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# Can the 'coronary dominance' be predicted by dominent handedness or by the finger dermatoglyphic pattern? – A cross sectional study

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**Abstract:** *Rationale:* Coronary dominance is one of the major prognostic factor for the coronary vascular diseases. This study was to explore whether such can be presumed by non-invasive low cost tests like assessing the handedness of an individual and his/her finger dermatoglyphics pattern. *Method:* 100 patients awaiting/ undergoing for coronary angiography were included in this work. From live CAG time, the dominance pattern was noted. Using Edinburg Handedness Inventory, the handedness pattern of that patient were also assessed. And from the same patient the fingerprints were collected. *Result:* 100 indoor patients were studied. Majority of them was found to have right dominance pattern in coronary artery. Rest of them were of left & mixed-dominance. During handed-ness assessment, none was left handed. The study reveals in right handed persons there is more chance of right dominance. Proportionately the prevalence of left dominance and co-dominance was observed more with the mixed-handed persons. It was observed that whorl and loop are the prevalent types of fingerprint in the subjects, but irrespective of the finger-print type, the right coronary dominance prevailed throughout. *Conclusion:* All the three parameters, studied here- the handedness, coronary dominance and finger print pattern- are somehow genetically fixed since birth and there are less possibility of change. So, this study was an attempt to find their correlation if any, which could be used as preventive mode for coronary risks. But, somehow for the lack of left-handed subjects, the result was not at per expected. So this study may be prolonged for further longer period even in multi-centric sites in near future.

**Keywords:** Acute Coronary Syndrome, Coronary Angiography, Finger Print Pattern, Mixed Handedness.

## Introduction

Coronary arterial dominance or in short 'coronary dominance' refers to the artery that gives rise to the posterior descending artery (PDA), which determines the blood flow to the posterior and inferior parts of the heart. In most individuals, the right coronary artery (RCA) is dominant, meaning it supplies the PDA. In a smaller percentage, the left coronary artery (LCA) via the circumflex artery is dominant, while a minority have a co-dominant system where both arteries contribute [1].

Knowledge of coronary dominance helps cardiologists plan appropriate interventions and predict patient outcomes following myocardial infarction [2]. The Indian Heart Journal reports a 25-30% increase in coronary artery disease (CAD) cases post COVID-19, with urban centres experiencing the highest surge due to improved diagnostic capabilities and increased healthcare access. This trend mirrors global findings, with inflammatory response exacerbating cardiovascular risk and pre-existing conditions like diabetes and hypertension. Middle-aged individuals, particularly those aged 45-65, show substantial CAD prevalence [3-10].

There are two ways of determining coronary dominance - *invasively* and *non-invasively*. Here we are very much focused on non-invasive ways. There are some non-invasive ways like Coronary Computed Tomography Angiography (CCTA) and Magnetic

Resonance Angiography (MRA). As per the high cost of angiography, in Country like India, where majority of the population is below poverty line, economically it is not possible to do the procedure in routinely for screening purpose.

Different researchers around the world have studied physical parameters that enable the prediction of coronary dominance at a low cost and in a non-invasive manner. Among these, two major parameters are (a) handedness and (b) dermatoglyphics patterns of fingers. Simon AB, Norland K, Blackburn M, Zhao S, Wang X, and Harris RA (2023) investigated the relationship between left-handedness and cardiovascular disease risk, finding that vascular endothelial function and Heart Rate Variability are lower in left-handed individuals compared to right-handed ones. However, the methods used to differentiate handedness were not clearly stated, and the study was limited to the population of Augusta, USA, excluding individuals with lung disease, COPD, cancer, and stroke, and lacking exploration of coronary dominance and dermatoglyphics patterns [11].

Similarly, Akoz A and Cesur G (2017) explored the link between handedness and coronary artery disease, suggesting that left-handedness may have a protective effect, though their study was confined to Aydin, Turkey, with no analysis of coronary dominance or dermatoglyphics patterns [12]. Hamza HH et al. (2016-'17) examined handedness and coronary dominance, noting a connection between right-handedness and right coronary dominance, but did not consider dermatoglyphics patterns [13]. Kumari R et al. (2023) assessed dermatoglyphic patterns in North Indian myocardial infarction patients, finding a strong genetic correlation, yet the study was limited to Haryana, India, without investigating coronary dominance and handedness [14].

