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DERMATOGLYPHICS IN PSORIATIC SYMMETRICAL POLYARTHRITIS IN FIFTY WOMEN - QUANTITATIVE ANALYSIS

DERMATOGLIFI U PSORIJATIČNOM SIMETRIČNOM POLIARTRITISU U PEDESET ŽENA - KVANTITATIVNA ANALIZA

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O Jehovah, I have been scared of all my pains.
Job 9:28, NW

Summary

Quantitative dermatoglyphic analysis of digitopalmar ridge count was used to research psoriatic symmetrical polyarthritis in fifty women. Analyzed were 25 dermatoglyphics traits: number of epidermal ridges on all ten fingers, their sum for five and ten fingers, four traits on both palms, i.e. between a-b, b-c, c-d and a-d triradii, and atd angles and their bilateral sum. The data obtained were compared with those recorded in a control group of 200 pairs of imprints of phenotypically healthy females from Zagreb area. Statistically significant differences were found in 13 variables in decreased ridge count in all ten fingers, their sum in five and ten fingers separately. Accordingly, a polygenetic system identical in some loci to polygenic system predisposing to women psoriatic symmetrical polyarthritis susceptibility might be found responsible for the dermatoglyphic pattern development.

Key words

dermatoglyphics, quantitative analysis, polyarthritic symmetrical psoriatic arthritis, female gender

Sažetak

U radu se kvantitativnom analizom digitopalmarnog kompleksa istražio broj grebenova u 50 žena sa simetričnim psorijatičnim poliartritisom. Analizirano je 25 varijabli, broj grebenova na svih deset prstiju šaka, zatim, sveukupno na pet i deset prstiju, te između triradijusa a-b, b-c, c-d i a-d na oba dlana, zatim, njihov ukupan broj na jednom i oba dlana, te atd kutovi na oba dlana i njihov ukupni broj u stupnjevima. Dobiveni podaci uspoređeni su sa kontrolnom skupinom - 200 pari otisaka odraslih i fenotipski zdravih žena Zagrebačke regije. Statistički značajne razlike prema kontroli nađene su u 13 varijabli u smislu smanjenja broja kožnih grebenova na svih deset prstiju, i njihovu zbroju na pet i deset prstiju zasebno. Stoga se dade zaključiti kako je poligeneski sustav u razvoju dermatoglifa identičan s nekim lokusima za razvoj simetričnog psorijatičnog poliartritisa u žena.

Ključne riječi

dermatoglifi, kvantitativna analiza, poliartritični simetrični psorijatični artritis, ženski spol

Introduction

Psoriatic arthritis (PsA) is a complex genetic disorder that results from an interplay between multiple genetic and environmental factors. Although the exact pathogenesis of PsA is unclear, there is a substantial contribu-

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tion of genetic factors to the etiology of PsA (1). Dafna Gladman and Vinod Chandran in their book "The facts - Psoriatic arthritis" wrote about Human leukocyte antigen (HLA) genes: HLA genes on chromosome 6 were found to be associated with PsA more than 30 years ago. HLA genes are classified into class I and class II.

HLA A, B and C belong to class I, whereas HLA DP, DQ and DR belong to class II. Antigens produced by HLA class I genes are present on almost all cells of the body, whereas those produced by HLA class II genes are present mainly on immune cells. Class I antigens, HLA-B13, HLA-B57, HLA-B39, HLA-Cw6 and HLA-Cw7, were shown to be associated with psoriasis and PsA by many researches worldwide. The strongest association is with HLA-Cw6. HLA class I antigens has also been shown with various types of PsA. HLA-B27 is associated with back disease, and HLA-B38 and HLA-B39 with peripheral arthritis. There are another two genes that have been shown to lie close to HLA genes and are associated with PsA, TNF-alpha and MICA genes. It is likely that environmental factors trigger the illness in a genetically susceptible individual. However, no single agent has been clearly identified. Physical trauma is one such environmental factor. Viral infections may also trigger PsA. Recently, rubella vaccination, injury sufficient to require a medical consultation, bone fractures, and house moving were found to be associated with onset of PsA (2).

