STUDY OF MORPHOLOGICAL ASPECTS AND MYOCARDIAL BRIDGE ON THE CORONARY ARTERIES IN HUMAN CADAVERS

Rajkumar
Associate Professor
Department of Anatomy
Zydus Medical College, Dahod, Gujrat

ABSTRACT

Introduction: The heart is supplied by two coronary arteries (left and right) and their branches, which are located between the epicardium and myocardium. Coronary arteries and their branches travel along the surface of heart under epicardium. However a portion of these arteries may be embedded in the muscle called MB and the submerged coronary artery is called mural coronary artery. A myocardial bridge occurs when one of the coronary arteries tunnels through the myocardium rather than resting on top of it. Coronary artery disease (CAD), also known as ischemic heart disease (IHD), is a group of diseases that includes: stable angina, unstable angina, myocardial infarction, and sudden cardiac death. Myocardial bridges have been reported in association with sudden death during exercise, but they are also an incidental finding at autopsy in up to 25% of patients dying of other causes. Hence knowledge about the number, length and depth of myocardial can help in identifying the people at risk. With the above background, the present study has been undertaken to study the prevalence of myocardial bridges in the coronary arteries. Materials and Methods: The study had included the 50 adult human cadavers used for the routine dissection procedure. The coronary arteries were dissected from origin to termination. During their course MB were observed on the branches of coronary arteries. The morphological study of MBs which were found during dissection was done. Result & Conclusion: The present study hereby observed that incidence of myocardial bridges is quite common in the human being. Currently myocardial bridges are an attractive and intriguing area of research. Knowledge about the variations of coronary arteries is helpful for cardiologists and radiologists in performing various procedures like coronary angiogram, coronary angioplasty, and bypass grafting surgeries and to plan the mode of treatment and to predict their prognosis.

Keywords: coronary arteries, ischemic heart disease (IHD), myocardial bridges.

INTRODUCTION

The heart is supplied by two coronary arteries (left and right) and their branches, which are located between the epicardium and myocardium. The right (RCA) and the left coronary arteries (LCA) arise from the aortic sinus of valsalva at the root of the aorta and encircle the base of ventricles like a crown.1 The LCA is responsible for irrigation of most of the left ventricle and also a considerable proportion of the right ventricle.2 Coronary arteries and their branches travel along the surface of heart under epicardium. However a portion of these arteries may be embedded in the muscle called MB and the submerged coronary artery is called mural coronary artery. A myocardial bridge occurs when one of the coronary arteries tunnels through the myocardium rather than resting on top of it. Coronary artery disease (CAD), also known as ischemic heart disease (IHD), is a group of diseases that includes: stable angina, unstable angina, myocardial infarction, and sudden cardiac death. 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 get better with rest. Shortness of breath may also occur and sometimes no symptoms are present. The first sign is occasionally a heart attack. Other complications include heart failure or an irregular heartbeat.3 Predisposing factors include: smoking, diabetes, lack of exercise, obesity, high blood pressure, high cholesterol, poor diet, depression, and excessive alcohol. The underlying mechanism involves reduction of blood flow and oxygen due to atherosclerosis of the arteries of the heart. Various tests may help in the
Study of Morphological aspects and myocardial bridge on the coronary arteries in human cadavers, Vol (1), Issue (1) 2018

Study of Morphological aspects and myocardial bridge on the coronary arteries in human cadavers

diagnosis including with electrocardiogram, cardiac stress testing, coronary computed tomographic angiography, and coronary angiogram, among others. Prevention is by eating a healthy diet, regular exercise, maintaining a healthy weight and not smoking. In 2015 CAD affected 110 million people and resulted in 8.9 million deaths. It makes up 15.9% of all deaths making it the most common cause of death globally. The risk of death from CAD for a given age has decreased between 1980 and 2010, especially in developed countries. The number of cases of CAD for a given age has also decreased between 1990 and 2010. In the United States in 2010 about 20% of those over 65 had CAD, while it was present in 7% of those 45 to 64, and 1.3% of those 18 to 45. Rates are higher among men than women of a given age.

Detection of MB is essential while investigating cardiac ailments since it had been found to be associated with ischemic heart disease and cardiomyopathy. Knowledge of MB is also essential to determine the mode of investigation as an atherosclerotic plaque within the MB is not detectable by angiography but by intra coronary ultrasound. Myocardial bridges have been reported in association with sudden death during exercise, but they are also an incidental finding at autopsy in up to 25% of patients dying of other causes. Hence knowledge about the number, length and depth of myocardial can help in identifying the people at risk. With the above background, the present study has been undertaken to study the prevalence of myocardial bridges in the coronary arteries.

