Study the Advantage of Dermatoglyphic in Patients leukemia in Iraq

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Abstract

Finger print's patterns and patterns intensity were examined in a group of diagnosed cases of leukemia patients (100 males and females) who attended Baghdad Teaching Hospital; and the National Center for Hematology / Al-Mustansiryiah University. This group was compared with apparently healthy control group of 100 males and females -These finger patterns were analyzed qualitatively and quantitatively. The results showed increment in the number of arches, ulnar loops and decline in whorls, radial loops in both hands in males leukemia patients in comparison with healthy male and this increment reach a significant level (P< 0.0001; Chi-square test= 48.0819). In contrast in female leukemia patients there was a significant increment (P< 0.0001; Chi-square test= 33.928) in the number of arches, whorls and a decline in ulnar loops, radial loops in both hands, in comparison with healthy females. In quantitative analysis, TRC (Total Ridge counts) and ARC (Absolute Ridge Counts) have been collected and the TRC values were 107.849 in male patients and 111.968 for control males. The TRC values were 107.4 female patients and 100.616 for control females. In addition, the ARC values were 143.221 in male patients and 153.548 for control males while the were 153.044 in female patients and 129.067 for females in the control group.

Key wards: Dermatoglyphics, finger ridge count, Finger print's patterns.

دراسة مزايا الخطوط الجلدية في المرضى الذين يعانون من سرطان الدم في العراق

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الخلاصة

تم فحص أنماط طبعات الاصابع ومعامل شدة النمط في عينة مشخصة من المرضى المصابين بسرطان الدم مكونة من 100 ذكور واناث من المراجعين لمستشفى بغداد التعليمي ومركز امراض الدم /الجامعة المستنصرية وتمت مقارنتها بعينة قياسية مكونة من 100 ذكور واناث (مجموعة السيطرة) ،هذه الطبعات للاصابع حللت نوعيا (وصفيا) و كميا، اظهرت النتائج زيادة في اعداد الاقواس ،العرويات الزندية وانخفاض في العرويات الكعبرية للذكور المرضى لكلا اليدين بالمقارنة بعينة الذكور الاصحاء وقد وصلت هذه الاختلافات لمستوى المعنوية عند استخدام اختبار مربع كاي = 48.0819 واحتمالية $P < 0.001$، بينما في الاناث المرضى ظهرت زيادة في الاقواس ،المستديرات ونقصان في العرويات الزندية والكعبرية في كلا اليدين بالمقارنة مع عينة لاناث اصحاء ووصلت هذه الاختلافات لمستوى المعنوية عند استخدام اختبار مربع كاي =33.928 تحت احتمالية $P < 0.0001$. في التحليل الكمي جمعت متوسط العدد الكلي للخطوط TRCوالعدد المطلق ARC، وبلغت قيم TRCفي الذكور المرضى (107.849) وللذكور في مجموعة السيطرة (111.968) بينما بلغت قيمTRC في الاناث المرضى (107.4) وفي الاناث في مجموعة السيطرة (100.616). اما قيم ARC في الذكور المرضى فبلغت (143.221) وفي الذكور الاصحاء (153.548) بينما بلغت قيم ARC في الاناث المرضى (153.044) وفي الاناث ا في مجموعة السيطرة بلغت (129.067).

الكلمات المفتاحية :الخطوط الجلدية ، تعداد تلال الاصابع ،انماط طبعات الاصابع.

Introduction

The dermatoglyphics care is concerned with the study of the patterns of skin ridges (dermal ridges) present on the fingers, descriptively and quantitatively, palm, toes and the soles of human and related species [1], as it is a single science in the field of biology, genetics and medicine proved to be important in giving some information about genetic defect [2]. The study of dermatoglyphics as a mean of medical diagnosis. Most cases of chromosomal disorders are associated with certain phenotype patterns of the dermatoglyphics. The irregular arrangement of the dermatoglyphics is not limited to cases of chromosomal aberration but

also anomalies that are also caused by dysfunction of genes or genes with soft or genetic disorder in some genetic rules. In terms of the genetic composition of the skin ridges (dermal ridges), their characteristics are often regular and can distinguish them in the fourth month of the fetus's lifetime [3]. The characteristics remain constant during the lifetime of the individual and the composition of the skin ridges affected by different genetic factors and environmental distribution of these lines is not arbitrary when the transmission of its characteristics from the predecessor to the back. The dermatoglyphics in the field of medical genetics is of great importance as it was found to be associated with certain types of diseases, for example schizophrenia [4], bladder cancer [5], and Leukemia [6][7][8].

