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ORIGINAL ARTICLE

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Dermatoglyphics in amenorrhea – qualitative analysis

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OBJECTIVE(S): To determine whether any specific dermatoglyphic (DG) features would emerge as markers in amenorrheic subjects.

METHOD(S): The study was done on 100 amenorrheic patients and 100 eumenorrheic controls with normal karyotype. Their finger tip patterns, hypothenar patterns, simian crease, Sydney line, interdigital area patterns (qualitative parameters of DGs) were analyzed. Printing method was used. The observations were correlated not only between subjects and controls but also between subjects with normal karyotype and subjects with abnormal karyotype. For statistical analysis percent frequency and chi square test were used.

RESULTS: Subjects and controls have shown predominantly loop pattern. It was arch pattern which predominated for the 2nd finger, loop for the 5th finger and whorl for the 4th finger. An increase in the loop pattern in the hypothenar area was observed in subjects, the highest being in patients with abnormal karyotype. Near significant association was seen for the simian crease and Sydney line in subjects. There was significant difference between the patterns in the left 1st interdigital area between controls and subjects with normal karyotype (P=0.05) and in the left 2nd (P=0.009) and 3rd (P=0.04) interdigital areas between controls and subjects with abnormal karyotype.

CONCLUSION(S): The qualitative DG parameters could be used in amenorrheic subjects for further referral for karyotyping and counseling.

Key words : dermatoglyphics, amenorrhea, qualitative analysis, finger print pattern, Sydney line

Introduction

Amenorrhea is one of the major problems encountered by women. WHO Annual Reports 1982 and 1985 have estimated that 15% of the human population is infertile and that amenorrhea is the 6th major cause of female infertility. Amenorrhea or the absence of menstruation is a symptom, not a disease [1].

Dermatoglyphics (DGs) is the study of epidermal ridges of skin [2]. The word dermatoglyphics is derived from Greek derma (skin) and glyphics (carvings). It defines collectively the ridge configurations in the palm/fingers and sole/toes.

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Dermal ridge differentiation takes place early in fetal development. The resulting ridge configurations are genetically determined and influenced or modified by environmental factors [2]. They are stable throughout life, unique to the individual, and significant as a means of identification. DG is in use as a diagnostic tool in genetic/ chromosomal disorders as well as in clinical conditions with genetic etiology.

In the present study an attempt has been made to correlate amenorrhea and dermatoglyphics, since both have the suspected multifactorial (genetic and environmental) etiology. Moreover, to date, the only Indian study available on dermatoglyphics and amenorrhea is by Mutalik et al [3] on 10 patients.

Methods

One hundred amenorrheic patients whose age ranged from 16 to 30 years and were referred to the Division of Human

Genetics in our department were taken as subjects for the present study. One hundred normal females whose ages ranged from 15 to 45 years were included as controls. We recorded the qualitative parameters of DGs – viz. finger tip patterns, simian crease, Sydney line, hypothenar patterns, and interdigital area pattern, and correlated the DGs of amenorrheic subjects with normal karyotype, of amenorrheic subjects with abnormal karyotype, and of the controls. We looked for any particular pattern emerging as a distinctive marker in women with amenorrhea and abnormal karyotype (Figure 1, 2 and 3).

