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Evaluation of skin disorders, skin sebum and moisture in patients with Parkinson's disease

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Abstract

Background: Parkinson's disease is a neurodegenerative disease characterized by motor and nonmotor symptoms. Skin manifestations may be seen in patients due to autonomic dysfunction or iatrogenic reasons. In this study, we aimed to identify various skin disorders and compare the skin sebum and moisture percentages in patients with Parkinson's disease with healthy controls. *Methods:* Forty patients with Parkinson's disease and 40 healthy controls were included in the study. Dermatological history of the patients and dermatological examination were recorded. A portable pen-shaped LCD Display Digital Skin Moist Oil Analyzer (Reyoung-Beauty, Guangdong, China) was used to measure the sebum and the moisture in the skin. *Results:* In this study, the skin disorders consisted of acneiform and sebum related changes, seborrheic dermatitis, anterolateral leg alopecia, and angular cheilitis, bullous pemphigoid and melanoma. Increased sweating and seborrhea were frequent complaints. While skin sebum content was significantly higher in patients compared to the control group, skin moisture did not differ significantly between the groups. Cutaneous malignancy or iatrogenic skin disorders were not detected in any patient.
Conclusion: Parkinson's disease is associated with increase in sebum content of the skin as well as other dermatoses.

Keywords: Parkinson's disease, skin sebum and moisture percentages, skin disease

INTRODUCTION

Parkinson's disease (PD) is a neurodegenerative disease characterized by selective loss of dopaminergic neurons, affecting approximately 0.3% of the population in western countries.[1] Tremor at rest, rigidity and akinesia are motor symptoms associated with the disease. In addition, it is known that non-motor symptoms such as sleep disorders, constipation, bladder problems, sialorrhea (excessive salivation), depression, apathy, fear, anxiety and cutaneous disorders are associated with the disease and may precede the overt motor manifestations.[2] In PD, skin disorders can appear due to autonomic dysfunction and iatrogenic causes. Excessive sweating, excessive sebum excretion, scaly skin and hypersalivation are common non-motor complaints associated with autonomic dysfunction.[3] Skin disorders such as seborrheic dermatitis, hyperhidrosis, malignant melanoma and bullous pemphigoid are reported to be common in patients with PD.[4,5] In this study, we aimed to compare the skin disorders, sebum and moisture percentages in patients with PD, and to compare them with healthy controls.

METHODS

The approval of Ethics Committee was obtained for this study. Forty patients with PD over the age of 18 and 40 healthy controls with no known systemic or dermatological diseases were included in the study. Patients were diagnosed with PD based on the criteria of The United Kingdom Parkinson's Disease Society Brain Bank and was staged according to Hoehn Yahr clinical staging scale by a neurologist.[6] Information on patient demographics, duration of disease, current treatments, systemic comorbidities, known dermatological diseases, increase or decrease in sweating, sebum excretion and history of malignant neoplasms were obtained. Patients were examined by dermatologist for angular cheilitis, skin type, seborrheic dermatitis, anterolateral leg alopecia, presence of fungal, bacterial and viral skin infection, acneiform or sebum-related changes (comedones, pustules, nodules, seborrheic keratosis, sebaceous hyperplasia, xanthelesma,

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and lipomas), and cutaneous malignancies. The findings were recorded.

It was preferred that the patients did not use moisturizing cream, sunscreen and concealer creams or use a coarse bath-glove in the bath/ shower at least one day prior to the measurement of skin moisture and sebum. On the day of the measurement, they were asked to wash their face with tap water only once, and not to use cleansing products such as washing gel, tonic and soap.

A portable pen-shaped LCD Display Digital Skin Moist Oil Analyzer (Reyoung-Beauty, Guangdong, China) was used to measure the sebum and the moisture in the skin. Four different measurements were taken from the face in the glabella, forehead and scalp hairline regions and from both maxillary regions. The mean scores were recorded. The measurement was made by placing the probe on the bare skin for a few seconds at room temperature. The percentages of sebum and moisture were recorded. After each application, the probes were wiped with soft cloths soaked in alcohol.

SPSS v.17.0 package program was used for statistical evaluation of obtained data in study (SPSS Inc, Chicago, Illinois, USA). While continuous data were summarized as mean, standard deviation, categorical data were summarized in terms of number and percentage. Chi-square test was used to evaluate the relationship between two categorical variables. Pearson correlation test was used to evaluate the relationship between two continuous variables. Independent T test was used to compare continuous variables between groups. P values below 0.05 were considered statistically significant.

