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Original Article

Anatomy Section

Correlation of Dermatoglyphics with Clinical Characteristics of Cervix Carcinoma Patients at a Tertiary Care Centre in Kanpur, Uttar Pradesh, India

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ABSTRACT

Introduction: Cervix cancer is most prevalent cancer in females. Early detection and regular screening methods are helpful for the prevention of cervix cancer related morbidity and mortality. Early stages of development, dermatoglyphic features are generated under genetic influences, but they can be influenced by environmental variables during the first three months of pregnancy. These trends may reflect an individual's genetic make-up and, as a result, his or her proclivity for particular diseases. Therefore, the dermatoglyphic prints may serves as a non invasive anatomic marker of cervix cancer risk, allowing for early detection and treatment.

Aim: To characterise dermatoglyphics in cervix cancer patients and correlate them to principal clinical features.

Materials and Methods: This cross-sectional study included 300 cervix cancer patients, analysed the clinical presentations and dermatoglyphics prospectively after obtaining ethics approval from a tertiary care hospital, Kanpur, Uttar Pradesh, India, during December 2016 to January 2020. The palmar dermatoglyphics (loops, arches, whorls and palmar angle) were obtained and evaluated for correlation with principal clinical features like vaginal discharge, postmenopausal bleeding, and intermenstrual bleeding using Spearman's correlation test.

Results: In this study, the frequencies of arches, loops and whorls were 81, 2051, 868 respectively. A strong positive correlation (r>0.92) existed between whorls of palmar digits and clinical features of cervix cancer.

Conclusion: Dermatoglyphic patterns could be used to investigate the genetic cause of cervix cancer and could potentially be used as a non invasive anatomical screening method in high-risk patients.

Keywords: Anatomical tool, Clinical features, Palmar ridges, Triradii, Uterine-cervix cancer

INTRODUCTION

Cervix cancer prevalence ranks fourth among all cancers worldwide [1]. In India, 1.3 lac women are prone to cervical cancer each year, with 67,477 deaths as a result of the disease. There are 432.2 million females in India aged 15 and up who may be at risk of developing cancer. It is the second most frequent cancer in women between the ages of 15-44 years [2].

The genetic aspect of cancer is widely understood, and a number of genes have been examined and confirmed as genetic linkages [3-5]. There is evidence that suggests a familial history of cancer is linked to a specific dermatoglyphic pattern [6-9], although finger print identification is genetic, it has been shown that environmental factors can influence it during the pregnancy. The patterns are somewhat continuous after birth, and hence can be used to examine genetic patterns in every individual [10].

As a result, fingerprints may be used for detection or to steer future studies in this area, and cancer screening could indeed be at our fingertips. Various genetic disorders such as few syndromes have been examined using dermatoglyphic patterns. As a result, the prints could be used as a diagnostic anatomical indicator of cancer risk. Recent studies have revealed the association between dermatoglyphics and cancers of oral, prostate and breast [11-14]. In cervix cancer patients, arches were more and ulnar loops were less in frequency [15]. In order to choose the high-risk population for surveillance, a progress has been put to develop a cervix cancer characterisation using dermatoglyphic studies. Hence, the present study aimed to determine the correlation of clinical characteristics of cervix cancer patients with their dermatoglyphics. Also, to characterise the cervix cancer patients based on their dermatoglyphics.

MATERIALS AND METHODS

The present observational cross-sectional study conducted for a period of three years (December 2016 to January 2020), which included all cervical cancer cases with age range between 21-60 years diagnosed and treated at this tertiary care facility. The researchers from Department of Gynaecology and Anatomy monitored information on the patient's clinical presentation including postmenopausal bleeding, vaginal discharge, inter-menstrual bleeding and dermatoglyphic details (loops, arches, whorls and palmar angle) to document and establish a correlation between them. After receiving informed consent and clearance from the Institutional Ethics Committee (IEC) (MEC/Regn/ECR/272/Inst/2016) of a tertiary care centre in Kanpur, Uttar Pradesh, India, the study was done on 300 diagnosed cervical cancer patients.

The procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975 that was revised in 2013.

Sample size calculation: The sample size was calculated using formula ($n=Z^2\ pq/e^2$). At 95% confidence interval and with unknown expected proportion of condition, with an acceptable error of 0.05 (p=0.5, q=1-p, e=0.05).

Inclusion criteria: The patients aged between 21-60 years with confirmed diagnosis of cervix cancer based on clinical and pathological findings were included in this study.

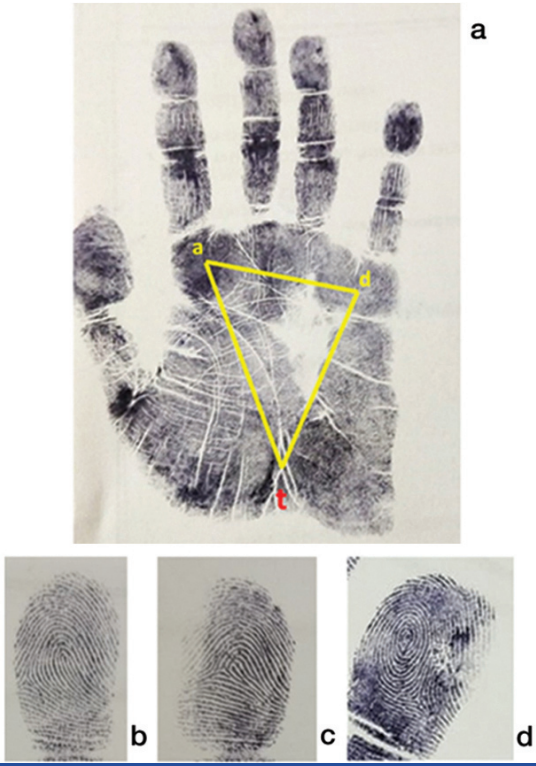
Exclusion criteria: Patients with history of fibroid disease, cervical growth and grossly distorted cervix were excluded from the study.

Study Procedure

Patients were asked to fill out a performa (patient details and dermatoglyphics) and have their digital prints taken. The fingerprints were captured on glossy paper using the rolling finger technique and ink [16], then digitally shot and examined for palmar dermatoglyphic characteristics using adobe photoshop. Concurrently, clinical characteristics of cervical cancer patients like postmenopausal bleeding, vaginal discharge, inter-menstrual bleeding were correlated.

For this investigation, fingerprints from both hands of patients were gathered. Other digits were positioned with the radial edge downward and rolled away from the body, whereas the thumb was placed with the ulnar edge downward and rolled toward the body. With the use of the hand lens, the prints were examined. The ridge patterns including loops, whorls and arches were researched and assessed. The palmar angles [Table/Fig-1] were taken as described in previous study [11].

The ATD angle (atd) is the characteristic of palm which reflects the coordinates of three triradii-a and d, which are located just below to the second and fifth digits on the distal palm, correspondingly, and t, which can be found anywhere on the proximal palm just from distal to the wrist up to the centre of the palm. Depicting two straight lines between the "a" and "t" triradii and the "d" and "t" triradii and measuring the resulting angle were used to estimate atd angles for every handprint. The atd angles were compared to see whether there was any correlation [Table/Fig-1] [11].



[Table/Fig-1]: Dermatoglyphics. a-palmar angles (atd), b-loop, c-arch, d-whorl.

STATISTICAL ANALYSIS

The statistical analysis was done using Microsoft Office Excel 2016. The correlation between principal clinical characteristics like postmenopausal bleeding, vaginal discharge, intermenstrual bleeding and dermatoglyphic palmar whorls were analysed using Spearman's correlation test (r value ranges between +1 to -1). Other details were expressed using simple descriptive statistics. Student's t-test was used for analysing parametric data. A p-value <0.05 was considered to be statistically significant.