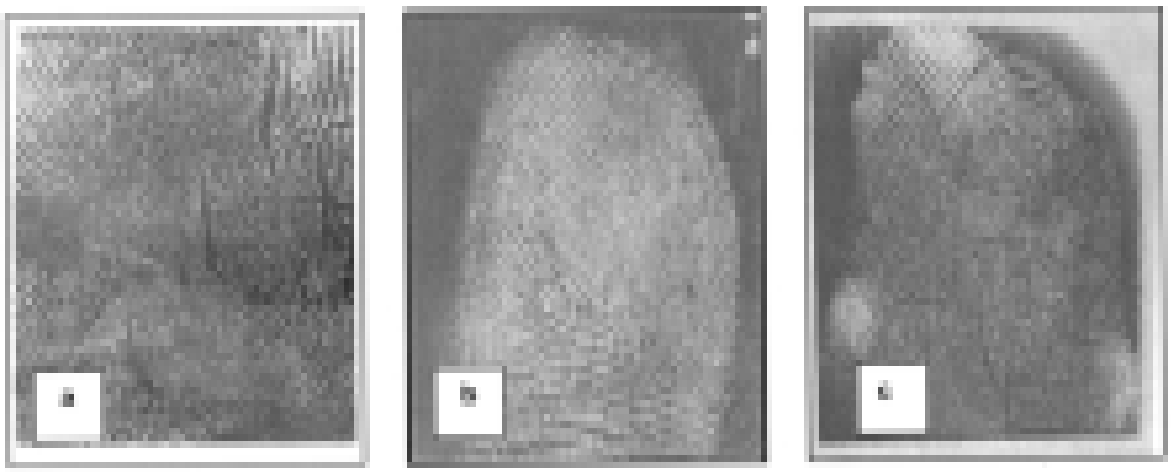

Figure 1. Finger print patterns – a - Whorl, b - Ulnar Loop, c - Arch

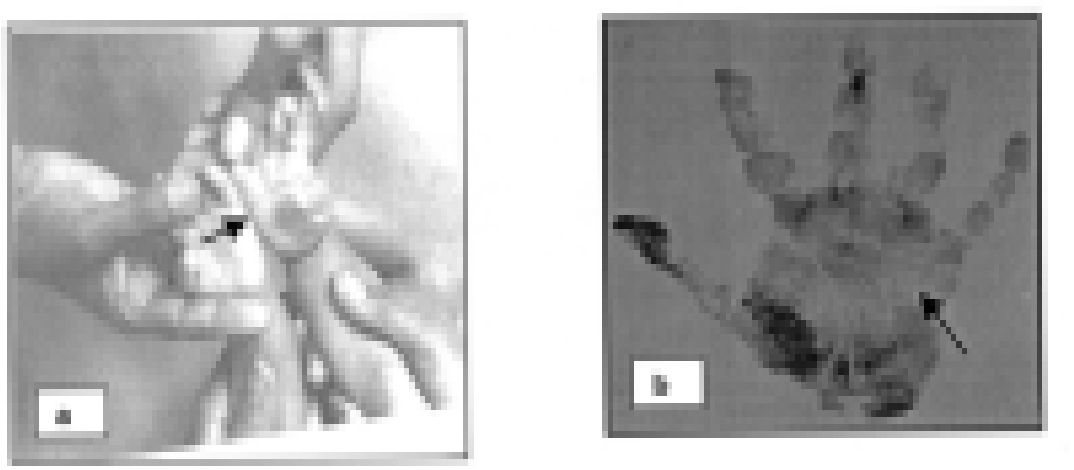

Figure 2. Flexor creases – a - Simian Crease b - Sydney Line

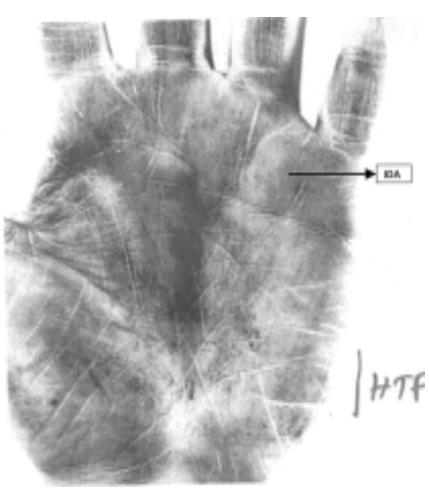

Figure 3. Palmar patterns, HTP: Hypothenar pattern – loop. IDA : Interdigital area pattern – loop.

Table 1. Frequencey of finger print patterns.

	Controls (n=100)	Subjects (n=100)	Subjects with normal karyotype (n=70)	Subjects with abnormal karyotype (n=30)
Arch	6.8	5.02	4.28	7.38
Loop	62.4	65.76	66.61	67.45
Whorl	30.8	29.22	29.11	25.11

Table 2. Preponderance of fingerprint patterns (percent).

