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Study of coronary dominance in population of Bihar

Dr. Birendra Kumar Sinha[1], Dr. Rashmi Prasad[2]
[1] MBBS,MS Assistant Professor, Department of Anatomy, Patna Medical College, Patna, Bihar, India
[2] MBBS, MS, Professor, Department of Anatomy Patna Medical College, Patna, Bihar, India

Abstract
With the ever increasing load of coronary heart disease, an in-depth study of the coronary arteries has been felt by the medical faculties. Also it can be seen that Coronary arteries show wide variations among different populations. Hence based on the above findings this study had been planned to focus on the pattern of coronary dominance in patients from the Bihar region
Invasive coronary angiography was performed by either femoral or radial route using radio-opaque dye and cineangiograms were taken in different views. Using Schlesinger's criteria, the coronary dominance was determined by eminent cardiologist.
The above results prove that there are wide regional variations in dominance pattern. These variations should always be borne in mind for better cardiac care. These findings correlated with angiographic study may result in developing a comprehensive epidemiological data pool. These data may be helpful in planning research.

Keywords: coronary artery, dominance, right dominant, left dominant, balanced, etc.

Introduction

The dominance of coronary circulation is determined by the type of arteries that supply the posterior and inferior wall of the left ventricle. The artery that supplies the posterior descending artery (PDA) and the posterolateral artery (PLA) determines the coronary dominance. Approximately 60% of the general population are right-dominant, 25% are co-dominant, and 15% are left-dominant [1]. The coronary artery dominance describes how many of the three major branches supplying the posterior and inferior wall of the left ventricle from the right coronary artery (RCA) and how many arise from the circumflex artery (CX). In order to determine the anatomic dominance, the three inferior wall vessels must be specified. There are four types of coronary tree dominance: large right dominant, small right dominant, co-dominant and left dominant.

Coronary arterial dominance is defined by the vessel which gives rise to the posterior descending artery (PDA), which supplies the myocardium of the inferior 1/3rd of the interventricular septum.

Most hearts (80-85%) are right dominant where the PDA is supplied by the RCA. The remaining 15-20% of hearts are roughly equally divided between left dominant and codominant. The strict definition of codominance can vary depending of which modality one uses to assess the coronary arteries (coronary angiography or CTCA) but is not overly important. Regardless, in left dominant hearts the PDA is supplied by the LCx wrapping around the left atrioventricular groove or less commonly the LAD coursing around the apex of the heart. In a codominant heart a single or duplicated PDA is supplied by branches of both the RCA and LAD or LCx.

Although the RCA is the dominant vessel in most hearts, it is important to consider that it is usually the LCA that supplies the majority of the left ventricular myocardium as well as the anterior and mid 2/3rds of the interventricular septum. Dominance has important implications in myocardial ischemia and infarction, imaging of the coronary arteries (CTCA and invasive coronary angiography) and the planning for coronary artery bypass grafting [2-4].

Coronary artery disease (CAD), also known as ischemic heart disease (IHD), refers to a group of diseases which includes stable angina, unstable angina, myocardial infarction, and sudden cardiac death. It is within the group of cardiovascular diseases of which it is the most common type. A common symptom is chest pain or discomfort which may travel into the shoulder, arm, back, neck, or jaw. Occasionally it may feel like heartburn. Usually symptoms occur with exercise or emotional stress, last less than a few minutes, and improve with rest. Shortness of breath may also occur and sometimes no symptoms are present. In many cases, the first sign is a heart attack. Other complications include heart failure or an abnormal heartbeat [5].

Risk factors include high blood pressure, smoking, diabetes, lack of exercise, obesity, high blood cholesterol, poor diet, depression, and excessive alcohol. The underlying mechanism involves reduction of blood flow and oxygen to the heart muscle due to atherosclerosis of the arteries of the heart. A number of tests may help with diagnoses including: electrocardiogram, cardiac stress testing, coronary computed tomographic angiography, and coronary angiogram, among others [6].

