



## PATTERN OF CORONARY ARTERY DOMINANCE IN KASHMIRI POPULATION—AN ANGIOGRAPHY STUDY

### Anatomy

**Sayma Samoon**

Post MD Demonstrator Department of Anatomy at SKIMS Medical College Srinagar, Kashmir.

**Syed Manzoor Ali Andrabi**

Associate Professor Department of Cardiology Government Medical College Srinagar

**Mohd Saleem Itoo\***

Associate Professor Department of Anatomy Government Medical College Srinagar  
\*Corresponding Author

### ABSTRACT

**Background:** In developing countries like India CAD is one of the major causes of death. The pattern of coronary artery dominance has a significant clinical role. Left dominance is said to be associated with increase in acute coronary syndrome. The aim of this study was to determine the pattern of coronary artery dominance in Kashmiri population. **Materials and Methods :** The study was carried on 150 patients above 18 years of age who after routine clinical evaluation were to undergo coronary angiography for various indications and their angiogram was labelled as normal by cardiologist. **Results:** A total of 150 patients were included in the study, among them 102 were male and 48 were female patients. The mean age for females was  $56.4 \pm 10.22$  years with range from 40-89 years. The mean age of males were  $56.1 \pm 10.83$  years with range from 30-89 years. Right coronary artery was dominant in 130 (86.67%) subjects, left coronary artery was dominant in 15 (10%) subjects and co-dominant circulation was found in 5 (3.33%) subjects. **Conclusion:** The right coronary artery dominance is more prevalent in Kashmiri population. Knowledge about coronary artery dominance provides helpful information to anatomist and is essential for interventional cardiologist.

### KEYWORDS

Coronary angiography, Dominance, Dominant coronary artery, Posterior interventricular sulcus

### INTRODUCTION

Coronary artery disease (CAD) is one of the major type of disease in the world<sup>1</sup>. In developing countries like India CAD is one of the major causes of death. Coronary artery dominance is defined as left coronary artery dominance (LD), right coronary artery dominance (RD), and co-dominant (CD)<sup>2</sup>. Coronary artery dominance is determined by the coronary artery that emits the posterior descending artery (posterior interventricular artery). The posterior descending artery originating from the right coronary artery is right dominance (RD), the posterior descending artery originating from the left circumflex artery (LCx) is defined as left dominance (LD). Co-dominant circulation is defined as the posterior descending artery that originates from the right coronary artery and a large posterior lateral branch originating from left circumflex artery (LCx)<sup>3,4</sup>. Right dominance is the most common pattern of coronary circulation found in 72-90% of individuals, left dominance in about 8-33% and co-dominance has about 3-7% prevalence<sup>5</sup>. The pattern of coronary artery dominance has a significant clinical role. Left dominant mode of circulation shows a less well balanced circulation with more myocardium at risk in acute coronary syndromes (ACS)<sup>6</sup>. Left dominance and co-dominance are said to be associated with an increased in hospital mortality than Right dominance undergoing percutaneous coronary intervention (PCI) for acute coronary syndrome<sup>7</sup>. Knowledge about the coronary arteries, their variation and the pattern of coronary artery dominance has a valuable role in the diagnosis and treatment of cardiovascular diseases. Information about the coronary artery dominance is scanty in Kashmir. This study was done to determine the pattern of coronary artery dominance in Kashmiri population.

### Materials and Methods

This study was carried out in the cardiology department of Government Medical College Srinagar, India after obtaining clearance from Institutional ethical committee. The subjects of either gender above 18 years of age who after routine clinical evaluation were to undergo coronary angiography for various indications were included in the study. Informed consent was taken. Patients with congenital heart disease, valvular heart diseases were excluded from the study. A total of 150 subjects were analysed. All the subjects were of Kashmiri ethnicity. Standard views with the necessary cranial or caudal angulations were taken to document the pattern of dominant coronary circulation.

### Results

A total of 150 subjects were included in the study, among them 102

were male and 48 were female subjects. The mean age for females was  $56.4 \pm 10.22$  years with range from 40-89 years. The mean age of males were  $56.1 \pm 10.83$  years with range from 30-89 years. The age and gender distribution of the subjects is shown in table<sup>1</sup>.

**Table1: Age and gender distribution**

| Age (years) |            | Gender |        | Total  |
|-------------|------------|--------|--------|--------|
|             |            | Female | Male   |        |
| 30-39       | Count      | 0      | 5      | 5      |
|             | Percentage | 0.0%   | 4.9%   | 3.3%   |
| 40 - 49     | Count      | 10     | 22     | 32     |
|             | Percentage | 20.8%  | 21.6%  | 21.3%  |
| 50 - 59     | Count      | 19     | 26     | 45     |
|             | Percentage | 39.6%  | 25.5%  | 30.0%  |
| 60 - 69     | Count      | 15     | 39     | 54     |
|             | Percentage | 31.3%  | 38.2%  | 36.0%  |
| 70 - 79     | Count      | 2      | 8      | 10     |
|             | Percentage | 4.2%   | 7.8%   | 6.7%   |
| 80 - 89     | Count      | 2      | 2      | 4      |
|             | Percentage | 4.2%   | 2.0%   | 2.7%   |
| Total       | Count      | 48     | 102    | 150    |
|             | Percentage | 100.0% | 100.0% | 100.0% |

Right coronary artery was found dominant in 130 (86.67%) subjects, left coronary artery was dominant in 15 (10%) subjects and co-dominant circulation was found in 5 (3.33%) subjects as shown in table 2.

