Original Article

Comparison of Skin Findings on Both Sides of the Body in Patients with Hemiplegia and Hemiparesis

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Abstract

Aim: It has been reported that some dermatological diseases have a different course on the hemiplegic/hemiparasic side oft he body. We aimed to determine which skin diseases are common in hemiplegic/hemiparasic patients and whether there are differences between the skin findings on both sides.

Materials and Methods: Between March 2022-March 2023, 51 patients with a history of hemiplegia/hemiparesis longer than 6 months were evaluated. The patient group was based on data from the hemiplegic/hemiparesic side of the patients, and the control group was based on data from the healthy side. Demographic features of the patients and the characteristics of their neurological diseases were recorded. Dermatological findings of the healthy side and the hemiplegic/hemiparesic side of the patients were recorded seperataly and compared statsitically with chi-square tests. A value of $P < 0.05$ was considered significant.

Results: Of the total 51 patients, 23 (45.1%) were female and 28 (54.9%) were male with a mean age of 65.00±11.38 (41-85). Skin findings were detected in 46 (90.2%) patients; no dermatological pathology was detected in 5 (9.8%) patients. Xerosis and onychomycosis were detected most frequently and were located symetrically. For all skin findings there was no statistically significant difference between the healty side and hemiplegic/hemiparesic side of the body in the course and localisation of all skin findings ($P > 0.05$).

Conclusion: Although we could not detect a significant difference between the healthy and hemiplegic/hemiparesic side of the body, hypotrichosis, cyanosis, and stasis dermatitis were found exclusively on the hemiplegic/hemiparesic side, while psoriasis lesions were more prominent on the intact side.

Keywords: Hemiplegic, hemiparesic, xerosis, psoriasis, hypotrichosis, cyanosis, stasis dermatitis

Introduction

Hemiplegia is a neurological disorder characterized by a complete loss of muscle strength, and hemiparesis is a partial loss of muscle strength in one half of the body. Both conditions usually occur as a result of an acute hemorrhagic or ischemic cerebrovascular event.[1] Alterations in cutaneous blood flow and autonomic functions may also occur on the hemiplegic/hemiparetic side of the body.[2-4] In addition, due to loss of motor function, difficulties with self-care may be observed. Inability to clean the skin adequately and moistness of the fold areas may cause hygienic problems. Besides these loss of sensation can also change the course of skin diseases. In fact, it has been observed that there are differences in the course of some skin diseases in patients with hemiplegia/hemiparesis.[2-14]

Submission: 16-Dec-2024 **Web Publication:** 04-Jun-2025
Acceptance: 04-Jan-2025

Access this article online

Quick Response Code:

Website: www.turkjdermatol.com

DOI: 10.4274/tjd.galenos.2025.98852

It was presented on September 8, 2023, in the VIII. Dermatooncology Agenda, in Van, Türkiye. Page:28

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How to cite this article: Çifci N, Aktürk AŞ, Yılmaz Z, Mülayim S, Açıkbaş E, Sade SI, Baydemir C. Comparison of skin findings on both sides of the body in patients with hemiplegia and hemiparesis. Turk J Dermatol. 2025;19(2):74-79.

In previous case reports, bullous pemphigoid, clubbing of fingers, scabies, some endogenous eczemas, and tinea versicolor lesions have been reported only on the hemiplegic/hemiparesic side or to be more prominent on that side.[5,6,8,9,13,14] In some case reports of patients with scleroderma and psoriasis, the lesions were reported on the healthy side.[7,10]

Since the research and case reports on this subject are limited in number, we conducted this study to evaluate which skin diseases are more common in hemiplegic/hemiparesic patients and whether there is a clinical difference between the hemiplegic/hemiparesic side and the intact side of the body. We aimed to achieve an early diagnosis and treatment opportunity, and to improve the quality of life for patients by determining the dermatological diseases that may occur in hemiplegic/hemiparasic patients.

Materials and Methods

Our research was planned and conducted by the Dermatology, Neurology, and Physical Therapy and Rehabilitation (PTR) clinics at Kocaeli University Faculty of Medicine (KOU-FM) and Kocaeli Derince Education and Research Hospital.