RESULTS

This cross-sectional study included 300 uterine-cervix cancer patients aged between 21-60 years (mean=45.66 years). Predominant age group affected was 41-50 years, followed by 51-60 years and 31-40 years. Minimal incidence was seen in 21-30 years age group. Considerable proportion of patients complained about pain in lower abdomen and lower back. The important clinical features of cervical carcinoma like vaginal discharge, postmenopausal and intermenstrual bleeding were observed in 135 (45%), 240 (80%) and 61 (20.33%), respectively [Table/Fig-2].

Patient characteristics		N (%)
Age range (years)	21-30	5 (1.67)
	31-40	84 (28)
	41-50	120 (40)
	51-60	91 (30.33)
Vaginal discharge	Present	135 (45)
	Absent	165 (55)
Postmenopausal bleeding	Present	240 (80)
	Absent	60 (20)
Intermenstrual bleeding	Present	61 (20.33)
	Absent	239 (79.67)

[Table/Fig-2]: Age range and clinical characteristics of study population. N-frequency

Dermatoglyphic characteristics of uterine cervix cancer patients: The dermatoglyphic traits like triradii and ridge patterns were analysed. The ridge patterns showed maximum number of loops, followed by whorls and arches. In this study population group, the frequencies of arches, loops and whorls were 81, 2051, 868, respectively. Total arches and whorls were more in right hand in comparison to left whereas total loops were high in left hand compared to right hand [Table/Fig-3,4]. The triangle angle was formed between the triradii of base of index: (a) and little finger; (d) to proximal palm (t) near to 4th metacarpal. The angles evaluated were tabulated in the [Table/Fig-4]. Significant difference (p=0.0001) was observed between right and left ATD and ADT angles of cervix cancer patients.

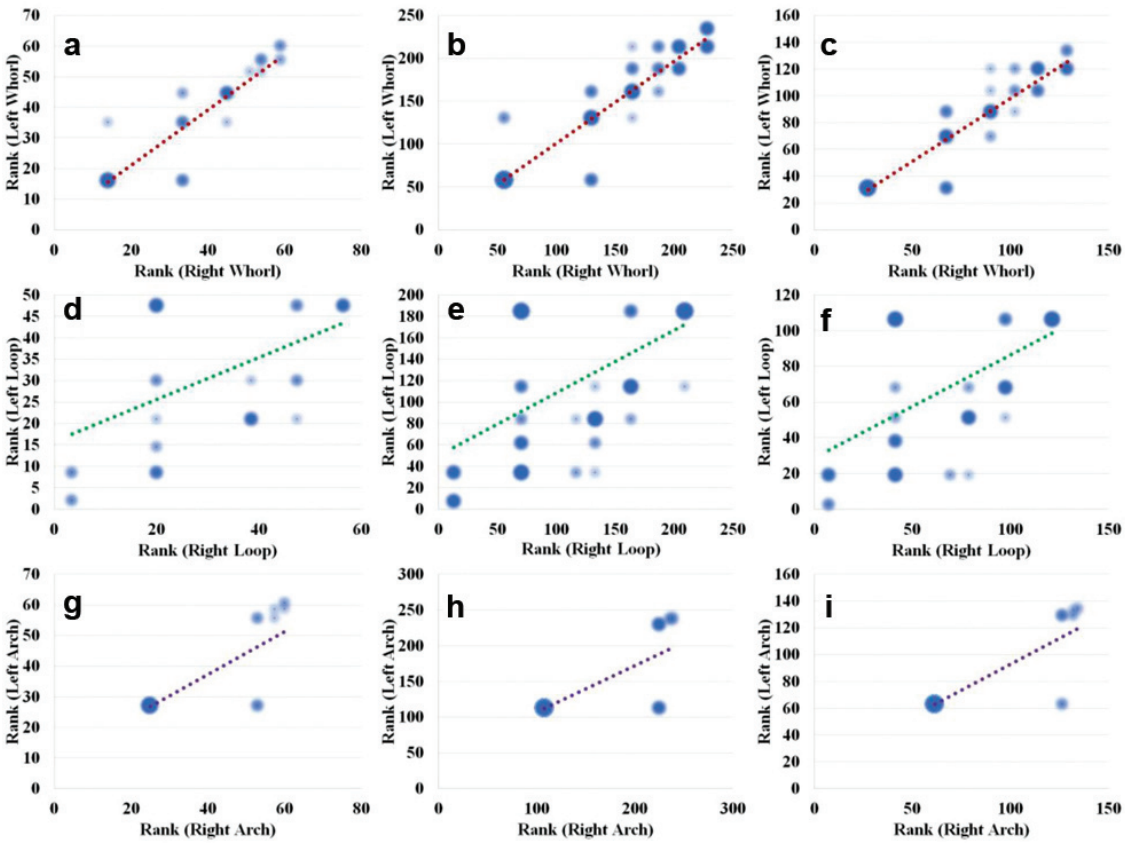
Digits	Arch (n)	Loop (n)	Whorl (n)
Right			
Digit 1	8	168	124
Digit 2	25	148	127
Digit 3	8	224	68
Digit 4	8	200	92
Digit 5	0	268	32
Left			
Digit 1	3	186	111
Digit 2	16	174	110
Digit 3	12	231	57
Digit 4	1	196	103
Digit 5	0	256	44

