

Original article:

Dermatoglyphic Pattern in Patients with Bronchial Asthma – A Qualitative and Quantitative Study

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ABSTRACT

Palmar dermatoglyphics is a simple, inexpensive and non-invasive anatomical procedure which may be used as a reliable indicator for screening of high risk population in a developing country like India. This will lead to early detection and early therapy, thus reducing the morbidity and mortality of bronchial asthma. Bronchial asthma is influenced by genetic factors and the present study was carried out to correlate the dermatoglyphic quantitative & qualitative parameters in patients of bronchial asthma. Dermatoglyphic prints were obtained from both hands of clinically diagnosed cases of 50 bronchial asthma patients in the age group of 20-80 years and 50 normal healthy individuals, without family history of bronchial asthma (control group). The study included both qualitative and quantitative tests. Qualitative study includes finger print patterns [whorls, radial loop, arches, and ulnar loop]. Quantitative study includes Total Finger Ridge count (TFRC), Absolute Finger ridge count (AFRC) and atd angle. In this study a significantly higher number of ulnar loops were seen in the bronchial asthma group and it was seen that the presence of arches were significantly lower than that compared to the control group. TFRC was seen to be significantly higher among the bronchial asthma patients. No significant results were obtained for AFRC. More elaborate studies with larger samples along with their first degree relatives need to be studied to get conclusive answers on whether dermatoglyphics can be used as a screening procedure

Key words: Bronchial asthma, dermatoglyphics, atd angle, finger ridge count.

INTRODUCTION

Asthma is one of the diseases longest recognized as a disease entity. Asthma is defined as a chronic inflammatory disease of airways that is characterized by increased responsiveness of the tracheobronchial tree to a multiplicity of stimuli resulting in episodic airflow obstruction.

Asthma is one of the most common chronic diseases globally and currently affects nearly 300 million people. Asthma has increased dramatically in prevalence and is now recognized as a major cause of disability, medical expense and preventable death¹.

Bronchial asthma is influenced by genetic factors. Many members of the family can be affected by the disease. As the dermatoglyphic patterns are

also genetically determined, these two may have a correlation which could be of help in predicting the occurrence of bronchial asthma among relatives of patients suffering from the disease. However the studies on correlation between dermatoglyphics patterns in bronchial asthma patients are few².

Dermatoglyphics is relatively a new science which involves the study of fine patterned dermal ridges on digits, palms and soles³. The word dermatoglyphics comes from two Greek words derma- skin and glyphos- carvings and refers to the friction ridge formation which appear on the palms of hands and soles of feet. The ridge formations of the skin of an individual begin to

appear during the third and fourth month of foetal development.

The relevance of dermatoglyphics is not to diagnosis, but to prognosis; not to the definition of existing disease, but to the identification of people with genetic predisposition to the development of certain diseases; not the academic identification of associations, but their practical application⁴. Therefore if a meaningful link can be established between dermatoglyphic patterns and bronchial asthma, it could prove to be a cost effective screening procedure to identify the population at risk thus helping us to keep a watch for the early onset symptoms in these individuals.

Method of Collection of Data:

Sample size: With the prevalence rate of bronchial asthma being 3%. At 95% confidence interval and ± 5 margin of error, the calculated sample size is 45 using statistical formula;

$$n = \frac{Z^2 \times p(1-p)}{\pm d^2}$$

n=45

Hence 50 cases of bronchial asthma (24 females and 26 males) and 50 controls (24 females and 26 males) were included in the study.

Methodology:

The work protocol was submitted to the ethical committee for approval and the necessary permission was taken. The purpose and procedure of the study was explained to all the patients and their consent taken.

The materials used were Kajal, bond paper and roller. Patients were asked to clean their hands with soap and water to remove dirt. Black kajal was applied to both hands and prints of both the palms, starting from wrist creases to fingertips were rolled on to the paper.

Diagnosed cases of bronchial asthma in the age group of 20-80 years were included in the

Hence this study was carried among patients suffering from bronchial asthma who attended the outpatient and inpatient departments of Shri B M Patil Medical College and Research Centre, Bijapur, to determine a possible correlation between the dermatoglyphic pattern of the person and bronchial asthma.

MATERIAL AND METHODS

Source of Data:

The material for this study was clinically diagnosed cases of bronchial asthma in the age group of 20-80 years. Patients were those attending outpatient and inpatient department of medicine at BLDEU's Shri B.M. Patil Medical College and Research Centre, Bijapur.

study. Controls comprised of individuals aged 20-80 years with no signs and symptoms or a family history of bronchial asthma. Patients with deformed fingers and palms, infections and injuries like burns of fingers and palms, scars of burns of fingers and palms of either hand were excluded from the study.

Statistical analysis:

The study includes both qualitative and quantitative tests. Qualitative study includes finger print patterns (whorls, radial loop, arches and ulnar loop). Quantitative study includes Total Finger Ridge count, Absolute Finger ridge count and atd angle.

To analyse them the following statistical methods were applied

1. Diagrammatic presentation.
2. Mean and standard deviation.
3. Z test.

RESULTS

The quantitative and qualitative data were calculated from the fingerprints of 50 bronchial asthma patients and 50 controls. They were tabulated, compared and analysed statistically. It

was seen that the presence of arches were significantly lower than that compared to the control group and a significantly higher number of ulnar loops were seen in the bronchial asthma group (Table 1). TFRC was seen to be significantly higher among the bronchial asthma patients. No significant results were obtained for AFRC (Table 2). There was no significant relationship seen between ‘atd’ angle and bronchial asthma (Table 3).