RESULTS

Table 1 shows the demographic and clinical characteristics of patients with PD, and Table 2 shows the skin disorders detected in patients and control group. Table 3 shows the comparison of age, gender, BMI and sebum and moisture

Table 1: Demographic and clinical characteristics of PD patients

Gender %(n)	
Male	65 (26)
Female	35 (14)
Average age of patients (year)	63.6 ± 9.5 (min-max:43-81)
Mean disease duration (month)	60.9±53.4 (min-max:1-180)
BMI* (kg/m^2)	29.4±5.8 (min-max:16.5-40.9)
Disease severity(Hoehn Yahr Stage)	2.12±0.72 (min-max:1-3.5)
Skin disease %(n)	
No known skin disease	75 (30)
Eczema	12.5 (5)
Other (pruritus, chronic lymphedema, allergy,stasis dermatitis)	12.5 (5)
Systemic disease %(n)	
No known systemic disease	30 (12)
Hypertension	37.5 (15)
Diabetes mellitus	7.5 (3)
Diabetes mellitus, hypertension and heart disease	15 (6)
Other (hypotension, familial mediterranean fever, hepatitis, thyroid gland disease)	10 (4)
Received treatments%(n)	
Levodopa/ carbidopa/ entacopine	45 (18)
Levodopa/ benserazide	32.5 (13)
Rasagiline	10 (4)
Pramipexole	5 (2)
Ropinirole	5 (2)
Amantadine	2.5 (1)

* BMI:Body mass index

Table 2: Skin disorders in patients with Parkinson's disease and control group

Skin disorders	Parkinson's Disease Group %(n)	Control Group %(n)
Sweating		
Increase in sweating	62.5 (25)	0 (0)
Reduction in sweating	2.5 (1)	0 (0)
No change	35 (14)	100 (40)
Seborrhea	40 (16)	12.5 (5)
Angular cheilitis	42.5 (17)	0 (0)
Skin type		
2	30 (12)	25 (10)
3	35 (14)	35 (14)
4	35 (14)	40 (16)
Cutaneous malignancy	0 (0)	0 (0)
Seborrheic dermatitis	52.5 (21)	0 (0)
Anterolateral leg alopecia	52.5 (21)	0 (0)
Acneiform or sebum related changes	65 (26)	20 (8)

percentages in the skin between patients with PD and the control group. Table 4 demonstrates the correlation between sebum and moisture percentages in the skin and disease duration, disease severity and age in patients with PD.

DISCUSSION

Neural and epidermal tissues originate from ectoderm and have a common embryological origin. Therefore, the skin is a promising source to identify biomarkers for neurodegenerative diseases.[7] In this study, the skin disorders consisted of acneiform and sebum related changes, seborrheic dermatitis, anterolateral leg alopecia, and angular cheilitis. Increased sweating and seborrhea were frequent complaints. Cutaneous malignancy or iatrogenic skin disorders were not detected in any patient.

The incidence of PD is 2 times higher in males than in females.[8] Consistent with the literature, 65% of the cases in this study were male. The incidence of disease increases in the seventh and eighth decade.[9] In our study, the mean age of the PD patients was 63.6 years.

It was reported that seborrheic dermatitis was detected in 52-59% of the patients with PD.[10] Seborrheic dermatitis is a chronic inflammatory skin disease that affects about 1% to 3% of the

Table 3: Comparison of age, gender, BMI and sebum and moisture percentages of patients with Parkinson's disease and control group

	Parkinson's Disease Group (n=40)	Control Group (n=40)	*p*
Age (year)	63.6±9.5	60.0±7.9	0.072**
Gender			
Female	14 (35%)	13 (32.5%)	0.813***
Male	26 (65%)	27 (67.5%)	
BMI (kg/m^2)	29.4±5.8	26.5±4.6	0.018**
Skin sebum percentage	38.6±4.7	35.9±3.9	0.006**
Skin moisture percentage	24.4±3.2	24.7±3.7	0.770**

*BMI: Body mass index
**Student t test was used.
***Chi-square test was used

Table 4: Relationship between skin sebum and moisture percentage and disease duration, disease severity, and age in patients with Parkinson's disease

	Disease duration	Disease severity**	Age
Skin sebum percentage	r = 0.068 p*= 0.677	r = 0.103 p*= 0.526	r = 0.128 p*= 0.257
Skin moisture percentage	r = 0.039 p*= 0.809	r = -0.029 p*= 0.857	r = 0.110 p*= 0.331

*Pearson correlation test was used.
**Hoehn Yahr Stage was used.

general population. It mainly affects seborrheic areas such as the scalp, face, hairline, eyebrow, glabella, nasolabial folds, presternal and interscapular regions.Increase in sebum excretion and proliferation of Malassezia yeasts contribute to the development of seborrheic dermatitis.[11] A study revealed that the sebum excretion increased in patients with PD, which lead to seborrheic dermatitis as a result of an increase in the number of yeasts and enzyme production.[12] In this study, seborrheic dermatitis was found in 52.5% of the patients with PD . Sebum and moisture percentages in the skin was significantly higher in patients compared to the control group. 40% of patients with PD reported an increased sebum in the skin after they got the disease. Acneiform or sebum related conditions such as comedones, pustules, nodules, seborrheic keratosis, sebaceous hyperplasia, xanthelesma and lipoma were detected in 65% of cases. The most common conditions were seborrheic keratosis (37.5%) and sebaceous hyperplasia (15%) respectively.