[Table/Fig-3]: Palmar dermatoglyphics ridge patterns in uterine cervix cancer patients. n- frequency

Angle	Right	Left	p-value
ATD	44.92±2.91	43.84±3.70	0.0001
DAT	58.76±5.16	58.87±4.15	0.77
ADT	78.77±3.15	79.63±1.28	0.0001

[Table/Fig-4]: Palmar dermatoglyphic traits in uterine cervix cancer patients. The p-value was obtained using student's t-test

Correlation of vaginal discharge, postmenopausal and intermenstrual bleeding with dermatoglyphic whorls: The correlation was made between the both hands whorls, loops, arches and clinical features vaginal discharge, postmenopausal and intermenstrual bleeding. There was increase in number of whorls in right hand compared to left hand which was very significant. Also, the right and left hand whorls showed strong positive correlation (r>0.92) with clinical features. Loops and arches also showed positive correlation but there was no strong correlation as whorls [Table/Fig-5].



[Table/Fig-5]: Spearman correlation. a) Right and left whorls vs intermenstrual bleeding (r=0.926, p=0.001), b) Right and left whorls vs postmenopausal bleeding (r=0.963, p=0.001), c) Right and left whorls vs vaginal discharge (r=0.955, p=0.001), d) Right and left loops vs intermenstrual bleeding (r=0.492, p=0.001), e) Right and left loops vs postmenopausal bleeding (r=0.597, p=0.001), f) Right and left loops vs vaginal discharge (0.583, p=0.001), g) Right and left arches vs intermenstrual bleeding (r=0.823, p=0.001), h) Right and left arches vs postmenopausal bleeding (r=0.796, p=0.001), i) Right and left arches vs vaginal discharge (r=0.876, p=0.001).

DISCUSSION

This cross-sectional study was first of kind correlating the dermatoglyphics with clinical features of cervix cancer in population of Kanpur, Uttar Pradesh, India. Clinical presentations like postmenopausal bleeding, vaginal discharge, intermenstrual bleeding was selected for the analysis in this study. The incidence of these features varied when compared to that study by Anunobi CC et al., like incidence of postmenopausal bleeding was high (80%) in present study compared to previous (53%) [17]. Few studies have been conducted in India, mainly from West Bengal and Maharashtra aiming to characterise cervix cancer patients based on dermatoglyphics [18,19]. In this study, a strong positive correlation was observed (r>0.92) between the dermatoglyphic ridges (whorls) and clinical features like vaginal discharge, postmenopausal bleeding and intermenstrual bleeding. Though, not as strong as whorls, significant association and positive correlation has been observed with loops and arches.

There have been many studies revealing the characteristics of dermatoglyphics in various types of cancer patients [Table/Fig-6] [13,20-23].