Table 1: Comparison of Fingertip Patterns in Patients and Controls

Patterns	Patients		Control		Z Value	Statistical Significance
	Total	Proportion + SD	Total	Proportion + SD		
Arches	27	0.054+ 0.006	60	0.120+ 0.009	-3.70	Significant (p= 0.002)
Total loops	294	0.588+ 0.016	268	0.536+ 0.015	1.66	Not significant
Ulnar loops	279	0.558+ 0.014	243	0.486+ 0.008	2.28	Significant (p= 0.0227)
Radial loops	15	0.030+ 0.004	25	0.050+ 0.004	-1.61	Not significant
Whorls	179	0.358+ 0.011	172	0.344+ 0.010	0.46	Not significant

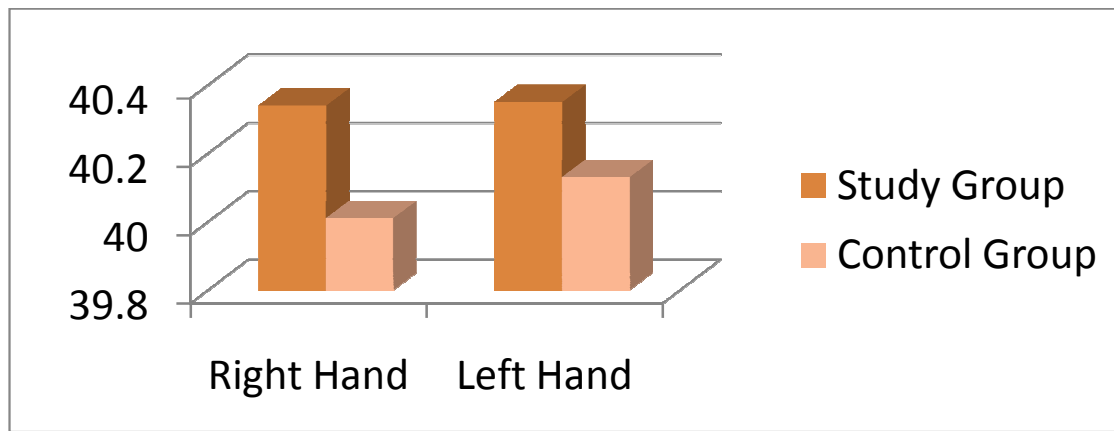
Table 2: Comparison of TFRC & AFRC in Patients and Controls

Count	Patients	Controls	Z Value	Statistical Significance
	Mean ± SD			
TFRC	142.35 +/- 41.02	117.5 +/- 39.06	3.10	Significant (p= 0.0019)
AFRC	189.04 +/- 82.56	166.48 +/- 84.52	1.35	Not significant

Table 3: Comparison of “Atd” Angle in Patients and Controls

Hands	Study Group Mean (SD)	Control Group Mean (SD)	Z Test	P Value	Inference
Right	40.34 (4.43)	40.01 (4.25)	0.380	0.7039	Not significant
Left	40.35 (4.22)	40.13 (4.73)	0.245	0.806	Not significant

Fig. 1: Comparison of “Atd” Angle in Patients and Controls



DISCUSSION

Cumins and Midloused dermatoglyphics as a diagnostic aid in medical diseases. Since then it has become a valuable tool in medico-legal, anthropological and genetic studies⁸.

Various diagnostic criteria are available for labelling bronchial asthma, such as medical history, family history, physical examination, and laboratory studies like skiagrams, spirometry, and allergy tests. Apart from advances in medical diagnostic procedures, the diagnosis of bronchial asthma is difficult, as patients with asthma are heterogeneous and they present a wide spectrum of signs and symptoms which vary in severity, from patient to patient and from season to season⁸.

Fingertip pattern: The findings in our study are similar to findings in the study done by S V Pakhale et al who found a lower count of arches in bronchial asthma patients and a higher number of ulnar loops as compared to control group in male

subjects⁵. Similar findings were also seen in a study by U K Gupta et al⁶. A significantly higher number of whorls was observed among female patients by S V Pakhale et al and in the first digit of patients by U K Gupta et al which was not observed in our study^{5,6}.

TFRC & AFRC: S V Pakhale et al found that AFRC was increased in bronchial asthma patients as compared to controls⁵. However the difference in AFRC between patients and controls in our study was not found to be significant. In our study the TFRC was significantly higher in patients as compared to controls which was not observed by S V Pakhale et al in their study.

Atd angle: The findings in our study are consistent with the findings of SV Pakhale et al⁷.

CONCLUSION

This study was taken up with an intention to find the relationship of two genetically related aspects- dermatoglyphics and bronchial asthma. Though

many statistically significant results were obtained, some results were in contrast to previously conducted studies. The present study indicates that there are some genetic factors which are involved in the causation of bronchial asthma and it is possible to a certain extent to predict an individual's chance of acquiring bronchial asthma from the dermatoglyphic pattern. Like clinical history, examination and investigations, dermatoglyphics will play an important role revealing the genetic susceptibility to bronchial asthma.

At present there are very few studies on palmar dermatoglyphics in bronchial asthma. Even though the findings of previous studies are in many ways similar to our present study, its findings cannot be generalized as our study had a small sample size of 50 patients.

Hence, more elaborate studies with larger samples along with their first degree relatives need to be undertaken to get conclusive answers on whether dermatoglyphics can be used as a screening procedure to find people that have a genetic predisposition to bronchial asthma.

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