Kakkeri SR et al. (2017) studied dermatoglyphics in ischemic heart disease patients, revealing a prevalence of whorl fingerprint patterns, but their study focused solely on Karnataka, India, without linking coronary dominance and handedness [15]. Patloo AA et al. (2017) explored dermatoglyphics in coronary artery disease patients, showing significant variations in fingerprint patterns, but their study was restricted to Jammu & Kashmir and lacked clarity on coronary artery disease diagnosis methods [16].

*Notably, there are very few studies conducted in India, and none in West Bengal, particularly among patients in tertiary care hospitals, highlighting an essential research gap*.

Dermatoglyphics is the study of ridge patterns of the skin, first used in India in 1858 by Sir William Herschel, systematized by Sir Francis Galton in 1892 and after that the Fingerprint Bureau was established in Kolkata. Fingerprints can be classified into loops (60-70%), whorls (25-35%), arches (6%-7%), and composites (1%-2%). In a whorl, ridges form a series of circles or spirals around the core, while in a composite, there are a combination of arches, loops, or whorls [17].

In medical contexts, handedness is defined as consistent use of one hand rather than the other in performing certain tasks, often related to a dominance effect of the contralateral cerebral hemisphere. Handedness is defined as the preference for using one hand for unimanual tasks or demonstrating greater efficiency in performing such tasks with one hand. Recent meta-analysis data shows that 89.4% of the general population is right-handed, emphasizing both preference and performance efficiency [18].

Here lies the importance of this study under the *Research Question: "Whether the type of coronary dominance can be predicted by non-invasive methods like handedness and finger dermatoglyphic study in an individual?"*

*Specific Objective:*

1. To explore the correlation of types of coronary dominance with handedness in an individual (if any)
2. To explore the correlation of types of coronary dominance with fingerprint dermatoglyphics pattern in an individual (if any)

## Material and Methods

*Study type:* Cross sectional analytical study.

*Study design:* Descriptive.

*Study setting*: This study was carried on under preview of department of Anatomy with liaison with Department of Cardiology of IPGME&R and SSKM hospital.

*Study duration*: The project proposal was placed for ethics committee final clearance after the approval obtained. The data collection will be carried on in three months- February, March & April of 2025. The data analysis and report preparation will be done in three months- May, June and July of 2025.

*Study population*: The study was carried on patients undergoing coronary angiography in department of cardiology.

*Sampling technique*: Non probability sampling.

*Sample size*: Presumably data from 100 patients were obtained within the stipulated time period.

*Inclusion criteria:* Patients undergoing planned coronary angiography were be included.

*Exclusion criteria:* Those who would not be providing the consent and any amputated/injured fingers that could be damaging the fingerprint impression; were excluded.

*Study variables/ tools/ ways of validation:*

| Parameter (variables) incorporated in study | Tool used to obtain the data | Validation |
|---|---|---|
| Age (yrs) | Proforma | In completed years of nearest birthday |
| Gender | Proforma | As mentioned in bed-head ticket |
| Nature of coronary dominance | Live procedure of Coronary angiography | Confirmed by concerned cardiologist |
| Handedness | Edinburgh Handedness Inventory & the objects mentioned in Edinburgh Handedness Inventory e.g. Spoon, Toothbrush, Pen | Pre-validated and globally accepted [19] |
| Fingerprint- type | White sheet, smudge free stamp pad, sanitiser spray for post application rub-off, magnifying glass with LED lamp | The nature of the fingerprint was confirmed with discussion from supervisor and co-supervisor of the project |

*Method of data collection:* The work was carried out after getting permission from Department of Anatomy and Cardiology and approval from the Institutional Ethics Committee of IPGME&R. Data were collected from the patients admitted in the Department of Cardiology for planned Coronary Angiography procedure. Admitted patients were approached day before the procedure. Following inclusion criteria, subjects were selected and explained about the study procedure in brief in their acceptable language. They were assured that; their health status would be not hampered during activities designed in the study. After assurance, informed consents were collected.

After having written consent form, their fingerprint pattern of all ten digits of hands was taken on the predesigned data collection sheet for dermatoglyphics study. They were asked some question and requested to perform some simple activities on the basis of 'Edinburgh Handedness Inventory' to determine the handedness. Next day, when the particular registered patient was undertaken for the coronary angiography, the origin point of posterior interventricular artery was noted during the procedure in Cath-lab.

