Iranian J Publ Health, Vol. 33, No. 1, pp.10-12, 2004

A Study for Determination of Relationship between Serum Testosterone Concentration and Dermatophytosis due to *Epidermophyton floccosum*

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Abstract

Physiological mediators of human host such as androgenic hormones interfere pathogenic fungal growth. It has been revealed that the growth of yeasts as well as of dermatophytes is influenced by human androgenic hormones in vitro. In this reason for in vivo condition, the andrgenic hormones level must be measured in patients with dermatophytosis and healthy individuals. To this purpose we measured the levels of testosterone, androstendione dihydroepianderosterone sulfate (DHEA-S) of 46 male patients with dermatophytosis due to *Edidermophyton floccocosum* by ELISA method. After determination of mentioned hormone concentration in serum statistical analyses were conducted. Using SPSS for windows, version 10. The most important result in our study was the low serum testosterone concentration in patients with *Epidermophyton floccosum.* Therefore the measuring of this hormone in patients with chronic dermatophytosis can be useful in treatment and control the disease.

Keywords: *Androgenic, Hormones, Dermatophytosis, Testosterone*

Introduction

Physiological mediators of human host that interfere with pathogenic fungi are of particular interest in clinical mycology. An example for such mediators is steroid hormones (1). It was also showed that the growth of yeasts as well as of dermatophytes be influenced by steroidal hormones in vitro (2). Therefore the androgenic hormones level must be measured in patients with dermatophytosis that determine a difference between patients and healthy cases.

The discovery of fungal receptors for human hormones in recent decades (2, 3) has revealed new aspects of fungal pathogenesis. However it is still unclear why certain dermatophytes tend to cause infection in specific sites of the body. Although it is widely believed that the severity and location of dermatophytic infections depend on host specificity, the mechanism of this process is not fully understood. For this reason, we measured serum level of testosterone, androstendione, and dehydroepiandrosterone sulfate (DHEA-S) in male patients with dermatophytosis and in healthy men in order to determine the effects of sex hormones on dermatophytosis in vivo.

Materials and Methods

After examination by dermatologists the patients were admitted to the Medical Mycology Department in Tehran University of Medical Sciences, Tehran, Iran. The patients were sampled by the scraping of lesions. None of them had taken antifungal agent at least 2 weeks before sampling. All specimens were examined by KOH 10% and cultured on sabouraud dextrose agar containing cyclohexamide and chloramphenicol. A blood sample was also taking from each patient with dermatophytosis due to *E.floccosum* as well as healthy controls. The sera was dispersed immediately and then frozen at -20^{o}C in order to keep the serum stability. After the sampling was finished, the freezed sera were defrosted and the levels of testosterone, androsteadione and DHEA-S were measured in both groups by

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means of the enzyme linked immunosorbentassay (ELISA) method. Commercially available kits from DRG international, Ins. (New York, N.K., USA) were used.

The serum hormone levels of all groups were compared using student's T test. *P* values<0.05 were considered significant statistical analysis was performed by SPSS software for windows, version 10.

Result

The patient group consisted of 46 male patients, 20-40 years old with confirmed dermatophytosis caused by *E.floccosum*. The control group consisted of 30 age matched male volunteers with no pervious history of dermatophytosis. Table 1 shows the distribution of lesions in the 46 selected patients who showed positive culture yielding *E.floccosum*.

The serum concentration of the tested hormones is shown in Table 2. The mean concentration of testosterone in patients with *E.floccosum* were 5.51ng/ml (+1.39), respectively. Our results show that testosterone levels were significantly lower in patients with *E.floccosum* than in healthy controls (*P*<0.01) (Table2). However no differences in androstendione and DHEA-S levels were noted between the patient group and the healthy cases.

Table 1: Distribution of isolated *E.floccosum* based on the site of infection

Site of lesion	positive cultures for *E.floccosum*	
	No.	%
Groin	45	97.8
Foot	1	2.2
Total	46	100

Table 2: Mean serum concentration of androgenic hormones in male patients with dermatophytosis and in healthy individuals

Groups	Serum hormone concentration					
	Testosterone		Dehydroepiandrosterone sulfate		Androstendione	
	Mean (ng/ml)	SD	Mean (g/ml)	SD	Mean (ng/ml)	SD
E. floccosum	5.51	1.39	2.26	1.23	1.02	1.03
Control	7.35	1.42	2.97	1.20	1.06	0.75

Discussion

Our results show that the testosterone level of serum in patients with dermatophytosis due to *E.floccosum* without androgenic disorder was significantly lower than those of normal subjects (*P*<0.01). Salemo, and Schirren isolated *E.floccosum* from patient with androgenic disorder (3). On the other hand Brasch showed the human androgenic steroids inhibitory effect on growth of *E.floccocum* and *T.rubrum* in vitro, so these studies support our findings (4). Androgenic hormones are present within the pilosebaceous units of human skin have different inhibitory effects on the growth of some dermatophytes (5). On the other hand these hormones are metabolized within human follicular tissue, therefore it may be speculated that they might influence the colonization of hair follicles by dermatophytes (6). The most important metabolic pathway of androgenic hormones in skin was done with activity of 5-α-reductase witch metabolized the testosterone to dihydrotestosterone (7, 8). Dihydrotestrosterone has a low inhibitory effect on dermatophytes (9, 10). The skins from groin contain a much higher activity of 5- α-reductase. In most cases of dermatophytosis *E.floccosum* was isolated from groin; therefore the high activity of 5- α-reductase in skin region from the groin

can be a hypothesis for the high affinity for colonization of this dermatophyte in groin.
Hence low testosterone concentration not only plays a role in the pathophysiology of some complications but it may also be considered a predisposing factor for tinea specially cruris. We suggest that there might be a relation between the low serum teslosterone levels seen in patients with dermatophytosis caused by *E.floccosum* and susceptibility to tinea cruris. This hypothesis gained strength because of the fact that serum testosterone level was significantly lower in patients with dermatoputosis caused by *E.floccosum* than in healthy controls.

Acknowledgements

The authors are thankful to Dept. of Biochemistry, Iran University of Medical Sciences, Tehran, Iran.

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