**Table2: Coronary artery dominance**

| Dominant Artery      | Count | Percentage |
|----------------------|-------|------------|
| Right dominance (RD) | 130   | 86.67%     |
| Left dominance (LD)  | 15    | 10%        |
| Co-dominant (CD)     | 5     | 3.33%      |

### DISCUSSION:

A total of 150 subjects were included in the study, among them 102 were male and 48 were female subjects. The mean age for females was  $56.4 \pm 10.22$  years with range from 40-89 years. The mean age of males was  $56.1 \pm 10.83$  years with range from 30-89 years. In our study

86.67% subjects had right coronary artery dominance, 10% subjects had left coronary artery dominance and 3.33% subjects had the co-dominant pattern of coronary artery dominance and are similar to the values mentioned in the literature. A study done by Vishram Singh et al<sup>8</sup> the right coronary artery dominance was found in 80.58%, 11.63% had LCx dominance and 2.79% had co-dominant coronary circulation. Studies have shown that extent of coronary atherosclerosis does not depend on the type of coronary artery dominance<sup>9</sup>. In ACS patients left dominance will be a significant and independent predictor of high long term mortality<sup>10</sup>. Coronary artery dominance has an influence on the relative contribution of different coronary arteries to total left ventricular blood flow<sup>11</sup>. Most of the individuals with left dominance the right coronary artery is small and fails to reach the acute margin of the heart, so a proximal stenosis of left coronary artery may result in extensive ischemia and worse consequences in a left dominant system than in right dominant system and the potential to rapidly form collaterals may be reduced in patients with left dominant system as right coronary artery is not sufficient to profuse the myocardium<sup>12</sup>. In a study done by Catherine Gebhard<sup>13</sup> et al the right dominance was present in 91% and left dominance in 9% and they also observed a higher incidence of coronary artery disease in left dominance patients, whereas the prevalence of normal coronary arteries was more frequent in right dominance. The pattern of coronary artery dominance varies in different regions. According to Altai<sup>14</sup> et al right coronary artery dominance was found in 83%, left dominance was found in 14.5% and co-dominance in 2.5%. Another study conducted by Bin Yan<sup>15</sup> et al shows right dominant pattern in 90.6%, left dominance in 6.7% and co-dominance in 2.7%. Another study in Italy<sup>16</sup> have reported the right dominant pattern in 86.6%, left dominant in 9.2% and balanced in 4.2%. In the study conducted in Netherlands, the pattern was 9.8% left dominant and 90.2% non left dominant<sup>17</sup>. In the study conducted in Rawalpindi, Pakistan the subjects were found to have 80.49% right dominance, 11.3% left dominance and 3.8% co-dominance<sup>18</sup>. From the above mentioned studies, the right dominance is more prevalent and it is in accordance with our findings.

**Conclusion:** In the current study the right coronary artery dominance is more in Kashmiri population. The knowledge about the coronary circulation and its dominance is very useful to anatomist, radiologist and interventional cardiologist for various diagnostic and therapeutic purposes.

**Conflict of interest:** None

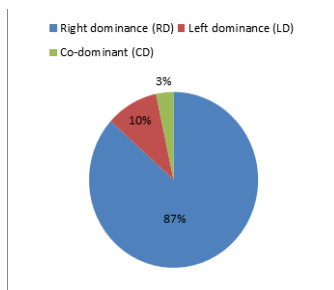
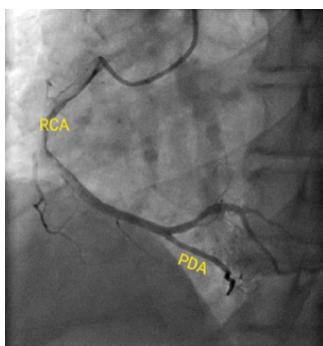


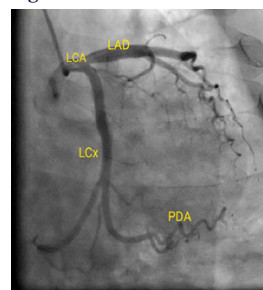
Figure 1 shows right coronary dominance, figure 2 shows left coronary dominance and fig 3 shows the left coronary artery and its main branches.

**Figure 1: Showing right dominance**



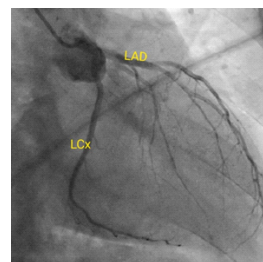
Posterior descending artery (PDA) from right coronary artery.

**Figure 2: Showing left dominance**



PDA from left circumflex artery  
(PDA=posterior descending artery)

**Figure 3: Showing LCA with its main branches**



(LCA=left coronary artery, LCx= left circumflex artery, LAD=left descending artery)

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