After having information regarding handedness and cardiac dominance from cardiology department; types of the fingerprint pattern, as obtained, was analysed in Department of Anatomy with help of magnifying glass. Then final correlation (if any) between these three variables: coronary dominance, handedness and dermatoglyphic pattern will be established by statistical analysis.

*Data Analysis:* The types of fingerprints were analyzed in the Department of Anatomy and were interpreted. All the gathered data were tabulated in a proper form and analyzed using the standard statistical software. Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS 20). Associations between different variables were measured by using the Pearson Chi-Square test. P value of <0.05 considered as level of statistical significance, Odds ratio and 95% confidence interval (95% CIs) were calculated for different studied parameters. The confidence interval (CI) at 95% was used to describe the amount of uncertainty.

*Quality control:* The institutional ethics committee approved the project proposal, and in no-point it was been deviated. 'Informed consent form' approved by IEC, was used. Participants have read, understood all the facts and signed in consent before the investigator. The data collection sheet was pre-validated. Patients' identity was kept confidential throughout the study. During the data collection in no point the patient's treatment were delayed for the project. The nature of coronary dominance was confirmed by field-expert during the procedure. The pattern of fingerprint was interpreted and reviewed by the supervisor from the department of Anatomy. The report writing was reviewed by guide & co-guides.

*Ethical considerations:* The work was carried on after the proper permission obtained from the institutional ethics committee. The data were collected on the patients who gave consent form participation.

## Results

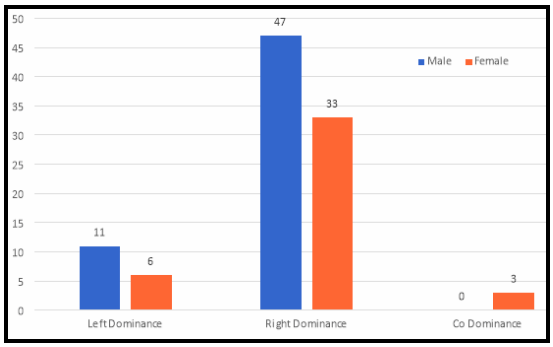
The present study was conducted to analyze the distribution of cardiac dominance patterns and their associations with variables such as gender, age group, handedness, and dermatoglyphic (fingerprint) patterns. Among the 100 Indoor Patients of Department of Cardiology of the institute assessed using coronary angiographic imaging and the Edinburgh Handedness Inventory, a predominance of right coronary dominance was observed across all the subjects.

*Table 1 & Figure 1* illustrates the distribution of cardiac dominance based on gender. Right coronary dominance was the most prevalent overall, observed in 81.03% of males and 78.57% of females. Left dominance was slightly more common in males (18.97%) than in females (14.28%). Interestingly, co-dominance was much low and found only among 3 females (7.14%), with no cases reported in males.

**Table-1: Frequency Distribution of coronary dominance pattern in different gender. (N=100)**

| | | | Coronary Dominance | | | Total | P value | 95% confidence interval | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left dominance | Right dominance | Co dominance | | | Lower bound | Upper bound |
| Gender | MALE | Count | 11 | 47 | 0 | 58 | >0.05 | 0.097 | 0.109 |
| | | % within Gender | 19.0% | 81.0% | 0.0% | 100.0% | | | |
| | | % within Coronary Dominance | 64.7% | 58.8% | 0.0% | 58.0% | | | |
| | | % of Total | 11.0% | 47.0% | 0.0% | 58.0% | | | |
| | FEMALE | Count | 6 | 33 | 3 | 42 | | | |
| | | % within Gender | 14.3% | 78.6% | 7.1% | 100.0% | | | |
| | | % within Coronary Dominance | 35.3% | 41.2% | 100.0% | 42.0% | | | |
| | | % of Total | 6.0% | 33.0% | 3.0% | 42.0% | | | |
| Total | | Count | 17 | 80 | 3 | 100 | | | |
| | | % within Gender | 17.0% | 80.0% | 3.0% | 100.0% | | | |
| | | % within Coronary Dominance | 100.0% | 100.0% | 100.0% | 100.0% | | | |
| | | % of Total | 17.0% | 80.0% | 3.0% | 100.0% | | | |

