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Original Article

The place of total testosterone in the etiology of pilonidal sinus disease

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Abstract

Aim: There are lots of factors accused in the etiology of SPSD. One of those factors is hypertrichosis. Hypertrichosis is increased by high levels of testosterone. In our clinical practices, we observe the secondary effects of high testosterone levels in those with SPSD. Hence, we intended to analyze the correlation between testosterone and SPSD.

Material and Methods: The first 200 patients who applied to General Surgery Clinic at Malatya State Hospital and were diagnosed with SPDS, were included in the study after being informed of our research and signing the informed consent form. The total testosterone (TT) levels of the patients were measured and recorded along with their demographic data. Also, a control group was formed of male and female patients without SPSD having the same demographic characteristics, whose TT levels were also subsequently recorded. The data from control and study groups were then compared and analyzed.

Results: Of the 200 patients included in the study, 43 (21.5%) were female and 157 (78.5%) were male. Their overall mean age was 24.13±7.04 years and the median age was 22 years (min:14- max:50). The male-to-female ratio was 3.65. The rate of females and males who had high levels of TT was significantly higher than that of the control group ($p<0.001$).

Conclusion: We recommend measuring serum TT levels of patients who apply to hospital for SPSD. SPSD might be the first visible ring of the chain of diseases characterized by high levels of TT.

Keywords: Etiological factors; pilonidal sinus disease; testosterone

INTRODUCTION

In today's context, Sacrococcygeal Pilonidal Sinus Disease (SPSD) was first introduced by the American surgeon Richard Manning Hodges (1). The term "pilonidal" used by Hodges in his paper published in Boston, is derived from the Latin words "pilus" (hair) and "nidus" (nest), which means hair nest when combined. SPSD starts in the natal cleft at 5 cm from the anus and is characterized by the sinus opening(s) which mostly extend(s) along the midline (2). Although it varies by region and community, SPSD is 3 to 5 times more common in males than in females (3). SPSD, which occurs most frequently between the ages of 20 and 25, first appears at the period when the glands start forming (4). There are widely differing results regarding the incidence of SPSD in different societies. However, there is broad agreement that its incidence gradually increases year after year (5). Although it has been a matter of debate for long years whether SPSD is hereditary or acquired, today a consensus has been reached that the disease is a chronic, acquired and infective disease of the cutaneous and subcutaneous tissue (6). The factors accused in the etiology of SPSD may include, but not limited to, poor aeration of the sacrococcygeal region, exposure to chronic trauma (history of extended cycling, horse-riding, off-road vehicle-riding), hard sitting surfaces, extended sitting hours, dark skin color, oily skin, excessive growth of body hair, poor personal hygiene, high body mass index (BMI) (7). Being one of the etiological factors, hypertrichosis occupies a prominent place in SPSD (8). Hypertrichosis is increased by high levels of testosterone. In our clinical practices, we observe the secondary effects of high levels of testosterone in those with SPSD. Hence, we intended to analyze the correlation between testosterone and SPSD.

MATERIAL and METHODS

The patients who applied to General Surgery Clinic at Malatya State Hospital for SPDS between the years 2013

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and 2016 were informed of our project. Having also informed the patients of the fact that participating (or not) in our study did not constitute a pre-requirement for and would in no way affect the treatment they would receive, we obtained the oral consents, followed by written informed consents, of the patients who agreed to participate in the study. We then measured the serum total testosterone (TT) levels of the first 200 patients who applied to the working group for SPSD and agreed to participate in the study. The control group included the patients who were admitted to our hospital and diagnosed with SPSD and whose serum TT levels were measured. Though, those who were referred from the endocrinology, gynecology and urology outpatient clinics were excluded from the control group. The serum TT level considered normal was 2.8-8 ng/ml for males and 0.06-0.82 ng/ml for females. Hence, we recorded those falling within these values as "normal", those below them as "low" and those above them as "high". In the study group, the patients with high or low serum TT levels were referred to the endocrinology outpatient clinic for consultation. Then, the results of male and female patients in the study group were compared with those of the control groups and subjected to an analysis.

Statistical Method

The numerical data were represented with mean-standard deviation, and the categorical data in "number-percent". During the comparison process, we used Pearson chi-square test and the exact chi-square test. In post-total test group comparisons, we used Bonferroni-corrected z-test. A level of 0.05 was considered significant. Also, analyzes were made using IBM SPSS Statistics for Windows version 25.0.

RESULTS

Of the 200 patients included in the study, 43 (21.5%) were female and 157 (78.5%) were male. Their overall mean age was 24.13±7.04 years and the median age was 22 years (min:14- max:50). The male-to-female ratio was 3.65 (Table 1).