This research is a descriptive prospective study, and data collection started after approval was obtained from the Clinical Research Ethics Committee of Kocaeli University (approval number: 2022/05.03, date: 04.03.2022). A total of 51 hemiplegia/hemiparesis patients who were admitted to Neurology, PTR, and Dermatology outpatient clinics were included in the study. Between March 2022-2023, patients with a history of hemiplegia/hemiparesis for more than 6 months were included, and patients with neurological diseases with a duration of less than 6 months were excluded from the study. Demographic characteristics of the patients, comorbidities, characteristics of neurological diseases and dermatological findings were recorded on the patient examination forms. Detailed examinations, including microscopic examination and dermatoscopy, were performed if needed. Skin findings of the healthy side and the hemiplegic/hemiparesic side of the patients were recorded separately. The patient group was formed with the data obtained from the hemiplegic/hemiparesic body side, and the control group was formed with the data obtained from the healthy side of the same patients. Dermatological findings of the healthy side and the hemiplegic/hemiparesic side of the patients were compared statsitically

Statistical analysis

Statistical evaluation was performed using the IBM SPSS 20.0 (IBM Corp., Armonk, NY, USA) package program. In order to determine the sample size of the study, the G*Power version 3.1.9.2 (Kiel University, Kiel, Germany) package program was used. In the power analysis, the values of "alpha = 0.05, Beta = 0.90, effect size = 0.65 " were used, and accordingly, the number of patients was determined at least 51. Numerical variables were given as mean ± standard deviation and frequency (percentages). Fisher's exact chi-square test, Yates' chi-square test, and Monte Carlo chi-square test were used for categorical variables in order to evaluate the differences between the groups. A value of $P < 0.05$ was considered statistically significant.

Results

The ages of the 51 patients, were between 41 and 85 (65.00 ±11.38). Twenty-three of our patients (45.1%) were women, 28 (54.9%) were men, and there was no statistically significant difference in distribution ($P = 1$). Twenty-six (51.0%) patients had hemiparesis, 25 (49.0%) patients had hemiplegia, and the neurological deficit was on the right side in 26 (51.0%) patients and on the left side in 25 (49.0%) patients. The distributions were statistically similar ($P = 1$). The duration of hemiplegia/hemiparesis was determined as 6 months-1 year in 22 (43.1%) patients, 1-2 years in 5 (9.8%) patients, and > 2 years in 24 (47.1%) patients. The cause of hemiplegia/hemiparesis was an ischemic event in 38 (74.5%) patients and a hemorrhagic event in 23 (25.5%) patients ($P = 1$). Demographic features, characteristics of neurological deficit and comorbidities of patients are seen in Table 1.

According to the results of dermatological examination, there were no skin lesions in 5 (9.8%) patients. Onychomycosis and xerosis were detected most frequently in the whole group. Psoriasis vulgaris, pigmented purpuric dermatosis, stasis dermatitis, rosacea, scabies, oral candidiasis, anogenital warts, actinic keratosis and onychogryphosis were present in only 1 patient (1.9%). No dermatological pathology was detected in 5 patients (9.8%). Other dermatological findings according to the order of frequency are seen in Table 2.

The comparison of skin findings according to their localization on both sides of the body is seen in (Table 3). It was observed that the difference between the healthy side and the hemiplegic/hemiparetic side was not statistically significant ($P > 0.05$). There was also no significant relationship between the duration of the disease and dermatological findings of the patients ($P = 1$).

The distribution of skin findings on the hemiplegic/hemiparetic and healthy sides is seen in Table 4. Xerosis was located symmetrically in all patients, and onychomycosis was located symmetrically in 81.5% of them. Hypotrichosis, cyanosis, and stasis dermatitis were detected only on the hemiplegic/hemiparetic side of the patients. In most of the

contact dermatitis patients (75%), lesions were detected on the hemiplegic/hemiparesic side of the body. Psoriasis lesions were present on both sides, but were more prominent on one side. Erythema ab igne was seen in two patients. In 1 patient, it was seen only on the hemiplegic side of the body, but in the other patient, it was seen on both sides of the body but more prominent on the hemiplegic side.