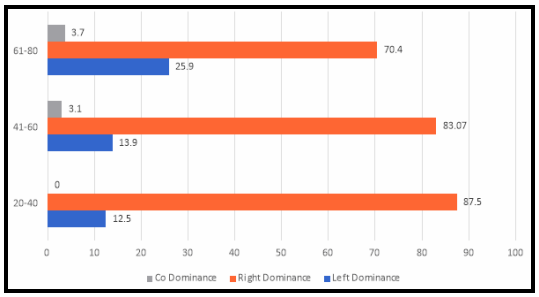
**Fig-1:** Frequency distribution of the coronary dominance in different gender group. (N=100)




*Inference:* Right dominance is the most common pattern in both males (81.03%) and females (78.57%).Left dominance is more frequent in males (18.97%) compared to females (14.28%). Co-dominance is observed only in females (7.14%), indicating potential sex-based anatomical or physiological variation. The results may suggest a slight gender influence on cardiac dominance, with more variability among females.

*Figure 2* highlights the frequency of cardiac dominance across three age groups: 20–40, 41–60, and 61–80 years. Right dominance remained the most frequent in all age groups. However, the proportion of left dominance increased notably with age from 12.5% in the youngest group to 25.93% in the oldest. Co-dominance appeared only in the 41–60 and 61–80 age groups. These findings may suggest age-related vascular remodeling or developmental variations that become more apparent over time.

**Fig-2:** Frequency distribution of the coronary dominance in age group. (N=100)




*Inference:* Right dominance remains the most prevalent across all age groups. Left dominance was observed 12.5- 25% cases only. A few proportion of subjects also found to have the co-dominant pattern.

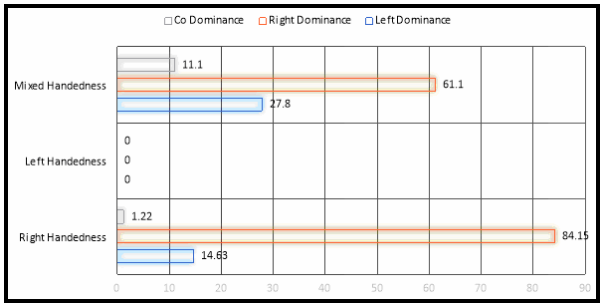
Handedness, assessed using the Edinburgh Handedness Inventory, showed notable patterns (Figure 3). Among right-handed individuals (n = 82), right dominance was overwhelmingly predominant (84.15%), while only 14.63% showed left dominance and 1.22% co-dominance. Among mixed-handed individuals (n = 18), a more varied pattern emerged: 27.78% left dominance, 61.11% right dominance, and 11.11% co-dominance. No left-handed individuals were present in the sample. Overall the finding suggests irrespective of the handedness the right dominant coronary pattern prevails *(Vide Table 2, Figure 3).*

**Table-2: Frequency distribution of the coronary dominance according to the handedness of the individual (Handedness explored by Edinburgh Handedness Inventory, N=100)**

| | | | Cardiac Dominance | | | Total | P value | 95% confidence interval | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Left dominance | Right dominance | Co dominance | | | Lower bound | Upper bound |
| Handedness | Right handedness | Count | 12 | 69 | 1 | 82 | 0.026 i.e. <0.05 | 0.024 | 0.031 |
| | | % within Handedness | 14.6% | 84.1% | 1.2% | 100% | | | |
| | | % within Cardiac Dominance | 70.6% | 86.2% | 33.3% | 82.0% | | | |
| | | % of Total | 12.0% | 69.0% | 1.0% | 82.0% | | | |
| | Mixed handedness | Count | 5 | 11 | 2 | 18 | | | |
| | | % within Handedness | 27.8% | 61.1% | 11.1% | 100% | | | |
| | | % within Cardiac Dominance | 29.4% | 13.8% | 66.7% | 18.0% | | | |
| | | % of Total | 5.0% | 11.0% | 2.0% | 18.0% | | | |

| | | Cardiac Dominance | | | Total | P value | 95% confidence interval | |
|---|---|---|---|---|---|---|---|---|
| | | Left dominance | Right dominance | Co dominance | | | Lower bound | Upper bound |
| Total | Count | 17 | 80 | 3 | 100 | | | |
| | % within Handedness | 17.0% | 80.0% | 3.0% | 100.0% | | | |
| | % within Cardiac Dominance | 100.0% | 100.0% | 100.0% | 100.0% | | | |
| | % of Total | 17.0% | 80.0% | 3.0% | 100.0% | | | |