Achievements of dermatoglyphic research until today show their value as valid method in biomedical and clinical research. It is certain that the increasing knowledge of mechanisms of their inheritance contributed to that. Dermatoglyphics indirectly point at the influence of polygenetic factors of inheritance, the near structures (palms and soles) the same as the distant ones (for example, CNS, and others to) (3). The basic principle of this kind of research is that there is some genetic mechanism between 13th and 25th week of intrauterine development which, at the same time, has an impact to predisposition to psoriatic arthritis and the change of dermatoglyphics drawing. Dermatoglyphic traits are inherited by polygenetic effect but without domination of one of the involving genes.

This is the first paper on dermatoglyphics and psoriatic arthritis, except our conference reports (4-12).

Material and methods

Dermograms of fifty female Psoriatic symmetrical polyarthritis were analyzed according to Classification of psoriatic arthritis (CASPAR) criteria (13), and in keeping with instructions provided by Miličić et al. (14). Results were compared with 200 dermograms of phenotypically normal women from the Zagreb area, obtained from the Institute of Anthropology in Zagreb (15).

Twenty five variables, abbreviated and designated as follows, were examined by the quantitative analysis: 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 the 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 a-b triradii of the right hand; 8. **b-c rcD** ridge count between b-c triradii of the right hand; 9. **c-d rcD** ridge count between c-d triradii of the right hand; 10. **a-d rcD** ridge count between a-d triradii of the right hand; 11. **atd D** atd angle on the right palm; 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 te fifth finger of the left hand; 17. **TFRCL** total ridge count on all five fingers of the left hand; 18. **a-b rcL** ridge count between a-b triradii of the left hand; 19. **b-c rcL** ridge count between b-c triradii of the left hand; 20. **c-d rcL** ridge count between c-d triradii of the left hand; 21. **a-c rcL** ridge count between a-d triradii of the left hand; 22. **atd L** atd angle on the left palm; 23. **TFRC** total ridge count on all ten fingers; 24. **TPRC** bilateral ridge count betwen all triradii of the palms; 25. **ATDDL** bilateral sum of palmar atd angle (in degrees)

Student's t-test was used to test statistically significant differences in the ridge count between the patients and the control group.

Results

Results are presented in tables 1-3.

Ridge count on the first, second, third, fourth, fifth finger and on all five fingers of the right hand was significantly lower in female psoriatic patients compared with controls.

Ridge count on the first, second, third, fourth, fifth finger and all five fingers of the left hand was significantly lower in female psoriatic patients compared with controls.

Ridge count on all ten fingers was significantly lower in female psoriatic patients compared with controls.

Table 1. **Quantitative properties of digitopalmar dermatoglyphics on both hands in patients and control subjects**
Tablica 1. **Rezultati analize kvantitativnih svojstava digitopalmarnih dermatoglifa u bolesnika i kontrole na obje ruke zajedno**

Variable	Patient group			Control group		
	n	x	SD	n	x	SD
TFRC	50	79.06	*30.28	200	133.30	42.57
TPRC	50	215.28	22.40	200	211.80	24.46
ATDDL	50	90.58	16.85	200	94.56	15.88

***Statistically significant difference from controls**

Table 2. **Quantitative properties of right hand digitopalmar dermatoglyphics in patients and control subjects**
Tablica 2. **Rezultati analize kvantitativnih svojstava digitopalmarnih dermatoglifa u bolesnika i kontrole na desnoj ruci**

Variable	Patient group			Control group		
	n	x	SD	n	x	SD
FRD1	50	13.6	*6.14	200	17.23	5.56
FRD2	50	3.94	*4.07	200	11.62	6.55
FRD3	50	6.32	*5.48	200	11.44	5.31
FRD4	50	10.86	*6.09	200	15.78	5.72
FRD5	50	9.20	*5.17	200	12.70	4.83
TFRCD	50	43.38	*16.05	200	68.77	21.65
a-b rcD	50	42.46	4.91	200	41.03	6.02
b-c rcD	50	28.64	5.86	200	27.31	6.00
c-d rcD	50	37.22	5.35	200	36.70	6.43
a-d rcD	50	108.32	11.47	200	105.05	12.68
atd D	50	45.36	9.26	200	46.87	8.67

*Statistically significant difference from controls

Table 3. **Quantitative properties of left hand digitopalmar dermatoglyphics in patients and control subjects**
Tablica 3. **Rezultati analize kvantitativnih svojstava digitopalmarnih dermatoglifa u bolesnika i kontrole na lijevoj ruci**