Table 1. Demographic features, characteristics of neurological damage and comorbidities of patients

Number of patients (n)	**51**
Age (mean ± SD)	(41-85) 65.00±11.38 year
Female/male, n (%)	23 (45.1%)/28 (54.9%)
Neurological damage; hemiparesis/ hemiplegia, **n (%)**	26 (51.0%)/25 (49.0%)
Damaged body side; right/lef, **n (%)**	26 (51.0%)/25 (49.0%)
Duration of neurological damage, **n (%)** 6 month-1 year 1-2 year > 2 year	 22 (43.1%) 5 (9.8%) 24 (47.1%)
Cause of neurological damage, **n (%)** Ischemic event Hemorrhagic event	 28 (54.9%) 23 (45.1%)
Comorbidities, **n (%)**	
Hypertension	39 (76.5%)
Diabetes mellitus	17 (33.3%)
Coronary artery disease	11 (21.6%)
Rhythm disorders	8 (15.7%)
Hyperlipidemia	6 (11.8%)
HeaRt failure	2 (3.9%)
Hypothyroidism	2 (3.9%)
Chronic obstructive pulmonary disease	1 (2.0%)
No comorbidity	5 (9.8%)

SD: Standard deviation

Table 2. Skin findings of patients

Skin findings	**Number of patients n (%)**
Onychomycosis	27 (52.9)
Xerosis	19 (37.2%)
Tinea pedis	5 (9.8%)
Hypotrichosis	5 (9.8%)
Seborrheic keratosis	5 (9.8%)
Lentigo	5 (9.8%)
Seborrheic dermatitis	4 (7.8%)
Contact dermatitis	4 (7.8%)
Cherry anjıoma	4 (7.8%)
Cyanosis	3 (5.8%)
Erythema intertrigo	3 (5.8%)
Erythema ab igne	2 (3.9%)

Discussion

As a result of the cerebrovascular hemorrhagic or ischemic events, changes in the motor, sensory, autonomic nervous system functions may occur on the hemiplegic/hemiparesic side of the body, and the alterations in neurological functions may change the clinical course of skin diseases.[2,5-14] In our study, there was no statistically significant difference between the healthy and hemiplegic/hemiparesic side of the body, but it was remarkable that some dermatological findings such as hypotrichosis, cyanosis, stasis dermatitis, were found to be located only on the hemiplegic/hemiparesic side and psoriasis lesions were more prominent on the healthy side.

In a previous study with hemiplegia/paraplegia patients, tinea pedis, onychomycosis, xerosis, and hypotrichosis of the lower extremities were reported as most commonly observed skin findings, and it was reported that the duration of neurological damage had no effect on the occurrence of these conditions. According to this study, limb edema was reported to be only on the hemiparesic side and other dermatological findings were reported as bilaterally located.[11] In another study, it was reported that endogenous eczema, such as nummular dermatitis, dyshidrotic dermatitis, Id reaction, and atopic dermatitis, were found on the neurologically damaged side.[9] Similarly, in a case

Table 3. The comparison of skin findings according to their localization on both sides of the body

Dermatological finding	**Number of patients n (%)**		***P***
	Hemiparesic/ hemiplegic side	**Intact side**	
Onychomycosis	27 (52.9%)	23 (45.1%)	0.693
Xserosis	19 (37.3%)	19 (37.3%)	1
Tinea pedis	5 (9.8%)	4 (7.8%)	1
Hypotrichosis	5 (9.8%)	0	0.056
Seborrheic keratosis	5 (9.8%)	3 (5.9%)	0.715
Lentigo	5 (9.8%)	5 (9.8%)	1
Seborrheic dermatitis	4 (7.8%)	3 (5.9%)	1
Chery anjioma	4 (7.8%)	3 (5.9%)	1
Contact dermatitis	3 (5.9%)	1 (1.9%)	0.617
Erythema intertrigo	2 (3.9%)	3 (5.9%)	1
Cyanosis	3 (5.9%)	0	0.243
Erythema ab igne	2 (3.9%)	1 (1.9%)	1
Psoriasis vulgaris	1 (1.9%)	1 (1.9%)	1
Pigmented purpuric dermatosis	1 (1.9%)	1 (1.9%)	1
Stasis dermatitis	1 (1.9%)	0	1
Rosacea	1 (1.9%)	1 (1.9%)	1
Scabies	1 (1.9%)	1 (1.9%)	1
Anogenital wart	1 (1.9%)	1 (1.9%)	1
Actinic keratosis	1 (1.9%)	1 (1.9%)	1
Onychogryphosis	1 (1.9%)	1 (1.9%)	1