**Fig-3:** Frequency distribution of the coronary dominance in different 'handed' group. (N=100)




*Inference:-* Right-handed individuals predominantly have right cardiac dominance (84.15%). But the prevalance of co-dominance and left-dominance in cororanry artery system increases in mixed-handed individuals. (this change was statistically significant).

Among the all studied variations of fingerprint, loop patterns were the most prevalent across all fingers and showed the strongest association with right dominance (70–88%). Whorl patterns had a higher representation of left and co-dominance, especially in the index (29.03% left) and middle fingers (27.27% left). Arch patterns, although less common, showed almost exclusive association with right dominance. Composite patterns displayed relatively higher percentages of left dominance in most fingers, particularly the right thumb (25%). Overall the finding suggests irrespective of the fingerprint pattern type the right dominant coronary pattern prevails *(Table 3, 4).*

**Table-3: Frequency distribution of different types of fingerprint, as observed**

| | | Loop | Whorl | Arch | Composite | Total |
|---|---|---|---|---|---|---|
| THUMB | Right | 23 | 47 | 9 | 20 | 99 |
| | Left | 42 | 37 | 8 | 11 | 98 |
| INDEX | Right | 39 | 31 | 20 | 8 | 98 |
| | Left | 40 | 33 | 20 | 6 | 99 |
| MIDDLE | Right | 58 | 22 | 8 | 11 | 99 |
| | Left | 52 | 33 | 8 | 6 | 99 |
| RING | Right | 42 | 49 | 3 | 5 | 99 |
| | Left | 43 | 47 | 2 | 7 | 99 |
| LITTLE | Right | 63 | 26 | 3 | 7 | 99 |
| | Left | 68 | 20 | 4 | 6 | 98 |
| Total | | 470 | 345 | 85 | 87 | **987** |

From the findings it is evident that loop and whorl are the major type of fingerprints prevalent in the subjects; only in the right thumb whorl was observed to be more prevalent.

**Table-4: Frequency distribution of the coronary dominance pattern with variations in fingerprint type of Right Hand Fingers**

| Right Hand Fingers | Fingerprint Type | Left Dominance | Right Dominance | Co Dominance | Total | |
|---|---|---|---|---|---|---|
| Right Thumb (n=99*) | Loop | 4 (17.39%) | 17 (73.91%) | 2 (8.70%) | 23 (100%) | *Kendall's Tau correlation coefficient= 0.99* *P=0.28 (not significant)* |
| | Whorl | 7 (14.89%) | 39 (82.98%) | 1 (2.13%) | 47 (100%) | |
| | Arch | 1 (11.11%) | 8 (88.89%) | 0 | 9 (100%) | |
| | Composite | 5 (25%) | 15 (75%) | 0 | 20 (100%) | |
| Right Index Finger (n=98**) | Loop | 5 (12.83%) | 33 (84.61%) | 1 (2.56%) | 39 (100%) | *Kendall's Tau correlation coefficient= 0.032* *P=0.728 (not significant)* |
| | Whorl | 9 (29.03%) | 20 (64.52%) | 2 (6.45%) | 31 (100%) | |
| | Arch | 1 (5%) | 19 (95%) | 0 | 20 (100%) | |
| | Composite | 2 (25%) | 6 (75%) | 0 | 8 (100%) | |
| Right Middle Finger (n=99*) | Loop | 9 (15.52%) | 48 (82.76%) | 1 (1.72%) | 58 (100%) | *Kendall's Tau correlation coefficient= 0.005* *P=0.96(not significant)* |
| | Whorl | 6 (27.27%) | 14 (63.64%) | 2 (9.09%) | 22 (100%) | |
| | Arch | 0 | 8 (100%) | 0 | 8 (100%) | |
| | Composite | 2 (18.18%) | 9 (81.82%) | 0 | 11 (100%) | |
| Right Ring Finger (n=99*) | Loop | 5 (11.91%) | 36 (85.71%) | 1 (2.38%) | 42 (100%) | *Kendall's Tau correlation coefficient= 0.10* *P=0.29(not significant)* |
| | Whorl | 10 (20.41%) | 37 (75.51%) | 2 (4.08%) | 49 (100%) | |
| | Arch | 1 (33.33%) | 2 (66.67%) | 0 | 3 (100%) | |
| | Composite | 1 (20%) | 4 (80%) | 0 | 5 (100%) | |
| Right Little Finger (n=99*) | Loop | 9 (14.29%) | 52 (82.54%) | 2 (3.17%) | 63 (100%) | *Kendall's Tau correlation coefficient= 0.07* *P=0.4(not significant)* |
| | Whorl | 7 (26.92%) | 18 (69.23%) | 1 (3.85%) | 26 (100%) | |
| | Arch | 0 | 3 (100%) | 0 | 3 (100%) | |
| | Composite | 1 (14.29%) | 6 (85.71%) | 0 | 7 (100%) | |