Finger print patterns	Controls (n=100)	Subjects (n=100)	Subjects with normal karyotype (n=70)	Subject with abnormal karyotype (n=30)
Arch				
1	4	3.5	5	2.8
2	10.5	13	16.7	11.4
3	13	4	10	1.4
4	3	1.5	1.67	1.4
5	3.5	3	3.33	2.8
Loop				
1	58	67	71.67	61.43
2	52	56.5	58.33	53.57
3	67	75	71.67	73.57
4	50.5	52.5	60	47.14
5	84	76.5	73.33	75
Whorl				
1	38	29.5	23.33	31.42
2	37.5	30	25	28.57
3	20	21	18.33	12.85
4	46.5	46	38.33	46.42
5	12	19	20	16.42

Statistical significance ($P < 0.003$) was observed for the preponderances of the finger print patterns for the 3rd finger between subjects and controls.

Table 3. Palmar patterns : hypothenar area patterns and flexion creases (percent).

	Controls (n=100)	Subjects (n=100)	Subjects with normal karyotype (n=70)	Subjects with abnormal karyotype (n=30)
Hypothenar pattern	53	64.6	51.72	68.09
Similar crease	39	24	21.4	26.6
Sydney line	02	14	14.2	23.3

Table 4. Interdigital area patterns.

	Controls (n=100)	Subjects (n=100)	Subjects with normal karyotype (n=70)	Subjects with abnormal karyotype (n=30)
1st IDA [a]	97	87	87.1	96.7
2nd IDA [a]	97.5	92	87.1	93.05
3rd IDA [a]	92	84	79.2	84.95
4th IDA [a]	95	87.5	82.85	86.65

[a] Interdigital digital area pattern

Printing method was used. All the prints taken were rolled ones. They were analyzed by the authors. One of the authors (SR) a qualified, competent and senior member of our faculty with most experience in DG supervised the analysis. Observations were tabulated, compared and statistically analyzed. For qualitative analyses percent frequency and chi square test were used.

Results

Among the frequency of finger print patterns, loops seemed to be of higher frequency in controls as well as in amenorrheic subjects, highest being in subjects with abnormal karyotype (Table 1).

Table 2 gives the preponderance of finger print pattern (FPP) in individual fingers. Arch pattern was predominant in the 2nd finger, loop in the 5th finger and whort in the 4th finger. For the FPP significant differences were noticed between controls and subjects (P=0.003) in the 3rd finger of the left palm.

In the palm patterns, the hypothenar patterns showed a higher percentage for the subjects with abnormal karyotype. Among the palmar creases, Syndney line was prevalent in amenorrheics (Table 3).

Among the patterns in the interdigital areas (IDA), significant differences were noticed for the patterns in the left palm for the 1st IDA (P=0.05) between controls and subjects with normal karyotype and for the 2nd (P=0.009) and the 3rd IDA (P=0.04) between controls and subjects with abnormal karyotype.

Discussion

As of today the only published Indian article on the subject is by Mutalik et al [3]. There are published reports on DG in gonadal dysgenesis [4], in Turner syndrome [5], in chromosomal disorders [6], and in medicine [7]. There has been difference of opinion regarding whether DG could be applied as a diagnostic tool in clinical conditions [8]. This work has been carried out on patients of amenorrhea to find out whether there could be an association or correlation between DG and amenorrhea.

Frequency of finger print pattern (FPP)

As seen in Table 1, among the finger print patterns, loop pattern seems to be predominant in the subjects and controls. This increase in the loop pattern has also been reported by Forbes [4] and Mutalik et al [3] in their study on gonadal dysgenesis and amenorrhea respectively. Both these studies have been done on cytogenetically confirmed cases, as in the present study.

Preponderance of FPP

Forbes [4] has reported the preponderance of FPP in 29 cases with gonadal dysgenesis out of which, in 25 cases, X chromosomal abnormalities have been noticed. In the present study 30 patients with X chromosomal abnormalities have been included (Table 2). On comparison, arch pattern was predominant in the 2nd finger in both the studies, loop in the 1st finger of Forbes's [4] study and in the 5th finger of the present study, and the whorl pattern in the 4th finger in both the studies. The concordance noted between the sample of Forbes's [4] and the present study for arch and whorl pattern could indirectly be because of the influence of X chromosomal abnormalities.

