

Original Research Paper

Study of Fingerprinting In Patients with Schizophrenia

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Abstract

In the recent decades, a considerable improvement has been achieved in the concept of relation between the types of pattern of lines on the fingers and psychiatric disorders. The study was conducted with the aim to find out association of fingerprint pattern and ridge count between schizophrenic patients and normal individuals. In this study we had examined fingerprint pattern and ridge count of right and left index finger. A total of 76 known cases of schizophrenic patients based on DSM-V diagnostic criteria were selected from out-patient psychiatry department and 76 controls were selected randomly from the staff and students of the North Bengal Medical College, Darjeeling. It was observed that loop pattern is overall commonest in both case and control group but arch pattern is comparatively more common in schizophrenic patients than that of the control group. Significant difference found between left and right index finger ridge counts between the case and control groups and men with schizophrenia had higher mean ridge count for both index fingers than normal men ($p < 0.05$) while for women this difference was not significant.

Key Words: Schizophrenia, Fingerprint Pattern, Ridge Counts, Dermatoglyphic

Introduction:

The type of fingerprint is unique based on the genetical characteristics of each individual. In the recent decades, a considerable improvement has been achieved in the concept of relation between the types of pattern of lines on the fingers and psychiatric disorders. Dermatoglyphics may be affected by both genetic and environmental factors.

A relationship exists between embryonic stress and distortion of dermatoglyphic patterns. [1] Schizophrenia is a chronic, severe and disabling brain disease. Approximately 1% of the general population suffers schizophrenia in their life time. Based on the pattern of ridge configuration, several criteria have been proposed to classify fingerprints into different pattern groups. These include the three-pattern system (loop, arch, whorl), the six-pattern system (plain arch, tended arch, ulnar loop, radial loop, whorl or combined figure).

It also include the eight-pattern system (plain arch, tended arch, ulnar loop, radial loop, plain whorl, double loop whorl, central pocket loop whorl, and accidental whorl) adopted by the FBI. The finger ridge count (FRC) is defined as the number of ridges intersected by a line between the triradial points (also called the delta point) to the point of core.

Some fingers may have more than one triradial point and these results in multiple ridge counts. To resolve this problem, the largest ridge count is typically chosen as the FRC. [2, 3]

Epidermal ridges are formed between 11th and 24th week of gestation; after this period epidermal ridges do not change. [4]

The critical growth of the brain is also occurring during this period. Since both the ridges and the brain are derived from the ectoderm, it seems reasonable to use unusual dermatoglyphic patterns to characterize disturbances of brain development. [5]

Cerebral and epidermal tissues share some aspects of development, such as similar ectodermal origin, rapid development during the second trimester of gestation, and susceptibility to neuronal growth factor.

Daily et al suggested that males tend to be at greater risk for a neurodevelopmental subtype of schizophrenia than females. [6] Preliminary experimental results have successfully demonstrated the association between dermatoglyphic and cerebral structural measures in patients with schizophrenia.

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DOR: 04.07.2014 DOA: 21.09.2014

Materials and Methods:

This study examined fingerprint pattern and ridge count of right and left index finger. A total of 76 known cases of schizophrenic patients were selected from out-patient psychiatry department of North Bengal Medical College, Siliguri. The controls were selected randomly from the staff and students of the N.B.M.C.H. who had no psychiatric disorders.

All subjects were diagnosed as schizophrenia based on the DSM-v diagnostic criteria. Finger prints were recorded on a plain white unglazed paper with a black stamp pad by plain and rolled method.

Ethical clearance was obtained from the institutional ethical committee.

Patients of either sex diagnosed as a case of schizophrenia and subjects having any ridge pattern of finger prints were included in this study. Patients suffering from any chronic skin disease e.g. Eczema, leprosy and chronic dermatitis and having scars, congenital or acquired anomalies due to trauma on fingers were excluded from this study.

A proforma was designed in which data including name, age, sex and family history of schizophrenia were recorded. Screening of finger prints were done by using magnifying lens and scanner. All analysis was performed using the SPSS statistical software.

Observation and Results:

In present study data showing loop pattern is overall commonest in both case and control group but arch pattern is comparatively more common in schizophrenic patients than that of the control group. (Table 1) In this study mean of both index finger ridge counts was 15.5 ± 4.3 and 13.6 ± 6.3 for the case and control groups, respectively. The t-student test showed a significant difference between left and right index finger ridge counts between the case and control groups ($p < 0.001$). (Table 2)

Our study observed significant differences in mean ridge count of both index fingers between control and case groups but these differences were contributed only to males. Men with schizophrenia had higher mean ridge count for both index fingers than normal men ($p < 0.05$) while for women this difference was not significant ($p > 0.05$). (Table 3)

Discussion:

Dermatoglyphics analysis has been investigated as a useful diagnostic and research tool in medicine and provides valuable insight on the inheritance and embryologic formation of many known clinical disorders. [7] Ridge count is increased in Turner's syndrome and decreased

in klinefelter's syndrome, chromosome 5p deletion syndromes [8, 9], beta- thalassemia [10] and rheumatoid patients. [11]

Fingerprint pattern of both index finger of the two groups show no statistically significant difference but arch pattern is comparatively more common in case group which is consistent with the findings of Van Valen. [12]

Case and control groups showed a statistically significant difference in terms of their both index finger ridge counts and this count was higher in patients with schizophrenia ($p < 0.001$) and this finding is consistent with previous dermatology reports by the HS Bracha et al [13] and F. Shakibaei, G. A. Asadollahiet al. [14]

Conclusion:

These results suggest that there may be an association between early developmental disturbances, occurring during prenatal life, and the later onset of schizophrenia.

These findings are important in screening by providing a biological marker which may help in prediction and early diagnosis of Schizophrenia. Our result encourages further studies to explain the exact role of both genetics and environmental factors.

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Table 2: Mean of Both Index Finger Ridge Counts in Two Groups

Mean Index Ridge Count	Control Group (n= 76)	Case Group (n=76)	P-Value
Right Index	13.9 ± 6.6	15.9 ± 4.1	
Left Index	13.3 ± 6.1	15.1 ± 4.5	
Mean of both	13.6 ± 6.3	15.5 ± 4.3	< 0.001

Table 3: Mean Ridge Count of Both Index Finger in Male & Female

Gender	Index Finger	Group	Mean + SD	P- Value
Male	Right	Control	13.7 ± 6.75	< 0.001
		Case	16 ± 4.26	
	Left	Control	13.3 ± 6.17	0.008
		Case	15 ± 4.85	
Female	Right	Control	14.6 ± 6.14	0.423
		Case	15.4 ± 3.23	
	Left	Control	13.2 ± 5.8	0.071
		Case	15 ± 3.70	

**Table 1
Frequency Distribution of Index Fingerprint Pattern**

Finger Pattern	Groups	Simple Arch		Tented Arch		Whorl		Loop		Total	
		Number	%	Number	%	Number	%	Number	%	Number	%
Left Index	Case	10	13.16	9	11.84	21	27.63	36	47.37	76	100
	Control	7	9.21	3	3.94	19	25	47	61.84	76	100
Right Index	Case	8	10.53	6	7.89	23	30.26	39	51.32	76	100
	Control	5	6.57	4	5.26	22	28.95	45	59.21	76	100