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Research Article

Role of Finger Dermatoglyphics in Prognosis of Gastric Cancer among the Bengalee Population of West Bengal, India

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Abstract

Cancer is the second most common disease among the populations of developing countries. Therefore, the relevance of prognosis at the early stage has an extensive impact. The cost-effective, non-invasive dermatoglyphics method seems useful for cancer identification and plays a critical role in the early prediction of different types of cancer worldwide. In view of the above, bilateral rolled fingerprints of 50 histopathological confirmed Gastric Cancer patients (M -17, F -33) from various Clinics in Kolkata and 50 controls without any family history of cancer (M -26, F -24) from the Bengalee Population of West Bengal, India were compared. The standard ink method was used to collect the finger prints. The results revealed noteworthy features regarding the finger patterns. Significant ($p<0.05$) presence of the whorl finger pattern might be used as an additional criterion to compare the cancer patients with the controls. More over significant ($p<0.05$) greater value of PII plays the key role the in the prognosis of cancer patients to a certain extent. Results envisaged that finger dermatoglyphics has the potential for early detection of patients with gastric cancer and stimulates further studies with large sample sizes to get a better insightful vision. Furthermore, the mortality rate may be declined by the early detection of the disease, and to conduct this early diagnosis must be ensured with ethnic group-specific mass screening insinuation.

Keywords: finger dermatoglyphics; gastric cancer; bengalee population

Introduction

Cancer, the second largest cause of death worldwide, extensively influences global morbidity and mortality pattern [1]. India shares a high cancer burden, often related to late-stage detection and low penetration of cancer–screening programs [2]. Cancer research has made remarkable progress and discoveries, which included the discovery of immune checkpoint inhibition mechanisms, exosomes, microbiome, and immunotherapy leading to further understanding of the mechanisms governing cancer proliferation, invasion, and metastasis, as well as the development of cancer detection and therapeutic methods [3]. The dermatoglyphic pattern, unique in every individual and remains unchanged throughout life, is developed during embryogenesis (between 4 weeks and five months), and the environment has little influence [4]. In recent eras, the application of dermatoglyphics has been restricted not only to personal identification or forensic sciences. There is an inevitable shift in the paradigm of dermatoglyphic research where the intensive use of dermatoglyphics is noticed in medico-legal purposes and genetic disorders [5, 6]. The relationship of differential patterns has also been reported earlier from various chromosomal aberrations [7, 8, 9]. Apart from chromosomal aberrations, studies reported significant differential patterns of quantitative and qualitative parameters in hereditary genetic diseases [10, 11].

Studies on finger dermatoglyphics revealed noteworthy features irrespective of different types of cancer [1]. Dermatoglyphics traits have been used as effective non invasive low-cost tools for early detection of different kinds of cancer [12]. Carcinoma Cervix patients [13], Prostate

Cancer [14], and Breast Cancer [15] were studied to find alliance with dermatoglyphic traits.

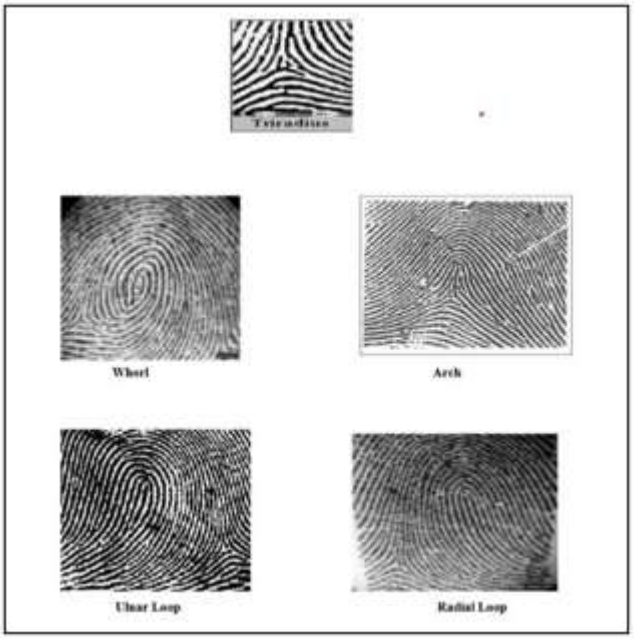
Gastric cancer is the third cause of death and the fifth most prevalent cancer globally [16]. The global burden of gastric cancer vindicated 1.1 million new cases in 2020, with a higher incidence rate in males than females across different countries, mainly Eastern countries [17]. Gastric cancer, the fourth leading cause of global mortality, requires urgent attention for better prevention [18]. Digitopalmar dermatoglyphic traits assert the existence of a genetic predisposition for the development of gastric cancer [19]. Both the stomach and finger patterns are developed during the 6 to 13 weeks of embryogenesis, fully formed at about seven months of fetus development [20]. The fundamental assumption is that since many genes take part in the formation of dermatoglyphic characters, it is possible that genes that predispose to familial disease may, by pleiotropy, also influence the ridge patterns so that particular constellations of dermatoglyphic features may be characteristic of a particular disease [21]. However, few studies have been conducted on dermatoglyphics and Gastric Cancers [22]. Hence, it requires further comprehensive ethnic group-specific studies for a better perceptive conclusion. Therefore, this study attempts to find the association between finger dermatoglyphics and Gastric Cancer among the Bengalee population of West Bengal India.