Variable	Patient group			Control group		
	n	x	SD	n	x	SD
FRL1	50	10.24	*6.12	200	14.80	5.76
FRL2	50	2.64	*3.53	200	10.87	6.88
FRL3	50	5.02	*4.64	200	11.58	5.72
FRL4	50	9.12	*5.93	200	15.13	5.25
FRL5	50	8.66	*5.17	200	12.26	4.80
TFRCL	50	35.68	*15.43	200	64.22	22.08
a-b rcL	50	43.62	4.32	200	41.82	5.90
b-c rcL	50	27.94	4.65	200	26.90	5.67
c-d rcL	50	35.40	6.82	200	36.34	6.86
a-c rcL	50	106.96	12.02	200	105.20	13.28
atd L	50	45.22	8.49	200	47.70	8.39

*Statistically significant difference from controls

Discussion

As we mentioned before, according to our best knowledge, this is the first paper dealing with psoriatic arthritis and dermatoglyphics. Because of that we could not make any comparison or discussion on this topic to the others. However, by the poster presentation on the 2nd World Psoriasis and Psoriatic Arthritis Conference in Sweden this year, we have presented four hundred psoriasis and psoriatic patients from Croatia (140 psoriatic and 260 with psoriatic arthritis) in quantitative analysis of dermatoglyphics.

We have found statistically significant differences between psoriasis and psoriatic arthritis patients from the one side, and among the five clinical subgroups (according to Moll and Wright, classical, mutilans, polyarticular, oligoarticular and spondylitis group (16)) in psoriatic patients from the other side. Statistically significant differences between psoriatic male patients to control were found in 14 variables, and female psoriatic patients to control in 6 variables; in psoriatic arthritis male patients to control in 9 variables and female psoriatic arthritis patients to control in 9 variables; between male psoriatic and male psoriatic arthrhritis patients in 12 variables, and between female psoriatic and female psoriatic patients in 13 variables. Furthermore, statistically significant differences were found in 67 variables among male psoriatic arthritis patients to control, and among female psoriatic arthritis patients in 69 variables to control. Lastly, statistically significant differences were found among five clinical subgroups of male psoriatic patients in 122 variables and among five clinical subgroups in female patients in 130 variables.

Additionally, we have found statistically significant differences between female symmetrical psoriatic polyarthritis and female rheumatoid arthritis patients in nine variables: on third, fourth and fifth fingers on both hands, on five fingers of both hands separately, and on all ten fingers in psoriatic arthritis patients (17). Statistically significant differences between symmetrical psoriatic arthritis males to rheumatoid arthritis male patients were found in 16 variables: on the first, second, third, fourth, fifth, then on all five fingers of the right hand, and between triradii a-d rcD and ATDD angle (in degrees) on the right hand to, on the first, second, fourth, fifth and on the all five fingers and ATDL angle (in degrees) on the left hand, and on all ten fingers and ATDL angles (in degrees of both hands) (18).

Statistically significant differences were found between psoriatic spondylitis and ankylosing spondylitis in seven variables to: on both second finger, fourth finger right fifth finger both, atd angle on the right palm and between triradii b-c on the left palm (8).

Lastly, statistically significant differences were found between psoriatic spondylitis and Riter's disease in 14 variables: on the first, second, third, fourth and fifth finger right, than on the first, second, third and fifth finger left, in total ridge count on five fingers of each hand, atd angle on the left palm, atd angles on both hands together, and in total sum of ridge count on the ten fingers of both hands (9).

Conclusion

In conclusion, we could say that dermatoglyphics came to existence as an important tool for genetics in psoriasis ant psoriatic arthritis, and in their differential diagnostics. Additionally, we have found differen-

tial diagnostics between psoriatic arthritis and rheumatoid arthritis in male and female patients, between psoriatic and ankylosing spondylitis, and between psoriatic spondylitis and Riter's disease.

Literature

1. Rahman P, Gladman D.D. Psoriatic arthritis in: K.B.Gordon, E.M.Ruderman ed. *Psoriasis and Psoriatic Arthritis - An Integrated Approach.* Berlin-Heidelberg: Springer-Verlag. 2005:12.

