World Research Journal of Cardiology
Volume 1, Issue 1, 2013, pp.-04-06.
Available online at http://www.bioinfopublication.org/jouarchive.php?opt=&jouid=BPJ0000036

MORPHOLOGICAL STUDY OF MYOCARDIAL BRIDGES

SABNIS A.S.*

K.J. Somaiya Medical College, Sion, Mumbai- 400 022, MS, India.
*Corresponding Author: Email- dranjus2003@yahoo.com

Received: March 09, 2013; Accepted: March 21, 2013

Abstract-

Background: The muscle overlying the intramyocardial segment of epicardial coronary artery is termed as myocardial bridge (MB). It is often considered as a simple variant of normal anatomy of coronary artery. Study on 108 hearts was conducted by keeping aim to provide definitive information of incidence and morphology of MB.

Material and Methods: 108 hearts from B. J. Medical and K. J. Somaiya Medical College were collected and 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.

Results:

1. 71 hearts showed MBs.
2. Out of 71 MBs, 61 were noticed on left coronary artery (LCA) and 10 were found on Right Coronary Artery (RCA).

Conclusion:

1. MBs are frequently seen in human hearts.
2. Left Anterior Descending Artery (LADA) was the commonest site to show MB.

Keywords- Mural artery, Tunnel artery, Right coronary artery, Left coronary artery.

Citation: Sabnis A.S. (2013) Morphological Study of Myocardial Bridges. World Research Journal of Cardiology, Volume 1, Issue 1, pp.-04-06.

Copyright: Copyright©2013 Sabnis A.S. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Introduction

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. Wide range of incidence of occurrence of MB (0.5% to 90.4%) is seen in the studies done by angiography and dissection. As only about 2/3rd of MBs exhibit 50% narrowing of vessels, angiographic result may be different from those of morphological one [1]. MB is present in fetal period [2] and so they are thought to be congenital. MB rarely causes myocardial ischemia [3] and stable and unstable angina pectoris, acute myocardial infarction, complete a-v block and sudden death associated with MB have been described [4,5] such contradictory statements enhance the doubt about the clinical significance of MB.

A study was undertaken on 108 human hearts to study the morphology of MB in terms of length, extent, number and arteries involved. The results will be useful to find out the incidence of MB on individual branch of coronary artery.

Materials and Methods

108 human hearts of unknown sex were obtained from dissection bodies from Anatomy department. All the hearts were preserved in 10% formalin and then coronary arteries along with their branches were dissected and traced subepicardially till they pierce myocardium. Myocardial bridges were identified and their length was measured with the help of divider and scale and extent and site was noted.

Results

- Out of 108 hearts 71 (65.7%) hearts showed MBs.
- Out of 71, in 61 hearts MBs (85.9%) were present on left coronary artery and in 10 hearts (14.08%) MBs were present on right coronary artery [Fig-1].
- In 46 (42.5%) hearts MB was present on left anterior descending artery (LADA) [Fig-2], [Fig-3].
- Length of MB was ranging from 5 mm to 62 mm.

- 45 hearts showed 1 MB, 18 hearts showed two MBs, 7 hearts showed 3 MBs and One heart showed 4 MBs on different arteries [Fig-4].

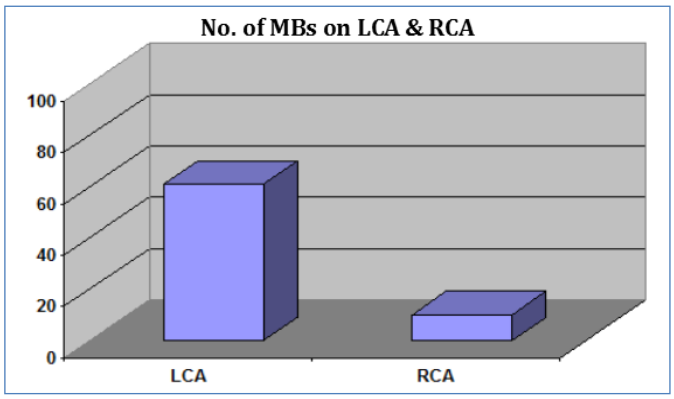

Fig. 1- Number of MBs on LCA and LCA

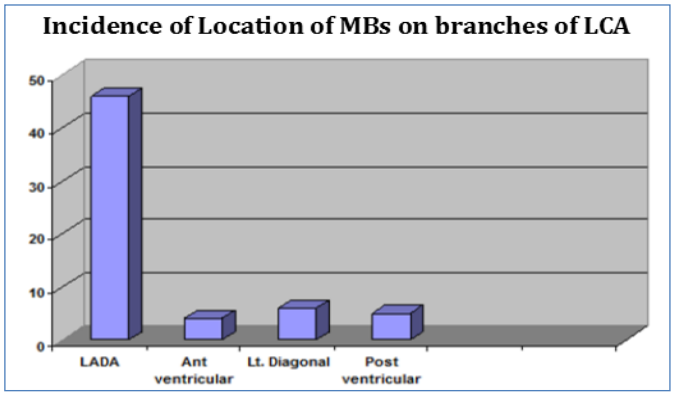

Fig. 2- Incidence of MBs on branches of LCA

Fig. 3- MB on LADA (1)