Materials and methods:

50 histopathological confirmed Gastric Cancer patients (M -17, F -33) from different Clinics in Kolkata and 50 controls (M -26, F -24) from the Bengalee Population were studied. The standard ink method for taking hands and fingerprints, as described by Schaumann and Alter was used [23]. The dermatoglyphic traits considered in the present study include digital dermatoglyphic pattern types. Digital dermatoglyphic patterns were classified Galton : arch, loop, and whorl, according to the number of triradii in each pattern type [24]. An arch has no triradii, a loop has one, and whorls have two triradii. The loops are further divided into two categories. The open loops at the radial and ulnar sides are called radial and ulnar loops. The results obtained were treated with descriptive and inferential statistics. SPSS version 18.0 was used for data analysis, and the cut off value was set at 95% probability limits.

Results:

Comparatively, the current investigation confirmed that gastric cancer patients have significant ($p<0.05$) Whorl patterns on their fingertips (table 1). However, the first three digits of cancer patients—the thumb, index finger, and middle finger—had the highest prevalence of Whorl patterns (table 1). The case and control fingertips included Loops, although the presence was considerable ($p<0.05$) in the control fingertips. Among the controls, the Arche pattern was substantially more prevalent ($p<0.5$) (table 1). The Whorl count was, however, substantially ($p<0.05$) greater among the cancer patients than the controls when the five fingers on the case and control hands, both left and right, were combined (table 2). Compared to the gastric cancer patients, the controls' left and right hands had considerably more Arches and Loops ($p<0.05$) than the cancer patients (table 2). A significant ($p<0.05$) higher value of PII within both hands was seen in the gastric cancer patients than in the controls, Pattern Intensity Index (table 3).



Groups		Whorl	Loop	Arche	Chi-Square	df	p
R1	Case	24	26	0	32.541*#	2	0.000
	Control	0	48	2			
R2	Case	20	27	3	7.325*#	2	0.02
	Control	8	39	3			
R3	Case	3	47	0	6.00*#	2	0.04
	Control	0	47	3			
R4	Case	9	41		3.677*	1	0.05
	Control	2	48				
R5	Case	0	50		0.51#	1	0.47
	Control	2	48				
L1	Case	15	35	0	21.25*#	2	0.000
	Control	0	45	5			
L2	Case	20	30	0	15.982*#	2	0.000
	Control	4	43	3			
L3	Case	12	38	0	7.309*#	2	0.02
	Control	4	43	3			
L4	Case	6	44	0	3.106#	2	0.21

	Control	6	41	3			
L5	Case	9	41		3.677*#	1	0.05
	Control	2	48				

Table 1: Finger-wise distribution of the Finger Pattern Types

*p<0.05; #Yate's Correction

		Whorl	Loop	Arche	Chi-Square	df	p
LH	Case	62	188	0	43.638*#	2	0.0000
	Control	16	220	14			
RH	Case	56	194	0	39.527*#	2	0.0000
	Control	12	230	8			

