

# Dermatosis in Patients with Hemiplegia and Paraplegia

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## Abstract

**Objectives:** To analyze the significant occurrence of dermatosis among patients with hemiplegia, paraplegia compared with other patients attending dermatology department as a control group as outpatients or inpatients.

**Study design** an open prospective case control study.

**Patients and Methods:** This is an open , comparative controlled investigative study conducted in Dijlah hospital of rehabilitation , enrolled 43 hemiplegic patient, 21 paraplegic patient and 65 persons as a control patients, between Nov. 2018 –30<sup>th</sup> June 2019. The total numbers was 129 , 91(70.5%) male patients and 38 (29.5%) female patients were . The data collection tools included designed closed and open-ended questionnaire, by using direct interviewing, and physical examination by the researcher.

**Results:** The most common diseases that statically significant difference were as follows : Unilateral xerosis was found in hemiplegic group 5(11.6%) cases and this was significant (P=0.04) compared to control group .Bilateral xerosis was significant among paraplegic group : 6 (28.6%) compared to 4(6.2%) among control group (P=0.04 ). Unilateral exogenous eczema was found in hemiplegic patients 5(11.6%) and this was significant (P = 0.04) related to control group. Seborrheic dermatitis was statistically significant in paraplegic group 6(28.6%) compared to )%8.01(7of control group. Unilateral fungal infection (Taenia paedis) was highly significant among hemiplegic group 15(34.9%) compared to 4(6.2%) control group with P value = 0.05). Bilateral fungal infection was also highly significant for paraplegic group 13(61.9%) compared to 2(3.1%) for control group with (P value = 0.05. Unilateral bacterial infection was statically significant among hemiplegic group 10(23.3%) compared to 5(7.7%) for control group with (Pvalue = 0.05 ) Bilateral bacterial infection was highly significant among paraplegic group 8(38.1%) compared to control 4(6.2%) with (P value = 0.05 ) .compared with control group in fungal, bacterial and xerosis , while other dermatosis as eczema , seborrheic dermatitis , psoriasis, lichen planus and viral Infection not significantly differ.

**Conclusion:** Unilateral dermatosis significantly differs in patients with hemiplegia compared to control group in fungal , bacterial and xerosis and exogenous eczema. Bilateral dermatosis significantly differs in patients with paraplegia compared to control Group in fungal, bacterial and xerosis and Seborrheic dermatitis. while other dermatosis as psoriasis , lichen planus and viral Infection not significantly differ.

**Keywords:** Dermatitis, Hemiplegia and Paraplegia

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## Introduction

Patients with hemiplegia and paraplegia are vulnerable to dermatological diseases due to multiple causes ; loss of sensation of the affected sides , loss of movement , the treatment of an associated condition , the drugs administration , immune-compromised

conditions due to underlying disease or may need to long term steroid use which may enhance different types of infections.<sup>(1)</sup> Several recent studies have independently shown that our skin is an unexpectedly prominent target organ for numerous neuroendocrine, neurotrophics, neurotransmitters, and neuropeptide signals whose release or blockage may strongly influence the immune system.<sup>(2)</sup> The occurrence of bacterial, fungal infections, eczema, severe seborrheic dermatitis, benign and malignant tumors shows that the destruction of nerve fibers alters the local immune status and support the hypothesis that such neurological alteration with associated immunologic symptoms may be considered to be the first step in the pathogenetic mechanism of isotopic response.

The present study attempted to understand more about dermatological findings in our patients with both hemiplegia and paraplegia and search the most common disease among them compared to control group and find the difference of occurrence of the dermatosis in each condition.

### Patients and Methods Study design

The study design was an open prospective case control study conducted in Dijlah Rehabilitation Hospital and Salah - Aldeen General Hospital in Tikrit city, during the period from November 2018 – June 2019. And there were 129 patients: 43 Hemiplegic, 21 Paraplegic as (cases) and 65 dermatological cases not hemiplegic or paraplegic disease cases with nearly same age group as (control) group.

