Imperial Journal of Interdisciplinary Research (IJIR)
Vol-2, Issue-10, 2016
ISSN: 2454-1362, http://www.onlinejournal.in

Quantitative Analysis of Digitopalmar Dermatoglyphics in Fifty Female Psoriatic Monoarthritis Patients

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Abstract*: By the quantitative dermatoglyhic analysis we have made research in 25 variables in number of epidermal ridges on palms and fingers in fifty female psoriatic monoarthritis patients: on all ten fingers, on five fingers separately and their sum all together, between triradii a-b, b-c and c-d on one and both palms, their sum on one and both palms and atd angles on one and both hands and their sum all together in degrees. Obtained date were compared with control group of 200 healthy women from the Zagreb area in Croatia. Statistically significant difference to control by t-test, we have found in 15 variables in the sense of increasing number of epidermal ridges: on each of ten fingers, their sum on five and all together both , then between triradius b-c of both palms and all together between triradii a-b, b-c and c-d on right palm then decreasing atd angle on left palm in degrees. Accordingly a polygenetic system identical in some loci to polygenetic system predisposing to female psoriatic monoarthritis susceptibility might be found responsible for dermatoglyphic pattern development.*

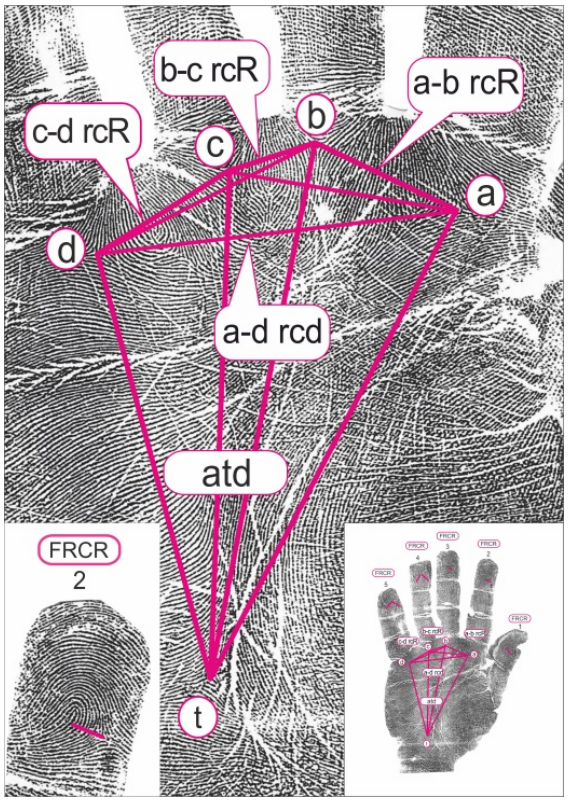
1. Introduction

It is a great deal in differential diagnostics in monoarthrtis patients (1-5). If we have psoriasis it will come easier to make diagnosis. But if it is not, in that case is complicated situation. Why? According to Gladman and Chandrane (in their comment on CASPAR classification criteria), they wrote: "The criteria are recognized to be sensitive and specific in both early and established psoriatic arthritis. The criteria are simple and easy to applay to data collected retrospectively. Moreover, using them, it is possible to classify patients as having psoriatic arthritis even do not have a current, past, or family history of psoriasis". From the other side, as a member of spondyolarthropathy Study Group (ESSG) criteria, even if patients with inflammatory arthritis were correctly identified, not all patients with psoriasis and inflammatory arthritis have psoriatic arthritis (6). By the one of genetic method, quantitative dermatoglyphic analysis of digitopalmar complex, we performed, in a number of epidermal ridge count and design in 50 female psoriatic monoarthritis, to assess the role of genetic factors in etiology. Cvjetičanin in his doctoral thesis (7) has found that there are two groups of psoriatic arthritis, type I and type II. In the first type are three subgroup, rheumatoid like (polyarticular), oligoarticular and spondylitic, and to second type belong classical and mutilans subgroup. Namely, in the number of epidermal ridges, there is statistically significant difference between two types, first lower and in second increased number of epidermal ridges. It seems the psoriatic monoarthritis is the separate subgroup sixth, additionaly to Moll and Wright five, of psoriatic arthritis, according to mentioned genetic research. Because of increased number of epidermal ridges psoriatic monoarthritis belong to type II of psoriatic arthritis. Additonaly, it seems, that psoriasis type I (earlier type in life) correspondens to psoriatic arthritis type I, and psoriasis type II (later appearance in life) to psoriatic typ II (classical, mutilans, and now monoarthritis too). Then, we presented in Table 4 of nearly half HLA typing patients with characteristic psoriasis and psoriatic arthritis antigens.

