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RESEARCH ARTICLE

Comparative Study of Palmar Dermatoglyphics in Vitiligo Patients and Normal Controls

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ABSTRACT

Background: Dermatoglyphics is the study of epidermal ridges and the patterns formed by them during early intrauterine period. Epidermal ridges have been useful in diagnosing hereditary diseases.

Objective: To evaluate significant difference in dermatoglyphic patterns in vitiligo cases and controls.

Material and methods: The palmar prints of 100 vitiligo cases were taken from outpatient department of Dermatology, Gandhi Hospital, Secunderabad and 100 healthy controls from general population. Ethics committee clearance has been obtained. Informed consent was taken from the patients and controls. Dermatoglyphic prints were taken by the ink method of Cummins and Midlo. The prints were then subjected to dermatoglyphic analysis with the help of magnifying hand lens and ridge counting was done with the help of a sharp needle and the details were noted.

Results: There was an increased incidence in ulnar loops and decreased incidence of radial loops in vitiligo cases compared to controls. There was a decreased incidence of whorls in male cases and an increased incidence of whorls in female cases compared to controls. There was a decreased incidence of arches in both male and female cases compared to controls. There was a significant increase in the percentage of Simian line in right hand of female cases compared to controls. There was a significant decrease in the percentage of Sydney line in the right hand of female cases compared to controls.

Conclusion: At present there are very few studies on palmar dermatoglyphics in vitiligo. The present study was a small study consisting of 100 patients only. Hence its findings cannot be generalized. Further large case control studies are needed to establish the exact relation between vitiligo and dermatoglyphics.

Keywords: Dermatoglyphics, Vitiligo, population

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Introduction

Dermatoglyphics is the study of epidermal ridges and their configurations on the palms, soles and digits. The word dermatoglyphics was coined by Cummins and Midlo and was originated from Greek words 'Derma' means skin and 'Glyphics' means carvings[1]. Epidermal ridges are differentiated in their definitive forms in the third and fourth months of foetal life and ridge pattern never changes in post-natal life. The original ridge characteristics are not disturbed unless the skin is damaged to a depth of about 1 mm[2]. Development of dermatoglyphic pattern is under genetic control[3]. Vitiligo is an acquired disorder characterized by well circumscribed milky white cutaneous macules devoid of melanocytes[4]. 30 to 40% of patients have a positive family history, suggesting a genetic basis for this disorder. Transmission is polygenic with variable expression[5]. Auto immunity plays an important role in the development of vitiligo at any age[4]. If a dermatoglyphic marker of vitiligo can be found, it will be of immense clinical significance. Few studies have been conducted in the past about dermatoglyphics in vitiligo patients but no definite pattern has been concluded.

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Material and methods

The palmar prints of 100 vitiligo cases (36 male and 64 female) were taken from outpatient department of Dermatology, Gandhi Hospital, Secunderabad and 100 healthy controls (50 male and 50 female) from general population. Informed consent was taken from the patients and controls. Dermatoglyphic prints were taken by the ink method of Cummins and Midlo.

Results

In the present study 100 vitiligo patients were studied and the observations were compared with a control group of 100 people. Arithmetic mean and standard deviation (SD) were calculated, chi square test (x^2) and 'z' test for proportions were applied and p value significance was noted. P value of <0.05 is significant. Present study shows that loops were the predominant pattern in both hands of vitiligo and control groups in males with 60.2% and 54.6% respectively followed by whorls with 33.05% and 37% respectively. Arches were the least common pattern (6.38%) in patients and (8.4%) in controls but this difference is not statistically significant (p>0.05) (Table 1). In females loops were the predominant pattern in 59.37% of patients compared to 62% in controls followed by whorls with 32.34% in patients and 28.2% in controls. Arches were the least common pattern (7.8%) in patients and (9.8%) in controls but this difference was not significant statistically (Table 1). 11.11% of male patients had Simian line as compared to 4% of controls in right hand, whereas 2.77% of patients had Simian line as compared to 6% of controls in left hand but this difference is not significant statistically (Table 2). 7.81% of female patients had Simian line as compared to 0% of controls in right hand which is statistically significant, whereas 6.25% of patients as compared to 6% of controls in left hand which is statistically not significant (Table 2). 8.33% of male patients had Sydney line as compared to 8% of controls in right hand, whereas 8.33% of patients had Sydney line as compared to 14% of controls in left hand but this difference is not significant statistically (Table 2). 3.12% of female patients had Sydney line as compared to 22% of controls in right hand which is statistically significant whereas 7.81% of patients had Sydney line as compared to 14% of controls in left hand which is statistically not significant (Table 2). Mean total finger ridge count (TFRC) in male patients was 129.94 with SD of 29.21 as compared to male control group which had TFRC 137.92 with SD of 50.94 (Table 3). TFRC in female patients was 125.09 with SD of 38.28 as compared to female control group which had TFRC 118.28 with SD of 45.40 (Table 3). Mean absolute finger ridge count (AFRC) in male patients was 168.53 with SD of 62.77 as compared to male control group which had AFRC 185.58 with SD of 91.94 (Table 3). AFRC in female patients was 163.59 with SD of 75.18 as compared to female control group which had AFRC 150.04 with SD of 77.04 (Table 3). Mean 'atd' angle in the right hand of male patients was 43.25 as compared to 42.58 in male controls (Table 4). Mean 'atd' angle in the left hand of male patients was 44.06 as compared to 41,6 in male controls (Table 4). Mean 'atd' angle in the right hand of female patients was 41.39 as compared to 43.28 in female controls (Table 4). Mean 'atd' angle in the left hand of female patients was 42.56 as compared to 44.76 in female controls (Table 4).