### Data Collection

The hemiplegic and paraplegic patients were diagnosed previously by the neurologist and approved by CT scan and MRI imagining tools, and the questionnaire was including detailed history of each patient regarding the following points: age, sex, Job, time of the onset of disability, duration of disability, are the patient in regular rehabilitation therapy, use assistive equipment or not. The diagnosis of dermatological disease was done clinically by dermatologist, any eczematous, papulosequamous, lichenoid lesion; burrow, scratch marks; maceration; any lumps or scars.

**Inclusion criteria** : Case :The hemiplegic and paraplegic patients not in the acute condition

Control group : dermatological cases not hemiplegic or paraplegic disease cases with nearly same age group.

**Exclusion criteria** : Complicated surgical cases e.g. sinuses, bed sores, comatose patients are excluded in this study

### Statistically Analysis

SPSS version (25) used in data entry and analysis. The descriptive statistics used (frequencies & percentages), graphical and tabular methods used to represent the data. The Chi-Square, and Yate's chi-square statistical tests used to test the associations between categorical variables with the results being considered as statistically significant when the p value is ( $< 0.05$ ).

### Results

There were 129 patients Hemiplegic: 43(33.3%) :26 male, 17 female/ Paraplegic :21(16.3%) :19 male, 2 female/ and control group :65(50.4%) :46 male, 19 female so as a total :91(70.5%) male and 38(29.5%) female. The mean age  $\pm$ SD was : (68.74 $\pm$ 8.61), (39.19 $\pm$ 8.7), (59.23 $\pm$ 16.14) for hemiplegic, paraplegic and control groups respectively

Most of hemiplegic patient 36(83.7%) didn't had rehabilitation therapy, while most of the paraplegic patient (81.0%) had rehabilitation therapy, this relation was statistically significant  $P = 0.001$

Dermatosis frequencies in hemiplegic, paraplegic and control patient groups were as shown in table 1.

Statistically most significant frequent skin disease among 43 cases of hemiplegic group were xerosis 8(18.6%), fungal infection 19(44.2%) & bacterial infection 10(23.3%); in paraplegic one: among 21 cases there was xerosis 6(28.6%), seborrheic dermatitis 6(28.8%), fungal infection 13 (61.9%) & bacterial infection 8(42.9%) as shown in table 1

**Table 1. Frequency of dermatological disorders among study groups**

		Hemiplegic Unilateral & bilateral		Paraplegic bilateral		Control Unilateral & bilateral	
1	Xerosis	8	(18.6%)	6	(28.6%)	4	(12.3%)
2	Eczema	12	(27.9%)	5	(23.8%)	14	(21.5%)
3	Seborrheic dermatitis	1	(2.3%)	6	(28.6%)	7	(10.8%)
4	Psoriasis	0	(0%)	1	(4.8%)	5	(7.7%)
5	Lichen planus	1	(2.3%)	1	(4.8%)	5	(4.6%)
6	Fungal Infection	19	(44.2%)	13	(61.9%)	6	(9.2%)
7	Viral Infection	5	(14.0%)	2	(9.5%)	21	(7.7%)
8	Bacterial Infection	10	(23.3%)	8	(38.1%)	9	(13.8%)
9	Exaggerated sweating	0	(0.0%)	2	(9.5%)	0	(0.0%)

According to the distribution of the diseases among study groups, the results were as followings:

#### According to Xerosis

Unilateral xerosis was found in 5(11.6%) cases of hemiplegic group compared to control group and this was significant  $P = 0.04$ . Bilateral xerosis was found in 3(7%) for Hemiplegic compared to 4(6.2%) among control and 6 (28.6%) for Paraplegic compared to 4(6.2%) among control group and this was statistically significant  $P$  value=0.04

#### According to exogenous eczema

Unilateral eczema was found in 5(11.6%) hemiplegic patients only and this was significant ( $P = 0.04$ ) related to control group. Bilateral eczema found in 7(16.3%) for Hemiplegic group and 5(23.8%) for paraplegic one compared to 14(21.5%) among control group and there is no significant difference.