2 . Materials and methods

Dermogams of fifty female psoriatic monoarthritis patients were analysed in keeping with instruction provided by Cummins and Miličić methods (8), and according to Classification of psoriatic arthritis (CASPAR) criteria from 2006 year (9). Results were compared with 200 dermograms of phenotypically normal women from the Zagreb area, obtained from the Institute of Anthroplogy in Zagreb, Croatia (10). Student t-test was used to test statistically significant

differences in the ridge count between the patient and control group. Digitopalmar prints were taken by use of finely granulated silver-gray powder onto transparent, adhesive tape (11). The following 25 traits were examined by the quantitative analysis, as it has shown on Picture 1 and Tables 1-3.



Picture 1
The areas of quantitative analysis of digito-palmar dermatoglyphics

1. FRD1 ridge count on the first finger of the right hand, 2. FRD2 ridge count on the second finger of the right hand, 3. FRD3 ridge count on the third finger of right hand, 4. FRD4 ridge count on the fourth finger of the right hand , 5. FRD5 ridge count on the fifth finger of the right hand, 6. TFRCD total ridge count on all five fingers of the right hand,7. a-b rcD ridge count between triradii a-b of the right hand, 8. b-rcCD ridge count between triradii c-d of the right hand, 9. c-d rcD ridge count between triradii c-d of the right hand, 10. TPRC rcD ridge count between triradi a-b, b-c and c-d of the right hand altogether, 11 atd D atd angle on the right hand in degrees. 12. FRL1 ridge count on the first finger of the left hand, 13. FRL2 ridge count on the second finger of the left hand, 14. FRL3 ridge count on the third finger of the left hand, 15. FRL4 ridge count on the fourth finger of the left hand, 16. FRL5 ridge count on tlhe fifth finger of the left hand, 17 TFRCL total ridge count on all five fingers on the left hand, 18. a-b rcL ridge count between triradii a-b on the left hand, 19. b-c rcL ridge count between triradii b-c on the left hand, 20. c-d rcL ridge count between triradii c-d on the left hand, 21. a-c rcL ridge count between triradii a-b, b-c and c-d of the left hand altogether, 22. atd L angle on the left hand in degrees, 23 TFRC total ridge count on all the fingers of the palms, 24. TPRC bilateral ridge count between all triradii of the palms, 25. ATDDL bilateral sum of palmar atd angle in degrees.

3. Results

Results are tabularly presented in Tables 1-3. Statisticaly significant differences to control were found in fifteen variables in the sense of increasing number of epidermal ridges on the fingers right hand, eight: first, second, third and fourth at risk level 0,000, on the fifth at risk level 0,001, on all five fingers at risk level 0,000, then between triradii b-c at risk level 0.050, and between triradii a-b, b-c and c-d all together at risk level 0,033, which is presented by FRD1, FRD2, FRD3, FRD4, FRD5, TFFR, b-c rcD and TPRcD variables respectively in Table 1. Further, on the left hand in six variables in the sense of inceasing number of epidermal ridges to control on first finger at risk level 0,003, and second, third, fourth and fifth finger and on all five fingers at risk levels 0,000. Then, ridge count on all ten fingers was statistically significant at risk level 0,000 too, which is presented by FRL1, FRL2, FRL3, FRL4, FRL5 and TFRC variables respectively in Table 2. and 3.