Discussion

Dermatoglyphics as a diagnosis tool is well established in a number of diseases having strong hereditary basis. Vitiligo is a disease with a hereditary background and hence certain dermatoglyphics variations are to be expected in vitiligo patients. In our study, out of 100 cases studied, number of female cases was found to be more (64) than the male cases (36). This increase in the number of female cases is probably due to greater concern for cosmetic disfigurement. Present study showed an increase in the frequency of ulnar loops in the vitiligo cases than the control group. Present study correlates with the study by Sumit Kar et al [6] in 2012 which also showed an increase in the percentage of ulnar loops. In the present study there was a decrease in the frequency of radial loops in male cases and an increase in the frequency of radial loops in female cases compared to controls. A study by Syed Iqbal et al [7] in 1983, showed an increased incidence of radial loops in female cases compared to controls. A study by Sumit Kar et al in 2012, showed a decrease in frequency of radial loops in both male and female cases. In the present study there was a decrease in the pattern of whorls in male cases compared to controls and an increase in whorl frequency in female cases. A study by Sumit Kar et al showed decreased percentage of whorls in both sexes and also when both sexes were considered together. In the present study the frequency of arches was decreased in both sexes and also when both sexes were considered together. A study by K.C. Varma et al [8] showed an increased incidence of arches in male vitiligo cases compared to controls. A study by Sumit Kar et al showed decreased percentage of arches in male cases while in females there was an increased percentage of arches. Overall vitiligo cases showed more number of arches compared to controls. So the present study partly correlates with the available literature. Present study showed an increase in the percentage (11.11%) of Simian

Table 1: Frequency and Percentage of Fingerprint Patterns (Both Hands)

Sex	*Pattern*	*Vitiligo Patients (No./%)*	*Controls (No./%)*	x^2	*p-value*	*Inference*
Male	Loops	217 (60.27%)	273 (54.6%)	3.2	>0.05	NS
	Whorls	119 (33.05%)	185 (37%)			
	Arches	23 (6.38%)	42 (8.4%)			
Female	Loops	380 (59.37%)	310 (62%)	3.17	>0.05	NS
	Whorls	207 (32.34%)	141 (28.2%)			
	Arches	50 (7.8%)	49 (9.8%)			

(NS – Not Significant)

Table 2: Presence of Simian Line ANF Sydney Line

Sex	*Line*	*Hand*	*Vitiligo Patients*	*Controls*	*Z-test*	*p-value*	*Inference*
Male	Simian	Right	11.11%	4%	1.28	>0.05	NS
		Left	2.77%	6%	0.7	>0.05	NS
	Sydney	Right	8.33%	8%	0.06	>0.05	NS
		Left	8.33%	14%	0.81	>0.05	NS
Female	Simian	Right	7.81%	0%	2.02	<0.05	Significant
		Left	6.25%	6%	0.06	>0.05	NS
	Sydney	Right	3.12%	22%	3.15	<0.05	Significant
		Left	7.81%	14%	1.07	>0.05	NS

(NS – Not Significant)