*The fingerprint of a patient cannot be obtained because of a skin lesion of the right hand extending towards the digits

**The reason for the index fingerprint not being obtained due to deformity in another patient. Irrespective of the nature of the fingerprint, the right dominance was observed thoroughly. No significant alteration was observed for any particular type of fingerprint.

**Table-5: Frequency distribution of the cardiac dominance pattern with variations in fingerprint type of Left Hand Fingers**

| Left Hand Fingers | Fingerprint Type | Left Dominance | Right Dominance | Co Dominance | Total | |
|---|---|---|---|---|---|---|
| Left Thumb (n=98##) | Loop | 10 (23.81%) | 30 (71.43%) | 2 (4.76%) | 42 (100%) | *Kendall's Tau correlation coefficient= 0.08* *P=0.37(not significant)* |
| | Whorl | 5 (13.52%) | 31 (83.78%) | 1 (2.7%) | 37 (100%) | |
| | Arch | 0 | 8 (100%) | 0 | 8 (100%) | |
| | Composite | 2 (18.18%) | 9 (81.82%) | 0 | 11 (100%) | |
| Left Index Finger (n=99#) | Loop | 4 (10%) | 35 (87.5%) | 1 (2.5%) | 40 (100%) | *Kendall's Tau correlation coefficient= 0.08* *P=0.35(not significant)* |
| | Whorl | 9 (27.27%) | 22 (66.67%) | 2 (6.06%) | 33 (100%) | |
| | Arch | 3 (15%) | 17 (85%) | 0 | 20 (100%) | |
| | Composite | 1 (16.67%) | 5 (83.33%) | 0 | 6 (100%) | |

| Left Hand Fingers | Fingerprint Type | Left Dominance | Right Dominance | Co Dominance | Total | |
|---|---|---|---|---|---|---|
| Left Middle Finger (n=99#) | Loop | 7 (13.46%) | 44 (84.62%) | 1 (1.92%) | 52 (100%) | *Kendall's Tau correlation coefficient= 0.05 P=0.57(not significant)* |
| | Whorl | 8 (24.24%) | 23 (69.7%) | 2 (6.06%) | 33 (100%) | |
| | Arch | 1 (12.5%) | 7 (87.5%) | 0 | 8 (100%) | |
| | Composite | 1 (16.67%) | 5 (83.33%) | 0 | 6 (100%) | |
| Left Ring Finger (n=99#) | Loop | 8 (18.60%) | 35 (81.40%) | 0 | 43 (100%) | *Kendall's Tau correlation coefficient= 0.07 P=0.42(not significant)* |
| | Whorl | 8 (17.02%) | 36 (76.60%) | 3 (6.38%) | 47 (100%) | |
| | Arch | 0 | 2 (100%) | 0 | 2 (100%) | |
| | Composite | 1 (14.29%) | 6 (85.71%) | 0 | 7 (100%) | |
| Left Little Finger (n=98##) | Loop | 8 (11.77%) | 59 (86.76%) | 1 (1.47%) | 68 (100%) | *Kendall's Tau correlation coefficient= 0.13 P=0.16(not significant)* |
| | Whorl | 7 (35%) | 11 (55%) | 2 (10%) | 20 (100%) | |
| | Arch | 1 (25%) | 3 (75%) | 0 | 4 (100%) | |
| | Composite | 1 (16.67%) | 5 (83.33%) | 0 | 6 (100%) | |

#Fingerprinting of a patient cannot be obtained because of the abrasions of the left hand fingers

##The reasons for not obtaining a thumb and little fingerprint are due to burn injury and fracture respectively..