Ways to reduce CAD risk include eating a healthy diet, regularly exercising, maintaining a healthy weight, and not smoking. Medications for diabetes, high cholesterol, or high blood pressure are sometimes used. There is limited evidence for screening people who are at low risk and do not have symptoms. Treatment involves the same measures as prevention. Additional medications such as anti-platelets (including aspirin), beta blockers, or nitro-glycerine may be recommended. Procedures such as percutaneous

coronary intervention (PCI) or coronary artery bypass surgery (CABG) may be used in severe disease. In those with stable CAD it is unclear if PCI or CABG in addition to the other treatments improves life expectancy or decreases heart attack risk [7].

With the ever increasing load of coronary heart disease, an in-depth study of the coronary arteries has been felt by the medical faculties. Also it can be seen that Coronary arteries show wide variations among different populations. Hence based on the above findings this study had been planned to focus on the pattern of coronary dominance in patients from the Bihar region.

Methodology

The study was planned on 50 heart subjects. These selected hearts are without any obvious pathology referred with cardiac conditions was enrolled into the study in Patna Medical College, Patna and CD of angiography obtained from Indira Gandhi Institute of Cardiology, Patna. The approval of the Institutional ethical committee was taken for the present study. Invasive coronary angiography was performed by either femoral or radial route using radio-opaque dye or cineangiograms were taken in different views. Using Schlesinger's criteria, the coronary dominance was determined by eminent cardiologist.

Results & Discussions

The data from the 50 enrolled heart patients were collected and presented as below. The patients were undergone to Invasive coronary angiography. Based on the coronary dominance was determined by Schlesinger's criteria as below.

Table 1

Dominance	No. Of subjects
Right	42
Left	6
Balanced	2
Total	**50**

In the present study out of 50 coronary angiography performed 45 were observed with the Right dominance and 6 were observed with left dominance. There are 2 cases with the balanced dominance also.

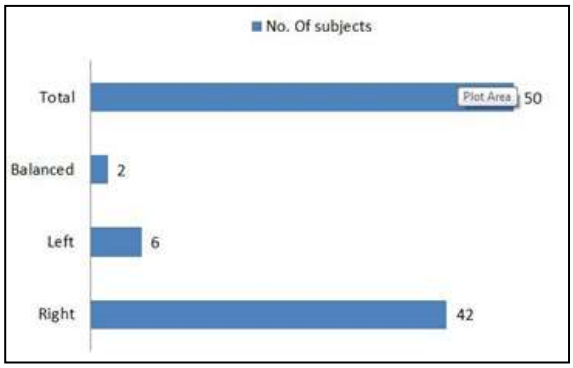

Fig 1

Considering clinical significance of coronaryarterial dominance, number of studies has been conducted all across the world till date. Different methods have been employed for the same. Angiographic method is one of them. In 1938, Schlesinger [8] considered the reference point indicating dominance consisted of determining which coronary artery supplied the posterior inter ventricular branch and which branches went beyond the crux cordis. Other criteria's like lengths [9] of right coronary artery and left marginal artery, layout [10] of arteries at the apex of heart, length [11] of paraconal inter ventricular artery, number [12] of branches to ventricles are also stated in the literature.

It is observed in left dominant hearts that left anterior descending artery wraps around apex of heart and supplies majority of inferior surface of heart. In right dominance, the posterior interventricular branch of right coronary artery supplies it, reducing the territory supplied by left anterior descending artery. So left anterior descending artery lesions would be more severe in left dominant systems as compared to that in right dominant ones. Dominance also plays important role in inferior wall infarcts of the heart. Inferior wall infarcts although less extensive than anterior infarcts, are more important as they can cause various degrees of atrio-ventricular blocks in approximately 30% of cases. The dominant right coronary artery usually supplies atrioventricular node. Therefore an inferior wall infarcts caused by occlusion of right coronary artery will have higher risk of AV blocks [13].

Conclusion

The above results prove that there are wide regional variations in dominance pattern. These variations should always be borne in mind for better cardiac care. These findings correlated with angiographic study may result in developing a comprehensive epidemiological data pool. These data may be helpful in planning research.

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