For a lack of studies on the relationship between leukemia and dermatoglyphics in Iraq, this study was proposed to investigate the possibility of using the dermatoglyphics as a tool for the diagnosis of the disease.

Materials and Methods

Dermatoglyphic prints of 100 diagnosed cases of leukemia patients who attended Baghdad Teaching Hospital, and the National Center for Hematology / Al-Mustansiryiah University, Baghadad, Iraq, during the period from April /2016 to March /2017. Finger prints were collected by using the ordinary ink method from 200 samples [100 diagnosed cases of leukemia (50 males and 50 females) and 100 healthy individuals (50 males and 50 females) as a control group]. These prints were printed on special sheets of paper contain sex and the prints of each finger in both hands. The finger prints were classified and analyzed as described previously (9, 10). The analysis was based on two conventions; the first was unilateral analysis –using one count per finger- and the second bilateral analysis –using two counts per finger. In the latter, an ulnar and a radial with one zero assigned in loops, and two zeros in arches. Sum of the first gives the total ridge counts (TRC) while the second represents absolute ridge counts (ARC).

Results

A: -Qualitative Analysis:

Table (1) shows the pattern number and percentage of frequency of whorls, radial loops, ulnar loops and arches. It can be seen from this Table that the numbers of arches and ulnar loops were higher while the numbers of whorls and radial loops were lower in both hands in male leukemia patients (61 arches and 211 ulnar loops), in comparison with healthy males and the difference were significant ($P < 0.0001$; Chi-square test =48.0819), while in female leukemia patients of the numbers of arches and whorls were higher , while the numbers of ulnar loops and radial loops in both hands were lower (72 arch and 181 whorl) than those in healthy females and the differences were significant ($P< 0.0001$; Chi-square test = 33.928).

Table 1: Comparison of tip ridge pattern of all fingers in both hands between control and leukemia groups.

Samples	Whorls (W)		Loops				Arches (A)	
			Ulnar (Lu)		Radial (LR)			
	No	%	No	%	No	%	No	%
Patients males =50	162	32.4	211	42.2	66	13.2	61	12.2
Standard males =50	194	38.8	144	28.8	132	26.4	30	6
Patients females =50	181	36.2	175	34.8	73	14.6	72	14.4
Standard females =50	144	28.8	177	35.4	139	27.8	40	8
Standard females =50	144	28.8	177	35.4	139	27.8	40	8

B: Quantitative Analysis:

1-a: Unilateral Analysis for males:

Table 2 shows the results of the unilateral analysis and it can be seen that finger 1 had the highest mean ridge counts in both hands of both male patients and control males while finger 5 had the lowest mean ridge counts in male patients. Finger 3 in right hand and finger 5 in left hand showed the lowest mean ridge counts in control males.

Table 2: Unilateral analysis for 10 fingers in both hands of male patients and mles in control group

Finger		Male patients		Control males	
		Mean	S D	Mean	S D
Right hand	1	11.568	3.281	13.939	3.788
	2	10.810	3.717	11.239	3.984
	3	10.930	3.801	9.978	3.671
	4	10.844	3.133	11.674	4.551
	5	10.660	3.607	10.333	3.191
Left hand	1	11.244	3.809	12.571	3.769
	2	10.075	3.547	10.848	4.179
	3	10.561	3.775	10.409	3.744
	4	11.357	3.875	10.956	3.529
	5	9.800	3.811	10.021	3.546
Totals		107.849	36.356	111.968	37.952

1-b: Unilateral analysis for females:

It can be seen from Table 3that finger 1 had the highest mean ridge counts in both hands of female patients and control females, while finger 5 had the lowest mean ridge counts in female patients. Finger 3 in right hand and finger 5 in left hand showed the lowest mean ridge counts in control females.