Palmar patterns

Hypothenar area patterns and flexion creases (simian crease and Syndey line) are given in Table 3. Discussion could be done only for patients with abnormal karyotype. Dallapicolla et al [5] have identified five cardinal features. Included in them is the presence of hypothenar pattern in Turner syndrome. Large hypothenar patterns have been observed in 50% of patients with 45X karyotype [2]. In the present study, in view of the small sample size in the abnormal karyotype, all 30 have been considered to have abnormal karyotype rather than differentiating them into monosomy X, X mosaicism, and X structural chromosomal abnormalities

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Though amenorrheic patients showed increase in the loop pattern in the hypothenar area, patients with abnormal karyotype showed a higher frequency (34.04%) compared to those with normal karyotype or controls. On comparison with that of the study by Forbes [4], a higher frequency of loop pattern in the left hypothenar area was observed.

Simian crease, the single palmar crease, could be either complete or incomplete (partial). Uchida and Soltan [9] have noticed the presence of simian crease in five out of 15 Turner syndrome cases with 45X karyotype. These results suggest that X monosomy may affect the normal DGs i.e. FPP and flexion creases. Simian crease was present in 1% of controls and in 5% of the 29 patients with gonadal dysgenesis in the study by Forbes [4] and in 28% of Turner syndrome in the study by Schaumann and Alter [2]. Saha [6] has reported simian crease in 27% of patients with sex chromosomal abnormalities. In the present study, the percentage frequency of simian crease has been found to be high for control population (39%) and in the patients with abnormal karyotype (26.6%).

Sydney line could not be discussed in view of the absence of any relevant published material on amenorrheic patients

as well as on patients with sex chromosomal abnormalities. From the present study Sydney line could be a discriminant feature between controls and subjects as a whole since it has occurred in a high frequency in patients with normal as well as abnormal karyotype.

Interdigital area pattern

Patterns in the 3rd and 4th inter digital areas have been found to be frequent [2]. Penrose [10] has also found patterns frequently in 1st and 3rd inter digital areas. Saha [6] has reported a high frequency of patterns in 2nd inter digital area. In the present study, the patterns in the left 1st inter digital area between the controls and subjects with normal karyotype and in the left 2nd and 3rd inter digital areas between the controls and subjects with abnormal karyotype have differed (Table 4).

Conclusion

The features which could be applied as markers for amenorrhea are the presence of arch pattern in the 2nd left finger, loop pattern on the 5th right finger, hypothenar pattern in the left palm, and Sydney line in the 1st interdigital area of left palm. The present study has emphasized the application of DGs as one of the DG tools for referral of amenorrheic patients for karyotyping.

References

1. Rennaisance SJ, Disaia PJ, Hammond CB et al. *Danforth's Obstetrics and Gynecology.* Philadelphia. Lippincott. William and Wilkins. *1999 : 601.*
2. Schaumann B, Alter M. *Dermatoglyphics in medical disorders*. New York. Springer-Verlag, *1976.*
3. Mutalik GS, Lokhandwala VA, Anjeneyulu R. Dermatoglyphical findings in primary amenorrhea. *J Obstet Gynecol India 1968;18:738-43.*
4. Forbes AP. Finger prints and palm prints (Dermatoglyphics) and palmar – flexion creases in gonadal dysgenesis, pseudohypoparathyroidism and Klinefelter's syndrome. *New Eng J Med 1964;270:1268 – 77.*
5. Dallapicolla B, Bagni B, Pistocchi G. Dermatoglyphic and skeletal hand abnormalities in Turner syndrome. *Acta Genet Med Gemellol 1972;21:69-78.*
6. Saha KC. Dermatoglyphics as diagnostic tool in chromosomal disorders. *Ind J Dermatol 1980;25:21-30.*
7. Shiono H. Dermatoglyphics in medicine. *Am J Forensic Med Pathol 1986;7:120-6.*
8. Fuller IC. Dermatoglyphics: A diagnostic aid?. *J Med Genetics 1973;10:165-9.*
9. Uchida IA, Soltan HC. Evaluation of dermatoglyphics in medical genetics. *Pediatr. Clin N Am 1993;10:409-22.*
10. Penrose LS. Finger-prints, palms and chromosomes. *Nature 1963;197:933-8.*