MATERIALS AND METHODS
The study had included the 50 adult human cadavers used for the routine dissection procedure and were obtained from dissection bodies from Anatomy department. All the hearts were preserved in 10% formalin of adult human cadavers used for the routine dissection procedure. The epicardium and fat were removed carefully from the surface of the heart. The origin and the course of all the coronary arteries and their important branches were carefully delineated. All were followed carefully to see any bridging myocardium running over the arteries. The specimens were numbered, length of the bridge measured by slide calliper. The Cunningham’s manual of practical Anatomy is referred for the detailed dissection procedure.

RESULTS
Total 50 hearts specimens were collected and the results are presented as below.

Table 1: Myocardial bridges occurrence

<table>
<thead>
<tr>
<th>Myocardial Bridges</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Coronary Artery</td>
<td>7</td>
<td>1</td>
<td>08</td>
</tr>
<tr>
<td>Left Coronary Artery</td>
<td>10</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>Both</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>03</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 2: Number of Single myocardial bridge over right coronary artery branches

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Marginal Branch</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Proximal segment of RCA</td>
<td>2</td>
<td>2</td>
<td>04</td>
</tr>
<tr>
<td>Posterior Interventricular Branch</td>
<td>02</td>
<td>1</td>
<td>03</td>
</tr>
</tbody>
</table>

Figure 1: Myocardial bridges occurrence
DISCUSSION

Nowadays, with the extensive use of advanced image diagnostic techniques and the development of non-aggressive treatments, a in depth knowledge of anatomy of the normal coronary and its variations and anomalies is important. Branches of coronary arteries may vary in origin, distribution, number and size. The origins of coronary arteries show great variability, about 90% of anomalies were anomalies of origin. Myocardial infarction have become the major killer for human race in modern times. Social factors, change of food habits, and sedentary life style has already increased the load on heart muscles addition of anatomical factors makes the heart more susceptible to ischaemia. Factors such as myocardial bridge are known for increasing cardiac load. Hence present study was undertaken. Main coronary arteries and their major branches are usually subepicardial but those in atrio-ventricular and interventricular sulci are often deeply sited, occasionally hidden by myocardium or embedded in it. The muscle overlying is myocardial bridge and underlying artery is termed as tunnel or mural artery. These bridges were considered as transitional stages in further development of coronary artery towards the subepicardial course which found at the highest stage of development. Such bridges represent remainders of phylogensis which are repeated in the ontogenesis of man. Geringer (1951) presented an in depth analysis of myocardial bridges by dissection method and reported an incidence of 23% with predominance of myocardial bridge on anterior interventricular artery. Coronary arteries are of Type B arteries in which they are mainly epicardial but exhibit frequent intramyocardial course in short segments MB of coronary arteries was recognized and described by Black in 1796. In a study of 100 specimens, Kosinski&Grzybiak (2001) reported the anterior interventricular branch, the diagonal branch and inferior interventricular branch as the most common site in the same order. Bharambe et al. (2007) during dissection of 50 hearts observed that myocardial bridges were more common over anterior interventricular branch. As per the observations of Loukas et al., it is necessary to determine the incidence of the variations, which are possibly capable of inducing sudden cardiac death, in order to evaluate the value of screening. Variation in the origin of coronary arteries and their branching pattern can pose difficulties in imaging by conventional catheters, thereby creating problems in diagnostic and therapeutic interventions. Hurst et al. 2005 had demonstrated by single photon emission computed tomography that with use of beta blockers in a patient of ischemic heart disease with MB, coronary perfusion and hence the symptoms improved. Calcium channel blockers, nitrates and anti-platelet agents
have also been used to reduce the incidence of angina with MB. Those who do not respond to medical therapy need surgical intervention. Previously surgical myotomy and coronary stenting these days are modalities of choice. As per Rahman et al. 2000, unresponsive angina due to MB is completely relieved following surgery.

CONCLUSION
The present study hereby observed that incidence of myocardial bridges is quite common in the human being. Currently myocardial bridges are an attractive and intriguing area of research. The clinical significance of myocardial bridges is uncertain and in the vast majority of cases, it remains clinically silent or acts as a contributing factor in the development of myocardial ischaemia, circulatory problems, angina, myocardial infarction, sudden cardiac death, systolic compression and other cardiac disturbances that may require surgical intervention. A proper knowledge of anatomy of coronary arteries and its variations are needed for a successful clinical outcome following treatment of coronary artery diseases. Knowledge about the variations of coronary arteries is helpful for cardiologists and radiologists in performing various procedures like coronary angiogram, coronary angioplasty, and bypass grafting surgeries and to plan the mode of treatment and to predict their prognosis.

REFERENCE

How to cite this article: Rajkumar, Study of Morphological Aspects and Myocardial Bridge on the Coronary Arteries in Human Cadavers, JRA, 2018; Vol (1), Issue (1).
Conflict of Interest: None declared