Table 4. Localisation of skin findings

Skin finding	Unilateral		Bilateral	Total
	Healthy side	Hemiplegic/ hemiparesic side		
Onychomycosis	**1**	**3**	22	27
Xerosis	**0**	**0**	19	19
Tinea pedis	**0**	**1**	4	5
Hypotrichosis	**0**	**5**	0	5
Seborrheic Keratosis	**0**	**2**	3	5
Lentigo	**0**	**0**	5	5
Seborrheic Dermatitis	**0**	**1**	3	4
Contact Dermatitis	**1**	**3**	0	4
Cherry angioma	**1**	**0**	3	4
Erythema intertrigo	**1**	**0**	2	3
Cyanosis	**0**	**3**	0	3
Erythema ab igne*	**0**	**1**	1	2
Oral candidiasis	**0**	**0**	1	1
Scabies	**0**	**0**	1	1
Anogenital verru	**0**	**0**	1	1
Rosacea	**0**	**0**	1	1
Stasis dermatitis	**0**	**1**	0	1
Actinic keratosis	**0**	**0**	1	1
Pigmented purpuric dermatosis	**0**	**0**	1	1
Onychogryphosis	**0**	**0**	1	1
Psoriasis*	**0**	**0**	1	1

*Bilaterally located lesions are more prominent on the hemiplegic/hemiparesic side of the body

report, the bullous pemphigoid lesions of a hemiplegic patient were found to be more prominent on the hemiplegic side.[5] In addition, there was a case report describing a patient with severe motor-sensory loss where scabies lesions were located only on the hemiparetic side.[8] For seborrheic dermatitis, there were two studies but the results were contradictory. Thomas et al.[12] measured the sebum production in paraplegic patients and they reported that there was no difference. However, Burton et al.[13] had reported that, sebum production decreased on the neurologically damaged side of the body and they tought that it may be due to alterations in the sympathetic innervation. On the other hand, there was only one case report about psoriasis in the literatüre and the lesions were reported as located only on the healthy side of the body.[10] We also previously reported a case in which tinea versicolor lesions were located bilaterally but were more prominent on the hemiparesic side of the body.[1]

In our current research, onychomycosis was observed most frequently, and xerosis, tinea pedis, hypotrichosis followed it, respectively. We also observed that there was no relation between the duration of neurological deficit and the features of the dermatological findings. The main goal of our study was to compare the healthy side and the neurologically damaged side. When all the skin findings of our patients were evaluated, there was no significant difference between the two sides of the body. Oral candida, anogenital verrucae, rosacea, actinic keratosis, pigmented purpuric dermatosis, and onychogryphosis were present in only one patient, and all were located symmetrically. However, in our patients, hypotrichosis, cyanosis, and stasis dermatitis lesions were all located on the neurologically damaged side. We thought that this could be explained by decreased blood flow and immobilization.

On the other hand, our study found no statistically significant difference in the clinical course and localization of seborrheic dermatitis. This result is compatible with Thomas et al.[12], but not compatible with Burton et al.[13]

For contact dermatitis, there were history of disinfectants and cologne usage in our patients. We thought that the localisation of contact dermatitis lesions is because of these chemicals and is not related to neurological damage.