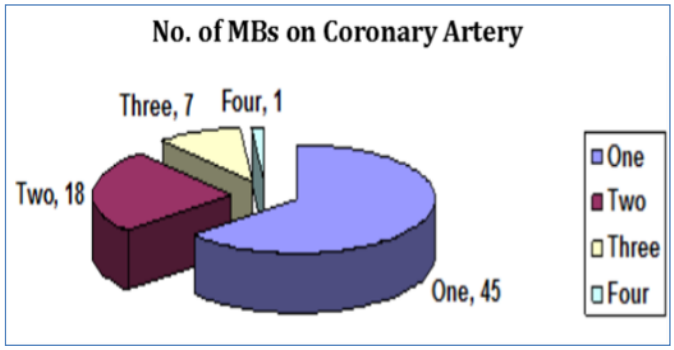

Fig. 4- Presence of single, multiple MBs in number of hearts

Discussion

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 phylogenesis which are repeated in the ontogenesis of man. Coronary arteries are of Type B arteries in which they are mainly epicardial but exhibit frequent intramyocardial course in short segments [6]. MB of coronary arteries was recognized and described by Black in 1796 [7]. Then various authors carried out studies either by dissection or angiography method to learn more about incidence of MB and arteries involved [Table-1]. It was found that LADA is the commonest artery on which MB is often present. We have also found LADA was the commonest site for MB [Fig-3], [Fig-5].

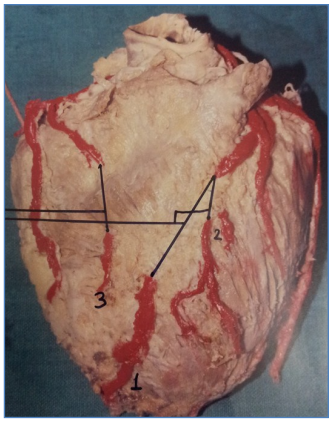

Fig. 5- MB on LADA (1), Anterior ventricular branch of LCA (2) and RCA (3)

Table 1- Comparison of results of present study with other studies

Name of the author	Method of study	Incidence of MB	Common Site	Mean length
Manimay Bandipadhyay [1]	Cadaver	90.40%	LADA	2.7+/-1.01cm on LCA 0.93+/-0.4 on RCA
Sahni D [2]	Cadaver	males-34.5% females-32.5% child- 40%	LADA	
Ferreira [3]	Cadaver	55.60%	LADA	--
Loukas M [8]	Cadaver	34.50%	LADA	--
Ballesterosle [9]	Cadaver	70.90%	LADA	19.4+/-10.7 mm
Ramazan Akdemir [10]	Angiogram	Case	LADA	--
Ozlem Soram [11]	Coronary arteriography	5%	--	--
Swayam Jothi [12]	Cadaver Angiogram	18% 0.61%	LADA	--
Vanildo [13]	Cadaver	86.66%	LADA	--
Adam Kosinski [14]	Cadaver	31.30%	LADA	--
Present study	Cadaver	65.70%	LADA	5-62 mm

The length of MB definitely plays a vital role in producing ischemic symptoms since a longer MB will produce more significant systolic compression on coronary arteries [15].In the present study the range of length of MB was 5-62 mm while it was 19.4+/-10.7 mm[9] and 2.7+/-1.01cm on LCA and 0.93+/-0.4 on RCA[1]. In the present

study the other arteries which showed MB were left diagonal in 6 hearts [Fig-2], [Fig-6], anterior ventricular in 4 hearts [Fig-2], [Fig-5], posterior ventricular in 5 hearts [Fig-2], [Fig-6] branches of LCA and right marginal in 2 hearts [Fig-7], anterior ventricular in 3 hearts [Fig-7], [Fig-5] and posterior ventricular in 3 hearts and posterior interventricular [Fig-7], [Fig-8], [Fig-9] branch of RCA. MBs were found on right marginal branch of RCA [14]. Single MB was seen 59 [8], 37 hearts [1] and in 45 hearts in present study and multiple MBs were seen 10 [8], 5 hearts [1] and in 26 hearts in present study.