**According to Seborrheic dermatitis**: there were 1(2.3%) for hemiplegic that was statically not significant, while 6(28.6%) paraplegic compared to 7(10.8%) control groups and was statistically significant ( $P = 0.04$ )

**Psoriasis** was found in 6 cases distributed as follows 1(4.8%) cases in paraplegic patients and 5(7.7%) control so it's not significant

**Lichen planus** was found in 7 cases in this study distributed as follows: hemiplegic 1(2.3%), paraplegic 5(4.8%) and control 5(7.7%).

**Fungal infection** (*Taenia paedis*) was distributed as follows: Unilateral infection was found in 15(34.9%) of hemiplegic patients compared to 4(6.2%) control group and this was highly significant ( $P = 0.05$ ). Bilateral infection was found in 4 (9.3%) of hemiplegic group, 13(61.9%) paraplegic compared to 2(3.1%) for control group and this was highly significant for paraplegic group ( $P= 0.05$ ).

#### According to bacterial infection

Unilateral infection was found in 10(23.3%) of hemiplegic and 1(4.8%) paraplegic compared to 5(7.7%) for control group and this was highly significant for hemiplegic group  $P$  value=0.05 (significant). Bilateral

bacterial infection was found in 8(38.1%) Paraplegic patients compared to 4(6.2%) control group and this relation was statistically significant (P value=0.02)

**Unilateral Viral infection** was 3(7.0%) hemiplegic patients compared to 16(24.6%) of control group. Bilateral infection was found 2(4.7%) among hemiplegic group and 2(9.5%) among paraplegic group compared to 5(7.7%) control one and this relation was statistically not significant (P value=0.08)

**Hyperhidrosis** was reported in 2(9.5%) cases in paraplegic patients only

### Discussion

Multiple systems affected after neurological injury and denervation, and it's thought to cause micro-environmental changes in the skin, leading to change in the epidemiology of skin disease.<sup>(3)</sup>

The male gender in both hemiplegic and paraplegic groups of the study were more than female this could be explained that spinal cord injury and trauma more among males due to the war and other insults in the country lead to neurological deficit as paraplegia (Asher D R et al)(2005) reported that (80%) of acute paraplegic were male.<sup>(4)</sup>

Unilateral xerosis was statically significant among hemiplegic group, and bilateral xerosis among paraplegic group compared to control group, these readings goes approximately similar to other studies : (Gül U et al 2009) in Turkey (13%), and (Han ZA, et al 2015) in Korea 89(8.3%). This may be explained by a possible reduction in cutaneous blood flow and nutritional deficiencies, Elderly patients are more susceptible to xerosis due to pre-existing disease states, treatments, and prescribed drugs<sup>(5)</sup>

In this study unilateral exogenous eczema was statically significant among hemiplegic group but bilateral eczema not significant among paraplegic group, this was also reported in (Han ZA, et al 2015) in Korea<sup>(5)</sup> 37.6%, and (Lee J et al) (2014)(15%), and may be due to the fact that eczematous lesion is secondary to general skin hygiene or due to alterations in eccrine and sebaceous gland function after spinal cord injury<sup>(6-9)</sup>