Table 3: Unilateral analysis for 10 fingers in both hands of females

Finger		Female patients		Control females	
		Mean	S. D	Mean	S. D
Right hand	1	12.864	4.578	13.755	4.206
	2	10.767	4.297	8.909	3.620
	3	10.366	3.579	8.391	3.435
	4	11.911	4.363	10.061	3.971
	5	9.346	2.560	9.200	3.329
Left hand	1	11.182	4.363	12.314	4.022
	2	10.256	3.830	9.971	4.138
	3	10.244	4.375	9.000	3.811
	4	10.488	4.930	10.152	3.590
	5	9.976	4.063	8.863	3.583
Totals		107.4	40.938	100.616	37.705

2-a: Bilateral Analysis for males:

According to Table 4, Finger 1 has the highest mean ridge counts in right hand while finger 4 has the highest mean ridge counts in left hand of female patients. Finger 1 has the highest mean ridge counts in control males for both hands, while finger 3 has the lowest mean ridge counts in right hand and finger 5 in left hand for both males patients and controls.

Table 4: Bilateral analysis for 10 fingers in both hands of males

Finger		Male patients		Control males	
		Mean	S D	Mean	S D
Right hand	1	16.089	6.934	19.816	8.028
	2	14.500	7.188	15.311	8.218
	3	13.581	7.465	12.689	7.991
	4	15.867	7.473	17.326	9.269
	5	12.894	7.385	12.646	5.789
Left hand	1	15.578	8.220	18.592	8.558
	2	13.325	7.454	15.500	8.500
	3	13.585	7.868	12.955	7.424
	4	16.535	7.753	16.239	7.798
	5	11.267	6.081	12.474	6.530
Totals		143.221	73.821	153.548	78.105

2-b: Bilateral Analysis for females:

Table 5 shows the mean of ridge counts and standard deviations for pattern types in both hands (female patients and control females). The results showed that finger 1 has the highest mean ridge counts in right hand while finger 4 has the highest mean ridge counts in left hand of female patients. In addition, finger 1 showed the highest mean ridge counts in control males for both hands, while finger 5 tends to have the lowest mean ridge counts in both hands in both female's patients and controls.

Table 5: Bilateral analysis for 10 fingers in both hands of females.

Finger		Female patients		Control females	
		Mean	S D	Mean	S D
Right hand	1	18.295	10.078	19.531	9.030
	2	14.674	8.524	11.523	6.997
	3	13.150	7.008	8.978	4.924
	4	18.311	10.262	12.612	7.659
	5	15.349	8.208	10.220	5.441
Left hand	1	15.659	9.035	18.824	8.145
	2	14.395	8.318	13.941	8.503
	3	13.951	9.471	10.308	6.606
	4	15.927	9.781	13.918	7.994
	5	13.333	8.233	9.980	5.809
Totals		153.044	88.918	129.067	71.108

Discussion

According to Ministry of Health Iraqi Cancer Board 2009, leukemia is the third most common cancer in Iraq. The total number of cancer cases was 20,278 according to the Ministry of Health Iraqi Cancer Board 2011.The present study revealed that there was a significant increase ($P< 0.0001$) in the number of arches, ulnar loops and a decline in whorls, radial loops in both hands in male leukemia patients in comparison with healthy males, while in female leukemia patients there was a significant increase ($P< 0.0001$) in the number of arches and whorls and a decrease in ulnar loops, radial loops in both hands in comparison with healthy females. This finding was supported by AL-Jashammi [11] who found that there was an increase in the arch pattern and ulnar loop in both hand in male leukemia patients and an increase in whorl pattern in female leukemia patients in comparison with the control group. In the quantitative analysis, the results are similar to those of AL-Jashammi [11]. The results in female patients but not in male patients are similar to the findings of Dubowitz [6].

Conclusion

There is a possible genetic influence of the digital ridge patterns in leukemia patients. The use of dermatoglyphics is a unique and low-cost approach for identifying such individuals. This relatively noninvasive anatomical technique could reasonably be used for screening leukemia. Therefore, and according to these results, the present study suggests doing further studies including dermatoglyphics to distinguish the genetic parameters.

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