2. Gladman DD, Chandran V. *The facts - Psoriatic arthritis.* New York: The Oxford University Press Inc. 2009:27-29.

3. Cvjetičanin M. *Kvantitativna analiza digitopalmarnih dermatoglifa u djece s kliničkim znacima oštećenja središnjeg živčanog sustava.* MS thesis. Zagreb: Postgraduate Study Center, University of Zagreb. 1990:89-91.

4. Cvjetičanin M, Sutlar-Kanižaj I, Majhen I. Kvantitativna analiza digitopalmarnih dermatoglifa oboljelih od psorijaze i psorijatičnog artritisa. *V. jugoslavenski reumatološki dani.* Zadar, 9.-12.V.1990.

5. Cvjetičanin M, Sutlar-Kanižaj I. Quantitative analysis of Digitopalmar Dermatoglyphics in Psoriatic Patients. *Some News in Dermatology.* Međunarodni znanstveni skup. Naftalan, 22. do 23. rujna 1997.

6. Cvjetičanin M, Jajić Z, Jajić I. Quantitative analysis of digitopalmar dermatoglyphics in 20 male patients with sixth Jajić subgroups of psoriatic arthritis. *Reumatizam* 2005;52(2):82-83.

7. Cvjetičanin M, Jajić Z, Jajić I. Differential diagnostics between polyarthritis form of psoriatic arthritis and rheumatoid arthritis in women using quantitative dermatoglyphic analysis of digitopalmar complex. *Reumatizam* 2006;53(2):110-111.

8. Cvjetičanin M, Jajić Z, Jajić I. Differential diagnostics between psoriatic and ankylosing spondylitis in men using quantitative dermatoglyphic analysis of digitopalmar complex. *Reumatizam* 2007;54(2):97-98.

9. Cvjetičanin M, Jajić Z, Jajić I. Differential diagnostics between Reiter's disease and psoriatic spondylitis in men using quantitative dermatoglyphic analysis of digitopalmar complex. *Reumatizam* 2008;55(2):103.

10. Cvjetičanin M, Jajić Z, Jajić I. A Quantitative analysis of digitopalpmar dermatoglyphics in 400 Psoriasis and Psoriatic arthritis patients from Croatia. *2nd World Psoriasis and Psoriatic Arthritis Conference 2009, "Psoriasis - Skin and Beyond".* 24-28 June 2009. Stockholm, Sweden. 2009;Abstract No. 7:4.

11. Cvjetičanin M, Jajić Z, Jajić I. Dermatoglyphics in psoriatic polyarthritis in fifty women - quantitative analysis. *Clin Exp Rheumatol.* Abstracts extracted from 2009;27(5):723.

12. Cvjetičanin M, Jajić Z, Jajić I. Quantitative analysis of digitopalmar dermatoglyphics in fifty male patients with psoriatic spondylitis. *Reumatizam* 2009; 56(2):52.

13. Gladman DD. Clinical Features of Psoriatic Arthritis in: Ritchlin CT, FitzGerald O. *Psoriatic and Reactive arthritis. A Companion to Rheumatology.* Mosby, Elsevier. 2007:26.

14. Miličić J, Rudan P, Schmutzer Lj, Škrinjarić I. Dermatoglifi u antropološkim istraživanjima. U: Tarbuk D, izd. *Praktikum biološke antropologije.* Zagreb: RSIZ za zapošljavanje, RZZ za znanstveni rad, HAD, IMI. 1989;13:31-36.

15. Schmutzer Lj, Rudan P, Szirovicza L. i sur. Analiza kvantitativnih svojstava digitopalmarnih dermatoglifa stanovnika Zagreb. *Acta Med Iug* 1977;31: 409-423.

16. Mease, PJ, Helliwell PS. *Atlas of Psoriatic Arthritis.* Springer-Verlag London Limited. 2008:26.

17. Cvjetičanin M, Jajić Z, Jajić I. Quantitative analysis of digitopalmar dermatoglyphics in women with rheumatoid arthritis, Reumatizam 1998;46(2):11-16.

18. Cvjetičanin M, Jajić Z, Jajić I. Dermatoglyphics of digitopalmar complex in forty malepatients affected by rheumatoid arthritis - quantitative analysis. *Reumatizam* 2009;56(1):25-29.