The aging process results in dry skin due to the decrease in the secretion of sebaceous and sweat glands.[13] In this study, there was no significant correlation between age and skin sebum and moisture percentages. This was attributed to the fact that the patients with PD and those in the control group were in an advanced and limited age range. In patients with PD, non-motor and motor symptoms may appear simultaneously; or they may also be present years earlier.[2] In this study, the absence of a significant correlation between sebum and moisture percentages in the skin and duration and severity of the disease was attributed to the fact that the patients were mostly diagnosed after the onset of motor symptoms.

It is known that about half of the patients with PD have sweating disorders. Sweating disorder refers to a decrease or increase in sweating. Patients experience excessive sweating in the form of attacks without any stimulus such as fever, physical strain and increased external temperature. It often occurs at night, in the face and upper trunk, to the extent where patients need a change of clothes. A decrease in sweating was also reported in some patients.[14] In this study, 62.5% of the patients had complaints of increased sweating, and 1 patient had decreased sweating. The high rate of sweating disorders in this study may partly be due to sweating being assessed subjectively. We are of the opinion that there was no significant difference in sebum and moisture percentages in the skin between the groups because sweating occured in the form of attacks and the sebum and moisture were measured in the stable period.

Sialorrhea is among non-motor symptoms affecting 32% to 74% of patients with PD. It has been reported that saliva production is lower in PD patients compared to healthy controls, and that sialorrhea is associated with the disorders in the coordinated activity of orofacial and palatolingual muscles.[15] Angular cheilitis refers to an acute or chronic inflammatory state of the skin at the corner of the mouth and adjacent lip mucosa. Sialorrhea may facilitate the formation of cheilitis by causing maceration around the mouth.[16] In this study, angular cheilitis was detected in 42.5% of the cases during dermatological examination.

Anterolateral leg alopecia refers to symmetrical and limited hair loss on the anterior and lateral aspect of lower legs. The incidence rate of anterolateral leg alopecia was reported to be 35% in males.[17]Autoimmune diseases, peripheral vascular disease and thyroid dysfunction are potential causal factors.[18] In this study, 60% of PD had a history of hypertension, diabetes and/or heart disease associated with vascular diseases. Anterolateral leg alopecia was detected in 52.5% of the patients during dermatological examination. It was surprising that the incidence of anterolateral leg alopecia and seborrheic dermatitis was both commonly seen in PD. This indicated the necessity of being alert for other vasculopathic dermatological changes in this patient group.

The patients in the study were questioned and examined for dermatological malignancies. There

were no history of dermatological malignancies or no suspicious lesions in the examination. PD was reported to be associated with melanoma for the first time in 1972 when a patient was treated with levodopa, in which levodopa served as a substrate for dopamine and melanin synthesis.[19]In a review by Ferreria *et al*., in which the correlation between skin cancer and PD was investigated, it was found that the prevalence of melanoma and non-melanoma skin cancers was higher compared to the general population.[20] The absence of cutaneous malignancies in this study could be due to the limited number of patients and low risk of melanoma.

Specific treatment methods, such as skin patches, subcutaneous administration of apomorphine, application of levodopa intestinal gel through percutaneous endoscopic gastrostomy and implantation of deep brain stimulation, anticholinergic medications (e.g. biperiden, bornaprin) may be associated with iatrogenic skin lesions in patients with PD.[3] In this study, there was no invasive procedure performed on any of the patients. None of the patients had iatrogenic cutaneous disorders, and the current findings were associated with autonomic dysfunction, which is an important component of the disease. As a result of this study, it was concluded that PD, a neurodegenerative disease, was associated with sebum excretion in the skin and some dermatoses, which should be taken into consideration during patients' overall examination.

The color of human skin is determined by the amount of melanin contained in the skin, the color of melanin (eu-melanin or pheo-melanin), blood circulation and other endogenous and exogenous pigments. According to Fitzpatrick, the skin types were divided into 6 groups according to the tanning capacity of the skin in the sun. Forexample, those with skin type 1 have a lightivory skin color and always burn when exposed to the sun and never tan.Those with skin color type 6 have a black complexion and never burn when exposed to the sun and quickly tan.[21] The skin types of all cases included in this study were 2,3 and 4 (Table 2). This may be related to the limited ethnic diversity in the study population.

DISCLOSURE

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