Table 2: Bilateral distribution of the Finger Pattern Types (total) among the Cancer patients and the controls

*p<0.05; #Yate's Correction

	Cancer Patients	Control
PII	$\bar{x}$±SD	$\bar{x}$±SD
LH	1.25±0.11*	1.01±0.06
RH	1.22±0.21*	1.02±0.07
*p=0.0000		

Table 3: Bilateral distribution of the Pattern Intensity Index (PII) among the Cancer patients and the controls

Discussion

The dermatoglyphic analysis could be a helpful tool for early genetic diagnosis. It could be a valuable tool for identifying people with a genetic predisposition to develop certain genetic disorders for a better insightful approach to clench the situation [1]. Finger dermatoglyphics are pivotal in assessing the relationship with breast cancer [25] in India and also the other Asian countries [26]. Studies indicated that breast cancer reveals noteworthy features regarding finger dermatoglyphics [27]. This alliance might be due to the pleiotropic effect, as finger ridge patterns formation associated with the development of breast as well as with the stomach within the same intrauterine phase of fetus development. The result of the present study revealed significantly higher existence of whorl patterns which is corroborated with other studies [28]. Earlier studies reported extensive notable outcomes [9, 28] and therefore further attempts are required to facilitate better scenario in order to comprehend. Such association between finger dermatoglyphics and gastric cancer which may ensure early detection of the disease and prioritize equitable access to prevention, ultimately influence the mortality rate of the particular ethnic group for better assessment of the national health burden.

Conclusion

The burden rate of cancer increases daily, eventually generating significant challenges in its prevention and control. Therefore, early detection and prognosis have become essential to direct morbidity and mortality patterns. Thus, more in-depth studies using large sample sizes in multi-ethnic populations are the urgent constraint, and finger dermatoglyphics can be used as a cost-effective imperative prognostic tool, which is equally significant to deal with cancer, a global health burden.

Declarations

Ethical approval and consent of participate

Ethical approval was provided by University of Calcutta (No. CU/BIOETHICS/HUMAN/2304/2022). Written consent was obtained from each participant of the present study.

Consent to Publication

Consent for publication in a research journal was obtained from all the studied participants.

Availability of Data and materials

All the data sets used during the present study to conduct the study are available to the corresponding author uponreasonable request.

Competing interest

This research work is original and has not been published elsewhere, nor is it currently under consideration for publication elsewhere. We have no conflicts of interest to disclose.

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Author's contribution

PD and BD are the prime investigators of this research work. PD and BD reviewed the literature, analyzed the data, and prepared the manuscript. ARB and DC reviewed the analyzed data and the manuscript. PD, BD, ARB, and DC edited and finalized the manuscript.

References

1. Abbasi S. Ayyoubzadeh MS (2023). The role of hand fingerprints in cancer development. Heliyon. 9(3):
2. Kulothungan V, Sathiskumar K, Leburu s, Ramamoorthy T, Stephen S, Basavarajappa D, Tomy N, Mohan R, Menon GR, Mathur P (2022). BNC Cancer. Artical No. 527(22).