4. Discussion

To the best of our knowledge there is not even one paper with which could we compare to, our research, except ours own female patients (12-25). As we mentioned before, increasing number of epidermal ridges on fingers of female monoarthrits patients ranking him in type II of psoriatic arthritis. What does it mean in practical clinical sense? First of all in differential diagnostic purpose. For example, in 20 female reactive arthritis patients we have found increasing number of epidermal ridges on second, fourth and fifth finger on both hands, then on both hands separately, and both hands together, and atd angles on one and both together in degrees. It seems a little difference, but in curing it is not. Psoriatic monoarthritis is very resistant, especially knee affection, because of unnaproachability of biologics (26,27) or Apremilast, at least in our country. DMARD's are to heavy, Methotrexat, Sulphasalasyn and Leflunomid by a lot side-effets, complications and laboratory monitoring. Additonally, in algic form of psoriatic arthritis (arthropathy) (Vilanova, Pinjol 1951) (28), as a rule, inflammatory, immunologic

and rheumatologic parameters are not elevated. That is why, therapy is local instillation Triamcinolon 40 mg (depot) by anaesthetics into joint and Indomethacin caps from 100 (besides a dose of 100 mg Indomethacin corresponding to 5 mg Decortin), to maximal dose of 200 mg daily by gastroprotection. Local instillation is limited on three applications and discontinuance for ten month after. Almost ex juvantibus it is possible to make diagnosis of psoriatic arthritis because of good response to Triamcinolon injection. To the other localisation of monoarthris is easier to control the disease. Another interesting thing is elevated acid uric by psoriatic arthritis in general, especially monoarthiris. (29-30). We could say that this might be a pathognomonic sign in differential diagnostics to other rheumatic diseases. Further, we have notice connection between psoriatic arthritis and algodystrophy (complex regional pain syndrome type I). Namely, algodystrophy might be a triggering factor for onset of psoriatic arthritis (31,32). Very often we have find locus HLA B17(57) in algodystrophy and psoriatic arthiritis together, and in the increasing number of epidermal ridges too, and in both locus HLA DQ1 (33,34). As it is seen in Table 4, in HLA 23 typing patients, antigen B17 is present in nine, and five by affected knee. It seems that HLA B17(57) antigen codes, among the others genes, to increasing number of epidermal ridges on fingers and palms. It could say, that the HLA antigens A1, A28, B7, B8, B12, B13, B17(57), B27, B35, B37, B38, B39, Cw6 and DR7 on the sixth chromosome, are the really latent sign of psoriatic arthritis in humans, before clinical symptoms. The next chromosome of interesting is fourth. The most interesting is the gene, SMARCAD1 on position 4q22-23, which is indeed the cardinal gen for dermatoglyphics, namely, he deletes the epidermal ridges (adermatoglyphia) from the surface of palms, plants and their fingers (35). The next is on 4q27 (IL2, IL21) genes for psoriatic arthritis (36) and 4q28-23 for psoriasis (37). Lastly 4p12 for algodystrophy syndrome (38). Why we are talking in such manner about dermatoglyphics? Very simple reason, HLA typing of eight loci in sixth chromosome costs over 1000 dollar, but dermatoglyphic prints less then one dollar, consequently cheep, nonaggressive and ethical acceptable genetic method.

5. Conclusion

It seems that polygenetic system, by a few main and great number of modification genes responsible for development of dermatoglyphics is identical in some loci with polygenic system for liability to psoriatic monoarthrits female patients. This genetic method may be used to diagnostic, preventive and even prognostic purposes.

Table 1. Quantitative properties of right hand digito-palmar dermatoglyphics in patients and controls

Variable	Patient group			Control group			Risk
	n	x	SD	n	x	SD	p
FRD1	50	20,56	5,86	200	17,23	5,56	0,000
FRD2	50	15,58	6,43	200	11,62	6,55	0,000
FRD3	50	16,33	5,15	200	11,44	5,31	0.000
FRD4	50	19,04	5,13	200	15,78	5,72	0,000
FRD5	50	15,28	5,44	200	12,70	4,83	0.001
TFRCD	50	86,46	20,76	200	68,77	21,65	0,000
a-b rcD	50	38,12	5,97	200	36,80	6,43	0,158
b-c rcD	50	29,26	5,25	200	27,31	6,00	0,050
c-d rcD	50	41,96	5,77	200	41.03	6,02	0,326
TPR cD	50	109,34	12,29	200	105,05	12,68	0.033
Atd D	50	45,82	9,39	200	46,87	8,67	0,454

Table 2. Quantitative properties of lef hand digito-palmar dermatoglyphics in patients and controls

