



Original Research Article

Comparative study of pulmonary function test and dermatoglyphics in eczema patients

Vatsala A R¹, Ajay K T^{2,*}¹Dept. of Anatomy, Chamarajanagar Institute of Medical Sciences, Karnataka, India²Dept. of Physiology, Chamarajanagar Institute of Medical Sciences (CIMS), Karnataka, India

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ABSTRACT

Introduction: Eczema is a pattern of inflammatory responses of the skin, characterized by spongiosis with varying degrees of acanthosis and a superficial perivascular lymphocytic infiltrate. Eczema results from a complex interaction between genetic susceptibility and environmental risk factors. Pulmonary function tests are valuable investigations in the management of patients with respiratory symptoms in eczema, as increased severity of respiratory illnesses, RSV wheezing and early allergic sensitization were significant risk factors for eczema disease.

Objectives: The objectives of the present study was to identify patterns of dermal ridges on finger tips and palms in eczema patients and pulmonary function tests to initiate preventive measures of respiratory symptoms in eczema in early detection program and to focus the predictive strength of specific dermatoglyphic patterns in eczema patients.

Materials and Methods: The present study was carried out on 50 eczema patients in JJM Medical College, Davangere which was compared with 50 normal apparently healthy individuals. Data analysis was done. Chi square test was used to compare the different groups. WRIGHTS Peak flow meter which is a portable device for measuring ventilator functions. Comparisons were performed using students t-test for 2 group comparisons

Results: In the present study we found reduced PEFr in eczema patients and decrease in frequency of total arches and whorls in eczema patients were observed. There are significant differences in eczema patients in various dermatoglyphics features when compared to normal. Hence it is possible to identify the risk population with the help of dermatoglyphics and suggest them to take periodic monitoring of pulmonary function test.

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1. Introduction

Eczema is a chronic inflammatory skin condition characterized by very dry skin with scaly, crusted or hard like patches and symptoms can range from mild to severe degrees of acanthosis.¹ Stress can contribute to flare up and exacerbate symptoms. Even low humidity, certain foods, overheating may aggravates eczema. Ways to reduce stress like by practicing yoga and controlling factors in the environment by minimizing or eliminating triggers can help to reduce the eczema flare ups.²

The word 'eczema' is also used specifically to talk about atopic dermatitis. Atopic refers to collection of diseases

involving immune system, including atopic dermatitis, asthma and hay fever.³ Scientists has worked and reported that children with eczema are prone more in developing asthma and this development from eczema to asthma and respiratory problems as termed as 'atopic march'.⁴

Population spirometric screening in eczema proven in Poland proved to be an effective method for early diagnosis of COPD and eczema. It was observed that Peak Expiratory Flow Rate (PEFR) and Forced Expiratory Volme in the first second (FEV1) parameters of lung function tests were reduced significantly among eczema compared to normal.⁵

Dermatoglyphics is a study of palm print which explains the, lines and shapes of hands, fingers, and toes. Each dermatoglyphic pattern is unique, right hand pattern will be

* Corresponding author.

E-mail address: drjaykt@gmail.com (Ajay K T).

different from left hand. It may grow in size from age to age, but never change and get destroyed if a person is seriously injured.⁶ Fingerprints will begin to grow again along with healing of the wound.⁷

Environmental factors and genetic factors definitely play a role in fingerprint formation. Ridge pattern development not only depends on genetic factors but also depends on shape of the mothers uterus and volume and density of amniotic fluid.⁸ The growth and activity of foetus and developmental conditions of mothers uterus prevent fingerprints from developing the same way in fetuses of identical twins, because of this identical twins have same gene code but different fingerprints. The condition called 'adermatoglyphia', in which individuals do not have dermatoglyphis prints.⁹

Apart from its use in predicting the diagnosis of genetic disease, dermatoglyphics is also used in Forensic science for individual identification. It is also a valuable research tool in the field of Physical Anthropology, Human Genetics and Medicine.¹⁰ Dermatoglyphics multiple intelligence test which is done by counting of ridge pattern of palms and fingers. And this can be used for clinical evaluation and for screening in the field of psychology, medicine and anthropology.¹¹

Considering all these factors the present work is an attempt to study the correlation between dermatoglyphics and eczema and lung function test in eczema and it assumes a great importance to prevent and avoid possible lung complications and also helps in early detection of COPD in eczema.

