Role of atd Angle of Palm in Diagnosis of Pulmonary Tuberculosis

*A Ahmed¹, S Ara², KMM Alom³, S Rashed⁴, S Rahman⁵, N Islam⁶

ABSTRACT

Background: Dermatoglyphics are the lines and ridges forming a skin pattern, especially on the palm of the hands, fingertips and soles of feet. Differentiations of dermal ridges in early life are genetically determined¹. Any disturbance by genetic factors causes development of unusual dermatoglyphics. On the other hand, deficiency of Mannose binding protein (MBP) gene and Interleukin-1 (IL-1) gene cause spread of pulmonary tuberculosis². The dermatoglyphic pattern in patient with pulmonary tuberculosis can represent an anatomical, non-invasive, inexpensive tool for screening high-risk population, and facilitates early prediction of vulnerable population of PTB.

Materials and Methods: A Cross-sectional, analytical type of study was conducted in Department of Anatomy, Dhaka Medical College, Dhaka, from January 2012 to December 2012. The study was performed in 100 patients suffering from pulmonary tuberculosis and 100 healthy individuals.

Results: There was significant reduction in mean±SD of atd angle in pulmonary tuberculosis patients in comparison to control subjects. Mean±SD of atd angle was 37.87±3.403 in pulmonary tuberculosis patients and 49.77±4.628 in the control subjects. The difference was highly significant (P<0.001).

Conclusion: The atd angle was found significantly narrower in the study group compared to the control subjects.

Key Words: Dermatoglyphic, pulmonary tuberculosis, axial triradius, atd angle.

Introduction

The skin of the palm of the hands and the plantar surface of feet is designed and corrugated with the ridges³. The epidermal ridges of these region form different types of configuration. These configurations of epidermal ridges of palms, fingers and soles are known as dermatoglyphics. Cummin in 1926. first time added the term dermatoglyphics to the field of science. The study of dermatoglyphics was pioneered by Sir Francis Galton (1892)⁴. After having a good grip on the basics of dermatoglyphic, the icons of this field were inspired to search and investigate its correlation with various types of diseases like -depression, schizophrenia, epilepsy, psoriasis, leprosy, Down's syndrome, Klinefelter's
Tuberculosis is a major global health problem especially in the developing countries, like Bangladesh. In "Fifth Joint Monitoring of the Bangladesh National Tuberculosis Control Program 2-12 October 2010" by WHO reported that in 2008 there were approximately 660,000 TB cases (range 420,000 - 980,000) in the country and about 79,000 patients (range 31,000 - 150,000) were died from TB. According to "WHO report 2011 - Global Tuberculosis control" -TB is more common in men than in women and affects mostly adult in the economically productive age group around 15 to 59 years. According to "National Tuberculosis Control Program -2009" of Bangladesh by WHO reported that approximately 875 new TB cases and 180 TB deaths occur daily in the country. To reduce the suffering from tuberculosis, development of new tools is necessary for early prediction of TB. The findings of the study will be useful in early prediction of pulmonary tuberculosis to the Pulmonologists.

Materials and Methods

The study was performed in 200 individuals. Among them, 100 were patients suffering from pulmonary tuberculosis and 100 were healthy individuals (not suffering from pulmonary tuberculosis) who served as control group. The patients suffering from pulmonary tuberculosis were selected from diagnosed cases. Diagnosis was done by the pulmonologist of National Institute of Diseases of the Chest and Hospital (NIDCH), Mohakhali, Dhaka. Diagnosis of the patients were based on - Sputum for AFB and Mantoux test (+)ve, and X-ray chest revealed features of pulmonary tuberculosis. The control group was selected from National Institute of Diseases of the Chest and Hospital (NIDCH), Mohakhali, Dhaka. Diagnosis of the patients were based on - Sputum for AFB and Mantoux test (+)ve, and X-ray chest revealed features of pulmonary tuberculosis. The control group was selected from National Institute of Diseases of the Chest and Hospital (NIDCH), Mohakhali, Dhaka. They attended the outpatient department of NIDCH with history of cough/ fever / chest pain. They were not suffering from pulmonary tuberculosis and were confirmed by the pulmonologist of that institute. They were sputum for AFB and Mantoux test(-)ve and in their chest X-ray, no abnormality was detected. The control group had no history of known contact with pulmonary tuberculosis patient. Data sheets of personal information were filled up...
for both groups to avoid duplication and to exclude diseases like diabetes mellitus, hypertension, congenital heart disease, neurological disorders, asthma, carcinoma breast etc from history. Those individuals who were suffering from any of these diseases were excluded from sample. All the individuals (patient or control) were informed by explaining about the nature of the work. Then written consent was taken from the individual. Data was collected with due permission from the Director of National Institute of Diseases of the Chest and Hospital (NIDCH), Mohakhali, Dhaka.

The materials used in present study were white paper, a clip board, printing ink, hand roller, a flat bottom container, optical grade hand lens with 4X & 6X magnification, protractor, scale, spirit or turpentine oil and liquid soap. Dermatoglyphic print of palm was taken by the "Ink & paper Method" as described by "Cummin (1936)" and "Cummin and Midlo (1961)".

The position of "axial or t triradius" was identified first and then the "triradius a" and "triradius d" were located by the hand lens. Then the atd angle was drawn by joining lines from "triradius a" to "axial or t triradius" and from "triradius d" to "axial or t triradius". atd angle was measured with the help of a protractor in the palm. Atd angle was measured in right and left hand separately. Then two values were summed to get single value for an individual. Then the mean values were calculated for different group7.

![Fig 1: Showing process of measurement of "atd angle"](image)

Data were analyzed with the help of SPSS (Statistical Package for Social Science) program. For quantitative data Unpaired Student’s ‘t’ test

**Discussion**

Mean ±SD of atd angle in pulmonary tuberculosis patients was 37.87±3.4 in the present study. In the control group, mean±SD of atd angle was 49.77±4.6. atd angle in control subjects was higher than the pulmonary tuberculosis patients (P<0.001).

Sangita S. Babu, B. P. Power, O. N. Khare (2006) in Madhay prodesh, India reported highly significant difference of atd angle in pulmonary tuberculosis patients and in normal individuals (P<0.02). They observed Mean±SD of atd angle in pulmonary tuberculosis patients was 38±3.77 and

<table>
<thead>
<tr>
<th>Group</th>
<th>No. of subjects (n)</th>
<th>Mean ± SD</th>
<th>Range</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient</td>
<td>100</td>
<td>37.87±3.403</td>
<td>30 - 56</td>
<td>0.001***</td>
</tr>
<tr>
<td>Control</td>
<td>100</td>
<td>49.77±4.628</td>
<td>34 - 60</td>
<td></td>
</tr>
</tbody>
</table>

Comparison of atd angle between pulmonary tuberculosis patients and control subjects was done by Unpaired student’s T’test. ***=highly significant.

![Fig 2: atd angle in pulmonary tuberculosis patients and control subjects.](image)
in the control group, mean±SD of atd angle was 43.6±5.564. In comparison of findings of their study with the findings of present study, similarity was found with the patient group (P>0.05) and dissimilarity with the control subjects (P<0.001).

Conclusion

There was significant reduction of mean ±SD of atd angle in pulmonary tuberculosis patients (37.87 ±3.403) as compared to control subjects (49.77 ±4.628). The difference was highly significant (P<0.001). These parameters may help in early prediction of pulmonary tuberculosis in a patient.

References