Table 3: Total Finger Ridge Count And Absolute Finger Ridge Count

Sex	*Measure*	*Group*	*Number*	*Mean*	*SD*	*Z-test*	*p-value*	*Inference*
Male	TFRC	Vitiligo	36	129.94	29.21	0.73	>0.05	NS
		Control	50	137.92	50.94			
	AFRC	Vitiligo	36	168.53	62.77	0.51	>0.05	NS
		Control	50	185.58	91.94			
Female	TFRC	Vitiligo	64	125.09	38.28	0.43	>0.05	NS
		Control	50	118.28	45.4			
	AFRC	Vitiligo	64	163.59	75.18	0.47	>0.05	NS
		Control	50	150.04	77.04			

(TFRC – Total Finger Ridge Count, AFRC – Absolute Finger Ridge Count, SD – Standard Deviation, NS – Not Significant)

line in the right hand of male vitiligo cases compared to controls (4%) which was not significant and a decreased percentage (2.77%) in the left hand of male cases compared to controls (6%) which was not significant. Right hand of female cases showed an increase in the percentage (7.81%) of Simian line compared to controls (0%). This difference was statistically significant. The left hand of female cases showed an increase in the percentage (6.25%) of Simian line compared to controls (6%) which was not significant statistically. A study by Syed Iqbal et al in 1983, showed 3 male patients and 1 female patient had Simian line and only 1 of the controls had a Simian line. In the present

Table 4: 'atd' ANGLE

Sex	*Measure*	*Group*	*Number*	*Mean*	*SD*	*Z-test*	*p-value*	*Inference*
Male	atd Angle Right	Vitiligo	36	43.25	6.57	0.26	>0.05	NS
		Control	50	42.58	4.71			
	atd Angle Left	Vitiligo	36	44.06	7.06	1.0	>0.05	NS
		Control	50	41.6	4.23			
Female	atd Angle Right	Vitiligo	64	41.39	5.05	0.9	>0.05	NS
		Control	50	43.28	5.91			
	atd Angle Left	Vitiligo	64	42.56	4.77	1.0	>0.05	NS
		Control	50	44.76	6.54			

(SD – Standard Deviation, NS – Not Significant)

study percentage of Sydney line was increased (8.33%) in right hand of male patients compared to controls (8%) and decreased (8.33%) in the left hand of male patients compared to controls (14%). These differences were not significant statistically. Present study also showed a decreased percentage (3.12%) of Sydney line in right hand of female cases compared to controls (22%). This difference was statistically significant. Left hand of female cases showed a decreased percentage (7.81%) compared to controls (14%) which was not significant statistically. A study by Syed Iqbal et al showed that only 1 male patient had Sydney line. In the present study TFRC was decreased in the male vitiligo group and increased in female vitiligo group compared to controls which was not significant statistically. A study by K.C. Varma et al in 1981, showed an insignificant change in TFRC in vitiligo cases compared to controls. A study by Sumit Kar et al in 2001, showed an increase in TFRC in male patients and a decrease in TFRC in female cases. A study by Sishira Potluru et all [12] in 2022, showed an increase in TFRC in male vitiligo cases, an increase in TFRC in female controls and an increase in mean TFRC in male vitiligo and control group compared to females. In the present study AFRC was decreased in male cases and increased in female cases compared to controls which was not significant statistically. A study by Sumit Kar et al showed a decrease in AFRC in both the sexes of vitiligo. In the present study 'atd' angle increased in both hands of male vitiligo cases and decreased in both hands of female vitilgo cases. A study by Pramod Kumar et al [9] in 2010, showed a statistically significant decrease in female vitiligo cases when compared to controls. A study by Sumit Kar et al in 2012, showed an increase in mean 'atd' angle in vitiligo males and females on both sides. A study by Manjusha et al [10] in 2013, showed a decrease in 'atd' angle in male vitiligo cases than the controls. A study by Prachi V Gole et al [11] in 2018, showed no significant difference in 'atd' angle between cases and controls.

Conclusion

Present study showed an increase in the frequency of ulnar groups in vitiligo cases than control group. There was a significant increase in the presence of Simian line in the right hand of female vitiligo cases compared to controls. There was a significant decrease in Sydney line in the right hand of female patients compared to controls. Mean TFRC is more in male controls than vitiligo patients whereas mean TFRC is more in female vitiligo patients than controls. In this study an attempt has been made to analyze whether any specific pattern exists for vitiligo and does it serve as a diagnostic tool for early diagnosis of vitiligo. At present there are very few studies on palmar dermatoglyphics in vitiligo. The present study was a small study consisting of 100 patients only. Hence its findings cannot be generalized. So, further large case control studies are needed to establish the exact relation between vitiligo and dermatoglyphics and also to know the utility of dermatoglyphics in predicting the susceptibility to vitiligo.

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