1.1. Fingertip patterns

Galton F divided fingertip patterns into 3 groups - Loops, Arches and Whorls.¹²

1.1.1. Arch

An arch is the simplest pattern. It is hill-shaped, curved top, no triangle was formed in with the shape.

1. Simple arch pattern
2. Tented arch pattern¹²

1.1.2. Loop

It is like a waterfall flowing toward radial or ulnar side.

1. Ulnar Loop pattern : In Ulnar Loop ridges opens on the ulnar side.
2. Radial Loop pattern : In Radial Loop ridges open on the radial side.

1.1.3. Whorls (W)

Whorls are pattern where lines starts from centre of small circle and turns into concentric circle, or into long oval shape and has two triangular points.¹²

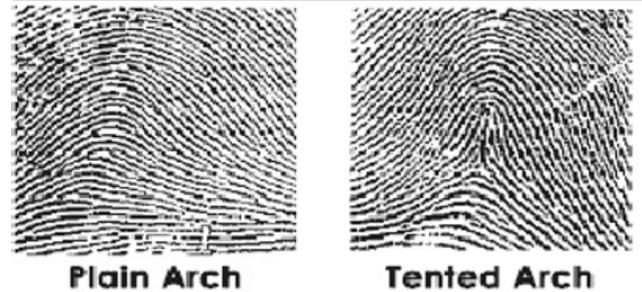


Fig. 1: Showing different finger tip patterns



Fig. 2:



Fig. 3:

1.1.4. Axial triradius

The triradius to wards palmar axis are termed as Axial triradius(t).

'atd' angle: It is finger print trait formed by lines drawn between thenar triradii to last digits triradii and on to hypothenar triradii. The purpose of examining this gives measurement reliability.

1.2. Methodology

The study was conducted on 50 eczema patients, 25 male and 25 females in J.J.M. Medical College Hospital who were attending the dermatology OPD, and were compared with 50 normal individuals, 25 male and 25 females.

The study was conducted over a period of one year. Written informed consent was taken from the subjects for their participation for the study, Institutional ethical clearance was obtained.

Lung function Parameter PEFr was done using standardized RMS Wrights Peak Flow Meter. The inclusion criteria of the study was non smoking adult male aged between 20 to 40yrs and females between 20-40 yrs and who are not suffering from any lung diseases and people who had a history of smoking and any lung diseases were excluded. The male subjects were asked to Blow forcefully into the wright's Peak Flow Meter with a nose clamp twice with an interval of 5 mins, The best value was considered. The results were given as Mean \pm SD and comparison was done using student t test

Dermatoglyphics analysis procedure – Modified Purvis smith Method

The hands were thoroughly washed with hand wash and dried neatly and required amount of camel ink was poured on the glass slab and was spread by the rubber roller to get a thin neat uniform ink film. Ink is applied to palm by passing the roller over the palm and digits and uniformly stamp on a paper by pressing palm gently. The fingerprints were taken starting from thumb to little fingers of right hand and similarly repeated for left hand. Then the prints were scanned into computer and calculate the fingerprint pattern and analyze the number of prints in order to understand genetic sequences. For qualitative analysis “Chi” square test is applied

1.3. Results and Discussion

Table 1 In the present study table no 1 shows more number of total arches in male eczema patients compare to normal individuals were found. Eczema male patients showed significant increase number of ulnar loops as compared to controls. Whorls pattern were found less in eczema. The results were statistically significant.

Table 2 In the present study table no 2 showed statistically significant decrease in number of total arches in female eczema patients compare to normal individuals. Whorls pattern of female eczema patients were also decreased as compared to controls and this difference were statistically significant.

Table 3 Out of 25 eczema male patients and female patients majority showed mean angles were lesser in both hands when compared to male controls and female control and this results showed statistically very significant.

Table 4 25 eczema male patients showed a mean decrease of 2.4L/sec in the PEFr when compared to 25 male controls and this results were statistically very significant.

Table 5 25 eczema female patients showed a mean decrease of 1.6L/sec in the PEFr when compared to 25 female controls and this results were statistically very significant.

2. Discussion

Dermatoglyphics reveals the congenital links between fingers and intrinsic qualities, behaviour and talents of an individual¹³ Dermatoglyphics has a absolute scientific basis with 200 years of research history. This can be analyzed and proven clinically with evidence in anthropology , genetics, medicine and statistics.