Seborrheic dermatitis was statistically not significant among hemiplegic and control group while statically significant between paraplegic and control group and this findings goes with (Han ZA, et al 2015) in Korea(54%) and Lee J et al (2014) (17.9%)<sup>(10, 11)</sup>. The best explanation is that sweat glands below the neurological level of injury were less sensitive to cholinergic activation and thus showed a decreased ability to produce sweat. In contrast, sweat glands above the lesion showed a compensatory increase in activity and consequently produced more sweat when exposed to physical training and physiological stress, as well as the inadequacy of hair and facial cleansing may be related to the increased episodes of seborrheic dermatitis above the neurological level of injury<sup>(12)</sup>. Psoriasis was not significant in both hemiplegic and paraplegic groups compared to control one. Lichen planus also was not significant in both hemiplegic and paraplegic groups compared to control one. Unilateral fungal infection (*Taenia paedis*) was highly significant among hemiplegic group (P = 0.05); and bilateral fungal infection was also high significant for paraplegic group (P= 0.05) compared to control, this goes with previous studies that reported increased prevalence of fungal infection among neurological impaired patient<sup>(13)</sup> (50%) skin and nail local fungal infections, in Turkey<sup>(14)</sup> tinea pedis (18%), Korea<sup>(10)</sup> (61.8%).

Unilateral bacterial infection was statically significant among hemiplegic group (P = 0.05); and bilateral bacterial infection was highly significant among paraplegic group (P= 0.02) compared to control. This finding was supported in Korea<sup>(10)</sup> (21.9%), among acute spinal cord injury cases but differ than (1%)<sup>(6)</sup>. Viral infection was not significant in both hemiplegic and paraplegic groups compared to control one. Alterations of immune function have been found to increase the appearance of infections. Immunological changes including an overall decreased immune function in spinal cord injury individuals. These changes have been found to start soon after injury and to continue thereafter<sup>(12-15)</sup>

Natural-killer cell function is decreased, T-cell function and activation are decreased and macrophage phagocytosis is altered., patients have

also been found to have reduced levels and function of cellular adhesion molecules and reduced levels of surface markers on both lymphocytes and granulocytes. Levels of IL-2, IL-6 and IL-2R receptors have also been found to be altered.<sup>(15,16)</sup> The high figure of infection in this study than other studies also may be explained by the frustrating number of patients only (37.5%) received rehabilitation, even with little quality because of destructed infra-structure of health system.

Most of hemiplegic patients didn't had rehabilitation therapy, versus paraplegic patient, this figure may be explained by the age of hemiplegic were old patient and the paraplegic were young and with limited infrastructure and economic ability of the families they prefer the youngest patient to receive the care.

Hyperhydrosis was reported in 2(1.5%) of paraplegic patients (this goes with (3.2%) in Korea reported that sweat glands below the neurologic injury level were less sensitive to cholinergic activation and thus showed a decreased ability to produce sweat. In contrast, sweat glands above the lesion showed a compensatory increase in activity and consequently produced more sweat when exposed to physical training and physiological stress.<sup>(16)</sup>

### Conclusions

1. The male gender in both hemiplegic and paraplegic groups of the study were more than female

2. Most of hemiplegic patient didn't had rehabilitation therapy, while the paraplegic patients had the therapy in considerable number.

3. Unilateral xerosis was statically significant among hemiplegic group and bilateral xerosis among paraplegic group compared to control group.

4. Unilateral exogenous eczema was statically significant among hemiplegic group only but bilateral eczema was not significant among paraplegic group compared to control group.

5. Seborrheic dermatitis was statistically not significant among hemiplegic and control group but significant in paraplegic compared to control group.

6. Unilateral fungal infection (*Taenia paedis*) was

highly significant among hemiplegic group. Bilateral fungal infection was also high significant for paraplegic group compared to control.

7. Unilateral bacterial infection was statically significant among hemiplegic group; and bilateral bacterial infection was highly significant among paraplegic group compared to control.

8. Hyperhydrosis was reported in 2 cases of paraplegic patients.

9. Psoriasis, lichen planus and viral infection was not significant in both hemiplegic and paraplegic groups compared to control one.

**Conflict of Interest:** (Nil – There are “NO CONFLICT OF INTEREST”).

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**Ethical Clearance:** Committee members are approved to perform a study about:

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