. **Kumsar Ş, Kumsar NA, Sağlam HS, Köse O, Budak S, and Adsan Ö. Testosterone levels and sexual function disorders in depressive female patients: Effects of antidepressant treatment. J Sex Med 2014;11:529–535.**

Key Words. Depression; Women; Testosterone; Sexual Dysfunction; Antidepressant Treatment

Introduction

The prevalence of mood disorders increases during periods of changes in hormonal level, both in women and in men. There are significant differences between genders in terms of the prevalence, course, and treatment response of mood disorders [1].

Testosterone, which is commonly known as the male sex hormone, affects the behaviors and mood of both women and men [2]. In women, 60–70%

of testosterone is secreted from the adrenal gland and 25–40% is secreted from the ovaries. The daily production of testosterone in healthy young premenopausal women is approximately 300 µg/day, which is approximately 5% of the daily production levels in men [3]. Only 1–2% of total testosterone circulates unbound; the remainder is bound by sex hormone-binding globulin (SHBG) or albumin. The unbound (free) testosterone (FT) is biologically active [4]. FT levels can be calculated from total testosterone (TT) and immunoas-

sayable SHBG using a simple and rapid method under all conditions so far studied [5].

A progressive decrease in hypothalamic–pituitary–gonadal axis function is observed with increasing age in men, and the relation between depression and testosterone is more apparent in elderly men [6]. It has been demonstrated that testosterone administration in hypogonadic men has beneficial effects, including reduction of fatigue and nervousness and improvement of mood [7].

Although estrogen and progesterone have greater effects on the behaviors and mood of women, androgens such as testosterone also have important effects [8]. Conditions that lead to considerably lower testosterone levels in women, such as ovariectomy or menopause, are associated with depression; in addition, very high testosterone levels in women who have hirsutism or display antisocial behaviors may also result in depression. Similarly to its role in men, testosterone has substantial effects on regulation of sexual desire and sexual functions in women. Low levels of testosterone are associated with impairments in sexual arousal, libido, sexual responsiveness, genital sensation, and orgasm [9,10].

The purpose of this study was to assess the relationship between testosterone and depression pathophysiology in depressive women along with sexual function. We also investigated whether antidepressant treatment causes any change in levels of this hormone or in sexual function.

Methods

In this study, premenopausal women aged 18–45 years who were diagnosed with major depression according to the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders IV (DSM-IV TR) and who had not received any treatment were included as the patient group ($n = 64$), and premenopausal women aged 25–46 years with normal physical examinations who did not have any systemic disease or any history of drug use were included as the control group ($n = 30$). The patient group was selected from among patients who were admitted to the psychiatric polyclinic of Sakarya University Training and Research Hospital. Patients were screened by a psychiatrist using a Structured Clinical Interview for DSM-IV (SCID-1), which was structured according to DSM-IV TR criteria, and patients diagnosed with major depression were included in the study. During the patient follow-up, 6 patients

who could not be reached for their second examinations, 1 patient who was deemed at risk of suicide during the treatment and for whom electroconvulsive therapy was planned, 4 patients who requested to be excluded from the study, and 1 patient who became pregnant during the treatment were dropped from the study. The data of 52 patients who continued and completed the study were included in the final analysis.

The inclusion criteria for the patient group were as follows: (1) diagnosis of major depression according to the DSM-IV TR; (2) premenopausal and aged 18–45 years; (3) the cognitive capacity to comprehend the tests and instructions to be given and the ability to read and write. Inclusion criteria for the control group were as follows: (i) healthy volunteer aged 18–45 years; (ii) no psychiatric disorder; (iii) no misuse and/or dependence on alcohol or other substances; (iv) no known physical illness; (v) the cognitive capacity to read and comprehend the tests and instructions and the ability to read and write.

Exclusion criteria for the study were as follows: (i) postmenopausal; (ii) diagnosed with comorbid axis I or axis II disorder according to the DSM-IV TR; (iii) diagnosed with a somatic disease (hypertension, diabetes mellitus, or rheumatoid arthritis); (iv) presence of a hypothalamic–pituitary–adrenal axis or thyroid disease; (v) receiving medication that affects metabolism or hormone therapy; (vi) chronic medication; (vii) presence of an endocrine disease; (viii) presence of dementia or other organic mental disorders; (ix) use of oral contraceptives within the last month.

Data on the age, height, weight, educational level, marital status, methods of contraception, menstrual cycle duration, and smoking habits of the women in the patient group and the control group were recorded.

The study protocol was approved by the Ethics Committee of Sakarya University Medical Faculty. Those who agreed to participate in the study were informed about the purposes and the method of the study, and written consent was obtained. The 17-item Hamilton Depression Rating Scale (HDRS) was used, and those who obtained scores of ≥ 15 points were included in the study. The intensity of depression and sexual function disorders in patients was evaluated before the antidepressant treatment and 6 weeks after the treatment by measuring their serum testosterone and SHBG levels. Sertraline (50 mg) was used for antidepressant therapy in all patients. Depression rating was performed with the HDRS, and sexual function

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