The control group included 4036 females and 769 males. The mean age was 31.02±9.97 years in females and 33.35±8.78 years in males (Table 1).

Table 1. Age distribution of patients by gender and groups

Gender	Group	N	Mean	Std. Deviation	Minimum	Maximum
Female	Control	4036	31.02	9.97	15	49
	Patient	43	20.40	4.24	16	39
Male	Control	769	33.35	8.78	15	49
	Patient	157	25.15	7.32	14	50

In females, those with low levels of testosterone in the control group had a rate higher than those in the patient group, whereas the rate of those with high levels of testosterone in the patient group was higher, compared with the control group. No difference was found between patient and control groups in terms of the rate of those with normal levels of testosterone (Table 2).

Table 2. Comparison of testosterone levels in females

Testosterone level	Control	Patient	p
Low	804 (19.9)[a]	0 (0)[b]	
Normal	3193 (79.1)[a]	39 (86.7)[a]	<0.001
High	39 (1.0)[a]	6 (13.3)[b]	

*The percentages of testosterone level with different superscripts were found to differ between patient and control groups

In males, the differences between control and patient groups in terms of all testosterone level percentages were found statistically significant (Table 3).

Table 3. Comparison of testosterone levels in males

Testosterone level	Control	Patient	p
Low	384 (51.3)[a]	39 (25.2)[b]	
Normal	364 (48.7)[a]	115 (74.2)[b]	<0.001
High	0 (0)a	1 (0.6)b	

*The percentages of testosterone level with different superscripts were found to differ between patient and control groups

DISCUSSION

Although there have been debates on whether SPSD is congenital or acquired in the past years, a consensus has been reached today that it is an acquired, chronic and inflammatory disease (6). Having answered the questions on its being congenital and acquired, there are now many factors being accused in its etiology, such as excessive hair growth, bathing habits, extended sitting, obesity, exposure of the sacrococcygeal region to chronic trauma (extended horse-riding, cycling, off-road vehicle-riding, etc.), skin color, oily skin, etc. Some of these factors are

associated with disorders in the hormonal profile. With reference to this information, our study aims to investigate the correlation between high levels of testosterone, accompanied by excessive hair growth and increased seborrhea activity, and SPSD.

Our results from the study supported our hypothesis on the probability of a correlation between SPSD and high levels of TT. Both in females and males, the TT levels which were low in the control group were relatively higher in the study group ($p<0.001$). The high TT rate was higher in both females and males in the study group than those in the control group ($p<0.001$). Those results suggest that high TT levels may be one of the factors leading to SPSD.

The major factor limiting our study was the scarce number of studies conducted on this subject. In their study conducted with 39 patients, Özkan et al. investigated hormone levels in those with SPSD, and reported having found no correlation between serum testosterone level and SPSD in males in their results (9).

Even though there is no specific study on the correlation between SPSD and TT in the literature, there exist a limited number of studies on the serum testosterone level of hirsute women. In his study on women with hirsutism, Vidal-Puig reported that they had significantly high testosterone levels (10). However, in another study, Lobo et al. reported that they found no correlation between anagen hair growth and testosterone in hirsute women (11).

The increased sex hormones in adolescence lead to an increase in the pilosebaceous gland activity, which results in the occurrence of SPSD (12). TT contributes to this process by increasing hair growth and seborrhea activity. Harlak et al. informed in their study that the risk of SPSD incidence was 219 times higher in people who sit more than six hours a day and have two or less baths per week and are hirsute (13). Androgenic hormonal activity also plays a role in excessive hair growth, which is one of the risk factors set forth by Harlak et al. In their study conducted on 42 hidradenitis suppurative female patients, Mortimer et al. reported that the TT and sex hormone binding globulin levels of eight patients with SPSD were significantly high ($p<0.01$) (14). The study of Mortimer et al. supports the results we obtained in female patients.

However, there is a need for more extensive studies involving broader equivalent groups investigating the correlation between SPSD and the level of testosterone.

CONCLUSION

We recommend taking TT measurement for patients who are considered as masculine in terms of excessive hair, aggressive behavior, especially android pelvis and secondary sex characters in women who applied for SPSD. It should be noted that a high TT level may serve as the first visible sign of SPSD especially in female patients. Adopting a treatment to bring TT level within normal limits may contribute to deescalating or preventing the other adverse clinical conditions that occur and may occur with SPSD.

Conflict of interest: The authors declare that they have no competing interest.

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