Variable	Patient group			Control group			Risk
	n	x	SD	n	x	SD	p
FRL1	50	17,50	5,41	200	14,80	5,76	0.003
FRL2	50	15,82	5,93	200	10,87	6.88	0,000
FRL3	50	16,02	5,39	200	11,58	5,72	0.000
FRL4	50	18,94	5,69	200	15,13	5,25	0,000
FRL5	50	16,04	5,34	200	12,26	4,80	0,000
TFRCL	50	84,32	20,17	200	64,62	22,08	0.000
a-b rCL	50	36,78	6,42	200	36,40	6,86	0,681
b-c rcL	50	28,64	5,09	200	26,90	5,67	0,086
c-d rcL	50	42, 68	4,89	200	41,82	5,90	0,342
TPR cL	50	108,10	12,12	200	105,20	13,28	0,164
Atd L	50	45,68	8,15	200	47,70	8,39	0,128

Table 3. Quantitative properties of digitopalmar dermatoglyphics on both hands in patients and controls

Variable	Patient group			Control group			Risk
	n	x	SD	n	x	SD	p
TFRC	50	170,78	39,90	200	133,39	42,57	0,000
TPRC	50	217,44	23,56	200	211,08	24,46	0,101
ATDDL	50	91,50	16,57	200	94,56	15,88	0,228

6. Ethics

There is not any danger for the patients from this kind of research. Dermatoglyphic analysis, which is one of genetic method, is without any harmful consequence for sick persons. The procedures are in accordance with ethical standards in scientific

research at Croatian Medical Association'c Codex of Medical Ethic and Deontology, and Helsinki Declaration of World Medical Association, Edinburg, 2000.

Table 4. Psoriatic monoarthritis affected joints and HLA typisation loci in fifty female patients

No	Patient's Joint	HLA Loci
1	PIP III right hand	A1, A2, B13, B17, DR7
2	PIP IV right hand	A1, A8, B8, B35
3	Left knee	-
4	PIP IV right hand	-
5	Left ankle	A3,26, B27,B35, DR1, DQ1
6	Left ankle	A2, A11, B12, DR5, DRw6
7	Left ankle	A11, B13, B35
8	Left knee	-
9	Left knee	-
10	MCP III left hand	A2, Ax,, B27, Bx
11	Left knee	A2, A9, B12, B17
12	Left knee	-
13	Left knee	A2,3,B35,B38,DR51,2 DQ1
14	Right knee	-
15	MCP IV left hand	-
16	Right knee	A2, B8, B35, DR52, DQ1,2
17	MCPIIIright hand	A3, A24, B7, B17
18	Right knee	-
19	Left knee	-
20	Dact II right foot	A1,A33,B17,Cw3,DR7,DQ3
21	Right knee	
22	Tempmand right	A25,29,B17,B18,DR2,DR3
23	MCP III left hand	A2, A9, B35, B62, DR7
24	Right wrist	-
25	PIP IV right hand	-
26	Dactil V left foot	-
27	MCP III left hand	A2, Ax, B40, Bx
28	Right knee	A2, A33 ,B14, B17
29	Left ankle	A3 , B38, B40, DR14, DQ1
30	DIP III right hand	-
31	Right knee	-
32	DIP IV righthand	-
33	MCP II righthand	-
34	Right ankle	-
35	Left knee	A1, B8, B62, DR2, DQ2
36	Left knee	-
37	Right knee	A2,A9, B12,B17, Cw4, DR7
38	Dact IV left hand	A2, Ax, B12, B13
39	Dact IV left hand	-
40	PIP V left hand	A3, Ax, B27, Bx, DR2
41	Dact II left hand	-
42	Sternoclavic dex	-
43	Right wrist	-
44	PIP III right hand	-
45	MCP II left hand	-
46	Right knee	A1, B7, B17, DR2, DQ1
47	Left wrist	-
48	Left knee	A2, B7, B17, DR2, 13, DQ1
49	Right knee	-
50	Right ankle	A1, Ax, B17, Bx, DR2

PIP means proximal interphalangeal joint,
MCP means metacarpophalangeal joint
Dactylitis means whole digit, but reckon as one joint

7. Conflicts of interest

There is no conflicts of interest among the authors.

8. Acknowledgements

We thank to academician Professor Pavao Rudan, from the Institute of Anthropology in Zagreb, Croatia, for his kindness that he permited us to use their Control group for this research..

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