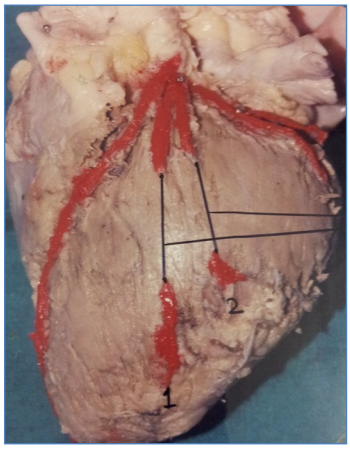

Fig. 6- MB on Diagonal branch of LCA (1) and Ventricular branch of LCA (2)

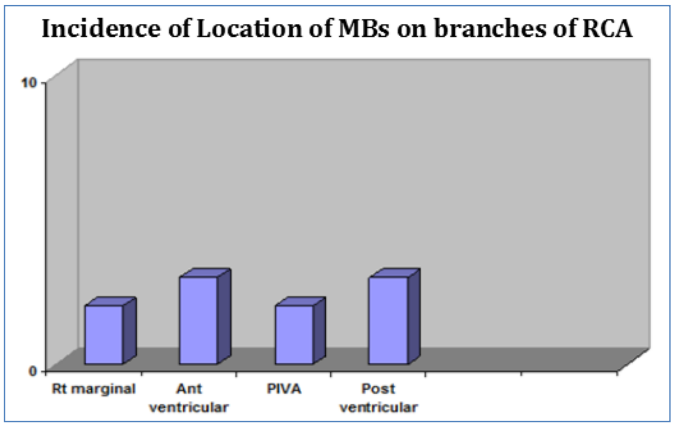

Fig. 7- Incidence of MBs on branches of RCA

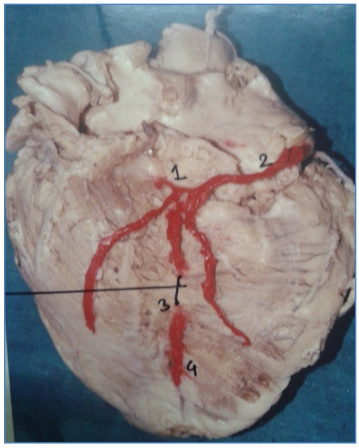

Fig. 8- MB(3) on PIVA branch of RCA(2)

MBs are seen in fetal period and yet symptoms, morbidity or mortality in children since birth have not been reported. MB is normal variant found incidentally and does not have any definitive clinical co-relation or pathological significance and so should not be considered as indication for coronary surgery [16-18].

Whether presence of MB is harmful or harmless is still an open issue. This will more cleared after ultrastructure of MB and tunnel artery will be studied and co-related with the symptoms.

Morphological study of MBs will be useful to find out its incidence and involvement of specific arteries.

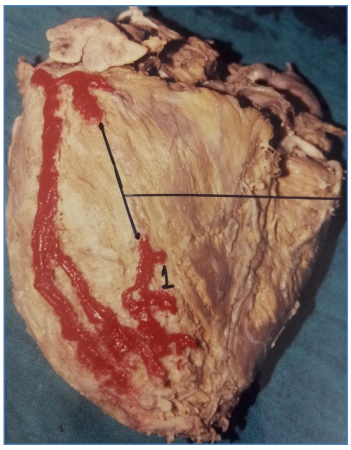

Fig. 9- MB on posterior ventricular branch of LCA

Conclusions

1. Majority of MBs were seen on branches of LCA and LADA is the commonest site to show MB.
2. Incidence MB is 65.7% which is high.

Acknowledgement

I want to thank Dr. Mrs. Dabak for the guidance and support.

References

[1] Bandopadhyay M. (2010) *Indian J. Thorac. Cardiovasc. Surg.,* 26, 193-197.

[2] Sahni D. (1991) *Indian heart journal,* 43(6), 431-6.

[3] Ferreira A.G. (1991) *British heart journal,* 66, 364-367.

[4] Chawbers J.D. (1994) *Am. Heart J.,* 128, 1036-1038.

[5] Dean Dulk K. (1983) *J. Am. Coll. Cardiol.*, 1, 965-969.

[6] Polacek P. (1968) *Acta. Facultatis Medicae*, Universitatis Brunensis, Brno.

[7] Black S. (1805) *Memoirs of the Medical Soc. of London,* 6, 41.

[8] Loukas M. (2006) *J. Anat.,* 209(1), 43-50.

[9] Ballesteros L.E. (2008) *Folia Morphol.,* 67(2), 135-42.

[10]Ramazan Akdemir (2002) *BMJ Cardiovas. Disord.,* 2(15), 1-5.

[11]Ozlem Soran (2000) *Tokai J. Exp. Clin. Med.,* 25(2), 57-60.

[12]Jothi S. (2012) *J. Med. Sci. Tech.*, 1, 1.

[13]Vanildo Jr. de melo Lima (2002) *Arq. Bras. Cardiol.*, 79, 219-22.

[14]Adam Kosinski (2004) *Folia Mophol.*, 63(4), 491-498.

[15]Bourassa M.G. (2003) *J. Am. Coll. Cardiol.*, 41, 351-9.

[16]Somnath H.S. (1989) *Indian Heart J.*, 41(5), 296-300.

[17]Kramer J. (1981) *Am. Heart J.*, 103, 284-288.

[18]Michael A. (1985) *Am. H. Journal,* 110, 499-501.