*Irrespective of the nature of the fingerprint, the right dominance was observed thoroghly. No significant alteration was observed for any particular type of fingerprint.*

*Table 5* presents similar data for the left hand. As with the right hand, loop patterns were the most frequent and aligned closely with right dominance (up to 87.5%).Here also the finding suggests irrespective of the fingerprint pattern type the right dominant coronary pattern prevails.

## Discussion

Knowledge of 'coronary dominance' has a prognostic role in outcomes of coronary artery diseases. This data commoly is obtained while a patient is undergoing the coronary angiography study. Present study was to search out any low cost non-invasive parameter, by which it can be presumed in an individual. In human body, Anatomy describes three 'dominances' as- dominance of coronary artery distribution, dominance in handedness & dominance in cerebrum. Here it was attempted whether the dominance of coronary artery goes at per with the dominance of handedness or not.

### *Whether objectives could be attained?*

| Objectives | What was found |
|---|---|
| Whether the coronary dominance can be presumed from estimation of 'handedness'? | Among right-handed individuals right dominance was overwhelmingly predominant. Although the right dominance was also found most in mixed-handed individial, but the proportion of patients with left dominance was found more in non-right dominance cases. |
| Whether the cpronary-dominance can be assumed from fingerprint pattern of an individual? | No, study revealed no coorelation among the anytype of specific fingerprint pattern to presume the coronary dominance. |

### *What can be the explanation of finding?*

As it this study was done in patients admitted in Cardiology IPD for coronary angiography planning, so pre-assessment of handedness wsa not possible. This resulted majority of the population was with right handedness, and very less was found to have mixed handedness; and no patients with left handedness. So the coronary dominance pattern in left handed people could not been

gathered. Only it was found that proportionately left dominance is commoner in non-right handed people.

***What is the limitation & future scope?***

During the data collection, the patients planned for coronary angiography was included in the project. After inclusion their handedness, coronary arterial pattern etc was assessed. As it was a natural selection, and a students' project of short-term, so, distribution of patients with right handedness, mixed handedness as well as left handedness was not equal. Rather no patients were found to have with left handed dominance and very less patients were found to have mixed handedness. If this project can be extended with more time span, then equal number of three categories of patients: (1) right handed, (2) mixed handed and (3) left handed can be incorporated.

***Whether the report varies from existing literature?***

Previous studies suggested there are relations between right-handed and right coronary dominance. But could not mention whether left-coronary dominance is more in left handed individual or not. Even studies on dermatoglyphics and myocardial infarction have shown a close correlation due to genetic association [11-16].

## Conclusion

*Compared to them, present study decribed:*

(1) In right handed people, there is major prevalance of right handedness. In mixed handed people (ambidextrous), comparatively less prevalance of right-coronary dominance; rather there is significantly higher surge of left dominance as well as co-dominance.
(2) Loop & Whorl are major type of fingerprint in patients awaiting for coronary angiography (patients with coronary artery events). So these persons with more these types of fingerprints, to be taken care of.
(3) Irrespective of the variations of fingerprint patterns, the right-coronary dominance prevalis more. No significant correlation found to have.

*Limitations:*

- Absence of any left handed subject. If present, there will be possibility of comparison between handedness more profoundly.
- Shorter duration of time- data was collected in 2 months time. It could be due to the limitations of the study population that could be overcome if we evaluate with large number of study population in future.

*Future Scope:*

- Longer duration planning- as extension of this project, especially to involve the data of left-handed peoples. If needed, multi-centric planning can be done.
- Age-related shifting of coronary dominance pattern, may be studied as longitudinal cohort study.
- This may hint at a potential neurodevelopmental link between handedness and cardiac vascular dominance, though the data on left-handed individuals is missing.
- These bilateral dermatoglyphic trends reinforce the hypothesis that fingerprint morphology especially complex whorl and composite patterns may serve as a marker for coronary arterial branching anomalies.

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**Conflicts of interest:** There are no conflicts of interest.

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