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A Dermatoglyphics Study of Retinitis Pigmentosa– A Case Study

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ABSTRACT

The aim of the study is to study the association between the dermatoglyphics and retinitis pigmentosa. Dermatoglyphics pattern stay constant during life and may sometime play a significant role in diagnosis of many disorder with genetics background. In human dermatoglyphics are present on fingers palms toes and sole and can give insight into a critical period of embryogenesis. Retinitis pigmentosa is a group of related eye disorders that cause progressive vision loss. In people with retinitis pigmentosa, vision loss occurs as the light-sensing cells of the retina gradually deteriorate. Mutations in any of the genes responsible for retinitis pigmentosa lead to a gradual loss of rods and cones in the retina At least 35 genes have been associated with the autosomal recessive form of the disorder. The most common of these is USH2A; mutations in this gene are responsible for 10 to 15 percent of all cases of autosomal recessive retinitis pigmentosa. Changes in at least six genes are thought to cause the X-linked form of the disorder. The palm and finger print were collected from confirmed patient eye hospital. . The dermatoglyphics pattern of normal person is compared with the patient suffering from retinitis pigmentosa.

KEYWORDS Dermatoglyphics, USH2A gene, retinitis pigmentosa, RPGRgene, RP2 gene

INTRODUCTION

Retinitis pigmentosa

Retinitis pigmentosa (RP) is the disorder of the retina which causes the progressive vision loss. In this, the vision losses occur gradually and it deteriorate, and the loss of night vision is the onset of this disease and later it cause blind spot which deteriorate further and it become tunnel vision [4]. When this disorder happens by itself then it is considered as non syndromic. Whereas the other pattern on inheritance are autosomal dominant, autosomal recessive. X- Linked [1]. Together, mutations in the RPGR and RP2 genes account for most cases of X-linked retinitis pigmentosa. The syndromic retinitis pigmentosa is called Usher Syndrome in which the patients suffer from both vision and hearing loss. It has been found that about 55 genes are the reason to cause non syndromic disease. Out of this about 22 genes are associated with autosomal dominant retinitis pigmentosa, while 30 genes are recessive in nature [2 &5]. These genes have a special role in production of protein on the retina which is called photoreceptor. This receptor sends the image to brain. There are two type of photoreceptor which is called as rods and cones. Mutation in these genes also causes the loss of rods and cones in the retina [3]. The rods break down before ones and hence its impairment is the first disorder. RP is usually the autosomal dominant, which means that he patients have affected parents and other family also suffer from RP. It may be possible to be autosomal recessive too, in which the parents and other family members has a single copy of affected gene [7].

Dermatoglyphics

Dermatoglyphics is the scientific study of variation, of the dermal ridges and the pattern present on the lips, soles palm and fingers. It has the genetic link to the humans and primates. Dermatoglyphics origin and development had been observed to be associated with the many congenital defects and genetics diseases. It is practically unique in stability in the environment changes as well as the ages. It is the morphological trial of humans which is established in the third month of gestation period. The complex patterns of the ridges and groves present on the fingers, lips, soles remain constant throughout the age. Dermatoglyphics analysis is a handy scientific investigation tools which is non- invasive, quick and inexpensive. The mode of inheritance of the patterns of individual, minutae and other features like, simple arch, tented arch, ulnar loop, radial loop single loop whorl, double loop whorl, central pocket loop whorl, etc, feature are still not fully established, but the munerous studies of various syndromes like, Down's Syndrome, etc and the study of twins too had shown its genetics influence on the above patterns [8&11]. No two individually, even the identical twins have been shown to have identical finger and palm prints. The patterns on the epidermal ridges of finger, palm can be studied to diagnose many genetics disease which are caused by the chromosomal aberration. Dermatoglyphics pattern as mentioned above are derivatives from the hypodermal neural system and is heritable. The finger ridges counts which is present between the triradius and the particular patterns, and the frequency of all palm patterns like the Distal Crease, Proximal crease, Thenar crease, the tri radius a, b, c, d, t and angle atd shows the genetic mode of major genes, thus its distribution of interdigital patterns has been proved to be a multi- allelic gene mode of inheritance in primates. A similar mode of inheritance has also been found in the chromosome no. 5 &1, which has the genetic linkage between the finger ridge counts [10]. But the Mendelian inheritance had not yet been discovered perhaps for two reasons i) to many and large no. of genes or ii) low inheritance. The total finger ridges counts are heterozygous. These ridges are developed through the regression of embryonic volar pods on

the fingers. Thus the genetics make up and the environmental influences are present during the finger ridges formation and likely to affect the total finger ridge number. The critical growth of the brain as well as the development of dermatoglyphics pattern presen on palm sole fingers and lips also develops in the 24th week of gestation since both develop from the same ectoderm [10].

MATERIALS AND METHODS

The study was conducted on the patients suffering from retinitis pigmentosa. The materials required for Dermatoglyphics prints are Kajal (carbon source), A4 size data sheet, magnifying glass, protractor, pencil, scale and tissue paper.

METHOD OF COLLECTING FINGERPRINTS

The fingerprints were taken on a100GSM bond sheet by rolling finger technique using kajal. Kajal was used because of its antiseptic property attributed by its constituent camphor. The selected subject was instructed to thoroughly wash his hands with soap. Using the kajal stick the digits of the fingers were coated one by one, simultaneously recording the prints on to the tabulated A4 size paper. This was followed by coating the palm with a thin coat of kajal and obtaining the prints. Once accurate palm and finger digit prints were obtained the prints were analyzed using magnifying lenses. After the entire data was obtained, the right palm and the left palm findings were tabulated separately to evaluate the specific or distinct dermatoglyphic patterns.

RESULTS AND DISCUSSION

In Retinitis Pigmentosa (RP) patients both hand was compared with the right and left hand of the control (a normal vision person) and some specific result was obtained. In case of control the angle atd was 42°in both the hand where as the angle atd in the patient in both hand was 38°. In control the proximal crease (PC), distal crease (DC), Thenar crease (TC), was normal but in the RP patient, DC, PC, was variable but TC was normal. The control had the triradius 'c' present in both the hand but 'c' triradius in RP patients were missing in both the hand.

CONCLUSION

As per the theory of Dermatoglyphics, the patient suffering from RP show the autosomal recessive characters because the recessive pattern was found in the palm print and the finger prints.

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