3. Andro K. Hu Q. Kasagi Y. Oki E, Mori M (2021). Recent development in cancer research: Expectations for a new remedy. Ann Gastroenterol Surg. 5: 419-426.
4. Galton F (1892). Fingerprints. London: MacMillan & Co.
5. Singh V. Jafar S. Kaul N. Singh B (2009). Role of fingerprint patterns in the histopathologicallydiagnosed breast cancer females. J Anat soc India. 82: 211-214.
6. Sharma A, Sood V, Singh P, Sharma A (2018). Dermatoglyphics: a review on fingerprints and their changing trends of use. CHRISMED J Health Res. 5(3):167–172.
7. Banerjee AR, Banerjee S., Bandyopadhyay AR, Pal SC. and Banerjee SP (1992). A note on Dermatoglyphic Features of Down's Patients. In, Dermatoglyphics Today.
8. Komatz Y. and Yashida O (1976). Finger patterns and ridge counts of patients with Klinefelter's syndrome (47, XXY) among the Japanese. Hum Hered. 26: 290-297.
9. Suzumori K. (1980). Dermatoglyphic analysis of fetus with chromosomal abnormalities. Am J Hum Genet. 32: 859-868.
10. Das P. Ghosh JR. Bandyopadhyay AR. (2014). Palmar a-b ridge count in E Beta thalassemia patients: a study on Bengalee Hindu Populations of West Bengal. Hum Bio Rev. 3(4): 384-394.
11. Dey B. Ghosh JR. Bandyopadhyay AR. (2014). A study on axial triradius among the Autistic patients of bengaleehindu caste Populations of West Bengal. Int J Biomed Res. 5(11): 715-716.
12. Surender K. Sharma S (2023). Dermatoglyphics: A study on cancer patients of South India. AIP Conference Proceedings. 2558 (1).
13. Vaishali VI. Vaidya SA. Kulkarni P. Devarsh DB. Kulkarni S. and Tungikar S. L. (2006). Dermatoglyphics in Carcinoma cervix. J Ana Soc Ind. 55: 63-67.
14. Oladipo GS. Olabiyi O. Oremosu AA. Noronha CC. Okanlawon AO. Paul CU (2007). Sickle-cell anaemia in Nigeria: dermatoglyphic analysis of 90 cases. Af J Biochem Res. 1(4): 54-59.
15. Chintamani RK. Khandelwal R. Mittal A. Saijanani S. Tuteja A. Bansal A. Bhatnagar D. and Saxena S (2007). Qualitative and quantitative dermatoglyphic traits in patients with breast cancer: a perspective clinical study. Bio Med Central: Cancer. 7: 44.
16. Smyth EC. Nilson M. Grabsch H. Grieken N Ct van. Lordick F (2020) Gastric cancer. Lancet, 396(10251):635–648.
17. Morgan Eileen. Arnold M. Camargo MC. Gini A. Kunzmann TA. Matsuda T. Mehetus F. Verhoeven HAR. Vigant J. Laversanne M. Ferlay J. Soerjomataram I (2022). The current and future incidence and mortality of gastric cancer in 185 countries, 2020-40: A population based modelling study. Eclin Med. 47: 101404.
18. Norwood AD. Montavan-Sanchez E. Dominguez RL. Morgan RD (2022). Gastric cancer: Emerging trends in prevention, diagnosis and treatment. Gastroenterol Clin North Am. 51(3): 501-518.
19. Gordana ZP. Milicic J. Bozicevic D (2003). Dermatoglyphs and gastric cancer. Coll Anthropol. 27(1): 213-219.
20. Maltoni D. Maio D. Jain AK. Prabhakar S (2003). Handbook of Fingerprint Recognition. Springer Verlag. New York.
21. Fuller IC (1973). Dermatoglyphics: A diagnostic aid? J Med Genet. 10: 165
22. Abbasi S. Rasouli M (2017). Association between gastrointestinal cancers and fingerprint patterns in the Iranian population. Genet Mol Res. 16(3).
23. Schaumann B. Alter M.(1976). Dermatoglyphics in medical disorders. Springer-Verlag. New York
24. Galton F. (1892). Fingerprints. London: MacMillan & Co.
25. Sinha S. Black M L. Agarwal S. Colah R.Das R. Ryan K. BeegardM.Bittles AH. (2009). Profiling â- thalassemia mutationsin India at state and regional levels: implications for genetic education, screening and counselling programmes. Sprin Sci. 3: 51-62.
26. Sani FQ. Mirfat M. Iskandar I (2020). Dermatoglyphics pattern on breast cancer patients in Dharmais cancer hospital.
27. Nkanash EO. Ahenkorah J. Adutwum –Ofosu L. Adjei RL. Adu-Aryee NA. Tagoe EA, Koney NKK. Aryee NA. Hottor AB. Blay RM. Clegg-Lamptey JN, Arko-Bohan B. (2022). BCRA1 gene polymorphism and finger dermatoglyphic patterens in Ghananian breast cancer patients: a quantitative cross-sectional approach. Pan Af Med j. 43(209)
28. Abbasi S. Rasouli M (2017). Association between gastrointestinal cancers and finger print patterns in the Iranian population. Genet Mol Res. 16(3).

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