In our study group, there was only one patient with psoriasis vulgaris. The patient presented with mild hemiparesis and slight loss of sensation on the hemiparesic side. His lesions were localized on both sides, but they were more prominent on the intact side. We thought that there were more lesions on the intact side because of the itching-induced Koebner phenomenon. On the other hand, there was only one case report about psoriasis in the literature. The lesions were reported as located only on the intact side of the body.[1] There was no sensation loss on either side of this patient, and there was friction due to the prosthesis on the hemiparetic side. Despite this, it has been reported that the lesions were seen on the healthy side and not on the hemiparesic side. So they thought that this may be due to other unexplained cortical factors.[10] So we also thought that Koebner phenomenon for psoriasis lesions may have an effect on the localization and amount of lesions, but these differences cannot be explained only by the Koebner phenomenon.

We detected scabies in only 1 patient, and in this hemiplegic patient, the lesions were symmetrically located. There was a case report of a patient with severe motor-sensory loss, indicating that scabies lesions were located only on the hemiparesic side.[8] For this case, Speight[8] thought that mechanical trauma such as itching reduces the parasite load, but since there is no itching sensation and exposue

to mechanical trauma in this patient, the parasite continues to increase on that side. They also reported that the patient was wearing gloves because the hand on the hemiparetic side was cold. So they thougt that severe motor loss of the hemiparesic hand and gloves wearing may avoided the spread of the parasite to the opposite side by scratching.[8] Although our patient was hemiplegic, the lesion distribution was symmetrical and we thought that this was because scabies is an easily transmitted parasitic infection.

Erythema ab igne was observed in 1 patient only on the hemiparesic side and in 1 patient on both sides, but it was more prominent on the hemiparesic side. Erythema ab igne occurs as a result of hot contact and may be more prominent on the side where the heat application is more intense. So, we thought that decreased blood flow and motor function may lead to coldness of extremities, longer lasting hot application may lead to erythema ab igne lesions on the hemiplegic or hemiparetic side of the body. In addition, due to the loss of sensation, the patient may have kept the hot application for a long time because he could not feel the excess heat on the hemiplegic side.

Study Limitations

We believe that the number of patients in our study was insufficient. This was our major limitation. Our results were not statistically significant due to the limited number of patients within the subgroups having dermatological findings.

Conclusion

We observed that onychomycosis, xerosis, tinea pedis, and hypotrichosis are common in hemiplegic/hemiparetic patients.

Most of the dermatological findings were located symmetrically, but hypotrichosis, cyanosis, and stasis dermatitis lesions were all located only on the neurologically damaged side.

In patients with hemiplegia/hemiparesis, skin diseases may show a different clinical course due to decreased blood flow, alterations in the autonomic nervous system, and changes in the motor-sensory functions.

For dermatological diseases, if not diagnosed and treated, there may be importent complications Dermatological findings such as stasis dermatitis, hypotrichosis and cyanosis are important because they can indicate circulatory disorders. Erythema ab igne can be precancerous; it should be diagnosed early; patients and their relatives should be educated about hot applications. It is also important to monitor immobile patients for secondary fungal infections. So routine dermatological examination should be performed in patients with hemiplegia and hemiparesia to prevent the complications

The most important limitation of this study is the small number of cases. Therefore, we believe that there may be statistically significant differences if more patients are included in the study. Larger research should also be conducted for each dermatological finding specifically, especially, for stasis dermatitis, hypotrichosis, cyanosis, erythema ab igne, psoriasis vulgaris and seborrheic dermatitis, to describe their etiopathogenesis more clearly.

Ethics

Ethics Committee Approval: This research is a descriptive prospective study, and data collection started after approval was obtained from the Clinical Research Ethics Committee of Kocaeli University (approval number: 2022/05.03, date: 04.03.2022).

Informed Consent: Patients were informed and patient concents were obtained.

Footnotes

Authorship Contributions

Surgical and Medical Practices: N.Ç., Concept: N.Ç., Design: N.Ç., A.Ş.A., Data Collection or Processing: N.Ç., Z.Y., S.M., E.A., S.I.S., C.B., Analysis or Interpretation: N.Ç., A.Ş.A., Literature Search: N.Ç., Writing: N.Ç., A.Ş.A.

Conflict of Interest: The authors declared that they have no conflict of interest.

Financial Disclosure: The authors declared that this study received no financial support.

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