In the dermatoglyphic study of cervix cancer population (N=144) at Bengal during 2015-2016 by Pramanik A and Bhattacharya A they reported significant decrease in loops and significant increase in whorls in cervix cancer patient when compared to normal individuals [18]. Another similar study at Solapur (N=90) by Priya PW and Hosmani PB demonstrated a significant decrease in ATD angle (mean=39.87) in comparison to normal population (mean=51.03) [19]. In present study, the mean ATD was 44.92 for right hand and 43.84 for left hand. Chukwumah AL evaluated the dermatoglyphic patterns in normal individuals [24]. They showed that normal female participants (n=100) had 192 whorls, 230 loops and 86 arches in right hand; and 184 whorls, 228 loops, and 96 arches in left hand. In contrast, present study included only cervix cancer patients (N=300) and demonstrated 443 whorls, 1008 loops and 49 arches in right hand while 425 whorls, 1043 loops and 32 arches were observed in left hand. In comparison, the loops were more and whorls were low in frequency in present study.

Sl. No.	Author's name and year	Place of study	Number of subjects	Type of cancer	Parameters assessed	Conclusion
1	Gupta A and Karjodkar FR (2013) [20]	Mumbai, India	120	Oral squamous cell carcinoma	1. Fingertip prints patterns 2. Palmar patterns 3. Prevalence of accessory triradii	In SCC- frequency of arch and ulnar loop patterns on fingertips increased, frequency of simple whorl patterns on fingertips decreased, frequency of palmar accessory triradii on right and left hands increased. Significant findings in OSF included an increase in frequency of arch and ulnar loop pattern, decrease in frequency of simple whorl patterns on fingertips, decrease in atd angle on right hand, decrease in frequency of palmar accessory triradii on right hand. The results revealed that the field of dermatoglyphics holds promising results for determining the genetic susceptibility of individuals to develop SCC and OSF.
2.	Raizada A et al., 2013 [21]	Jaipur, Rajasthan, India.	100	Carcinoma breast patients	1. Fingertip ridge pattern, 2. The ridge count in the individual fingers, 3. The Total Finger Ridge Count (TFRC) 4. The Absolute Finger Ridge Count (AFRC)	This study was able to establish a specific finger tip predominance in the carcinoma breast patients.

3.	Sridevi NS et al., 2010 [13]	Bangalore, India	200	Breast cancer	1. Finger ridge counts 2. Angles of palmar triradii 3. Fingertip pattern	Digital ridge patterns are significantly affected in carcinoma of breast patients.
4.	Khandelwal R et al., 2007 [22]	New Delhi, India	120	Breast cancer	1. Ridge count 2. Pattern intensity index 3. Digital pattern 4. Histological types analysed with whorls	The ridge count was significantly lower in cases as compared to controls and the whorl pattern frequency showed maximal changes as compared to other patterns.
5.	Lakshmana N et al., 2017 [23]	Review	Review	Oral cancers	Review	The variations seen in dermatoglyphic studies conducted, so far, contradicting the role of dermatoglyphics might be reasoned out due to geographic variations.
6.	Present study, 2022	Kanpur, Uttar Pradesh, India	300	Cervix cancer	1. Ridge patterns 2. Angles of palmar triradii 3. Clinical characterisitics	A strong positive correlation was observed between the clinical features of vaginal discharge, postmenopausal bleeding, intermenstrual bleeding and dermatoglyphic pattern-whorls of uterine-cervix cancer patients of Kanpur.

[Table/Fig-6]: Comparison of the present study inferences to the previous literature [13,20-23].
SCC: Squamous cell carcinoma; OSF: Oral submucous fibrosis

Limitation(s)

The limitations include small sample size, as the cervix cancer patients with the above discussed principal clinical features were unequal. The correlation study was not done for palmar angles and clinical features.

CONCLUSION(S)

A strong positive correlation was observed between the clinical features of vaginal discharge, postmenopausal bleeding, intermenstrual bleeding and dermatoglyphic pattern-whorls of uterine cervix cancer patients in present study. This study inference may be considered by the future studies in corelating the dermatoglyphic data with cervix cancer features using larger sample size and thus helping in development of non invasive anatomic screening method for early detection.

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