Medical Scientists in US, Japan etc have applied dermatoglyphics in the diagnosis of Congenital disorders like Turner's Syndrome, genetic abnormalities and in educational fields. Many scientists and medical doctorate found that the born number of brain cells can be checked from the various dermatoglyphics pattern.¹⁴

The Frequencies of various types of skin ridges in patients of 50 eczema & 50 controls were examined in our study. The frequency of distribution of dermatoglyphics ridge patterns in both hands of eczema patients showed significantly decrease in arches when compare to controls. Whorl pattern showed a significantly decrease in number in eczema patients when compared to controls.

Fingerprint pattern were observed on various diseases such as ichthyosis, atopic dermatitis, eczema, anhidrotic ectodermal dysplasia and various skin diseases. A study on dermatoglyphics in malignant skin diseases and in patients with psoriasis, eczema showed differences in arches and whorl pattern which is similar to our study.⁸

Dermatoglyphics of each individual are unique has been utilized to identify people with the genetic predisposition to develop eczema and various skin diseases, to determine significant fingerprint pattern applicable for eczema and to develop inexpensive tool for inspecting skin ridges and screening for eczema and asthma and they reducing mortality and morbidity.¹⁰

Our result of decreased PEFr in the eczema were similar to other studies which showed a decrease in lung functions in eczema patients and this can be explained as constriction and inflammation of airway which leads to decrease in elastic recoil pressure of the lungs.¹⁵

3. Conclusion

From our study we can conclude that dermatoglyphics is most inexpensive important tool and therefore promised to provide simple means for medical investigations and it will help in genetic counseling in relation to eczema and other various dermatoses diseases and may be used to predict the future eczema.

Our study is by no means exhaustive but the limitation of the study is less studies done in dermatoglyphic and further many quantitative study are needed in this aspects but the strength is the study establishes there is a random relation between dermatoglyphic pattern, eczema And lung functions and we conclude that population with decreased arches in both hands may develop eczema and hence we

Table 1: Comparison of dermatoglyphic patterns between male eczema patients & controls

Pattern	Total value in Eczema pt (In Nos)	Total value in Control (In Nos)	Chi-square value	P-value
Arches	31	20	2.1	0.145
Ulnar loops	358	461	19.20	0.0002
Radial loops	11	28	3.95	0.056
Whorls	148	181	4.47	0.0321

$X^2 = 2.1, P = 0.145$ $X^2 = 3.95, P = 0.056$

$X^2 = 19.2, P = 0.0002$ $X^2 = 4.47, P = 0.0321$

Table 2: Comparison of dermatoglyphic patterns between female eczema patients & controls

Pattern	Total value in Eczema Patient (In Nos)	Total value in Control (In Nos)	Chi-square value	P value
Arches	8	33	18.908	0.0001
Ulnar loops	161	179	0.37	0.61
Radial loops	11	14	0.74	0.321
Whorls	121	91	4.409	0.031

$X^2 = 18.9, P = 0.0001$ $X^2 = 0.74, P = 0.32$

$X^2 = 0.37, P = 0.61$ $X^2 = 4.40, P = 0.031$

Table 3: Comparing mean of atd angle in male eczema patients and female eczema patients with the controls

Hand	Male Eczema pts	Male controls	Female Eczema pt	Female controls
Right hand	36.89	40.95	44	44.9
Left hand	44.28	47.81	36.2	49.8

Table 4: Comparison of PEFR between male normal and Eczema patients

Groups	n	Actual value (L/sec) Range	Mean \pm SD
Normal male	25	5.40 -10.6	8.3 \pm 0.92
Eczema Pt Male	25	4.16- 7.64	5.8 \pm 0.7
Mean difference		2.40	
Significance	p	< 0.001 HS	

All values expressed as Mean \pm SD

HS – Highly significant

Table 5: Comparison of PEFR between Female normal and Eczema patients

Groups	n	Actual value (L/sec) Range	Mean \pm SD
Normal Female	25	4.30 -8.46	6.2 \pm 0.82
Eczema Pt Female	25	3.28- 6.84	4.6 \pm 0.5
Mean difference		1.60	
Significance	p	< 0.001 HS	

All values expressed as Mean \pm SD

HS – Highly significant

recommend for these people to do more of respiratory exercise and periodic monitoring of pulmonary function test.

4. Source of funding

None.

5. Conflict of interest

None.

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Author biography

Vatsala A R Assistant Professor

Ajay K T Associate Professor

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