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Origin of SA Nodal Artery: An Angiographic Study

Abdur Rafe Abdul Waheed[1*], Shaikh S. I.[2], Diwan C. V.[3]

{[1]Assistant Professor, [2]Associate Professor, [3]Professor and Head}

Department of Anatomy, Government Medical College, Aurangabad, Maharashtra, INDIA.

[*]Corresponding Address:

abdurrafe@ymail.com

Research Article

Abstract: Artery supplying the SA node is usually a branch of right coronary artery but in some of the individuals it can arise from the left coronary artery. In the present study angiographic evaluation of the origin of the SA nodal artery was done. Out of the 348 cases studied, 248(71.28%) had right coronary artery supplying the SA node while 100(28.74%) had left coronary artery supplying the SA node. In cases where SA nodal artery originated from the left coronary artery, it was a branch of the circumflex artery rather than the main trunk. The distribution of the SA nodal artery makes us understand the possible ischaemic etiology of the sinusal nodal syndrome and helps the surgeon accordingly.

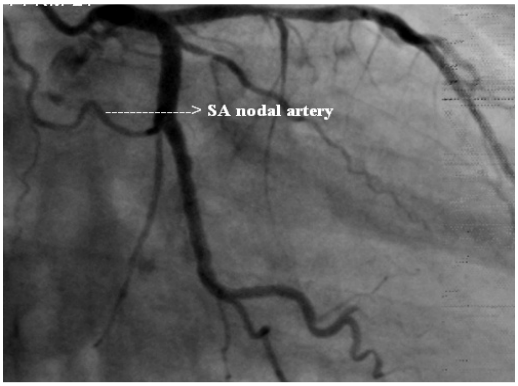
Key words: SA node, Right coronary artery, Left coronary artery, Ischaemic.

Introduction

Coronary angiography is a technique in which a catheter is inserted into the femoral artery in the thigh, passed through external and common iliac arteries and into the aorta uptil the origin of coronary arteries, where the contrast agent is pushed and roentgenography done. Accurate identification of coronary arterial branches is important in the interpretation and description of coronary arteriograms, especially if surgery is condidered. The first selective coronary arteriography was done by Dr F Mason Sones in 1959.[1] The sinuatrial node, or pacemaker of the heart, is a small mass of histologically distinct myocardial cells. It is subepicardially situated in the wall of the right atrium, just below the superior vena cava, at the top of the sulcus terminalis. It has no macroscopic or palpable features that indicate its location[2]. The artery supplying SA node can be a branch of the right or the left coronary artery. It is the 2nd branch of the 1st segment of the RCA from the initial 1-2 cm. When originating from the LCA the artery is most commonly a branch of the LcX than from the trunk of the artery.[3] Gray's anatomy describes the artery of the sinoatrial node as an atrial branch, distributed largely to the myocardium of both atria, mainly the right. Its origin is variable; it comes from the circumflex branch of the left coronary artery in 35% of people.[4]

Materials and Methods

The study was carried out in the Department of Anatomy, Government Medical College, Aurangabad in collaboration with Cardiovascular and Thoracic Surgery Centre of the same institute. A consecutive series of 348 adult patients having mean age range between 40-60 years referred to the Cardiovascular and Thoracic Surgery Centre from November 2008 to September 2010 for coronary angiography were included. Patients with diagnosed anomalous coronary arteries were excluded from the study. Approval from the ethics committee Government Medical College and Hospital was obtained. Angiographic films of the patients were analyzed for the origin of SA nodal artery. For the Right Coronary Artery, LAO view, and for the Left Coronary Artery, RAO view were analyzed.



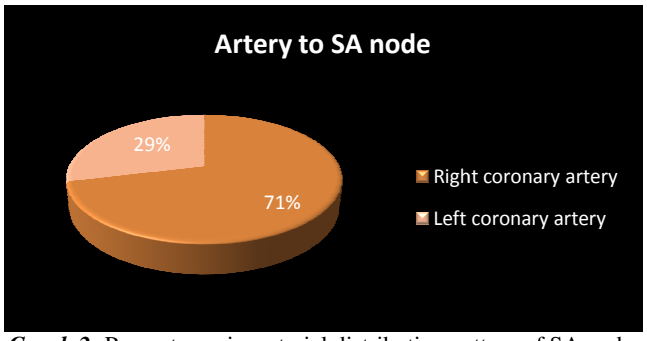
Graph 1: RAO view showing the SA nodal artery arising from the LCX

Observations and Results

Out of the 348 cases studied, 248 (71.26%) were seen to be supplied by the sino atrial branch of the right coronary artery and 100 (28.74%) by the sinoatrial branch of the left coronary artery. The SA nodal branch of the right coronary artery arised from the proximal segment of the artery. In cases where SA nodal artery was seen to be arising from the left coronary, it was a branch of the circumflex artery rather than from the main trunk.

Table 1: Arteries supplying blood to SA node

	Artery to SA node	
	Number	%
Right coronary artery	248	71.26
Left coronary artery	100	28.74



Graph 2: Percentagewise arterial distribution pattern of SA node

Discussion

In the present study, 248 out of 348 cases (71.25%) received SA nodal artery from the right coronary artery and 100 out of 348 cases (28.74%) from the left coronary artery. Even in those cases in which the SA nodal artery was a branch of the left coronary, it arised most commonly from the circumflex branch of the left coronary artery than from the main trunk of the artery. Thus a constant pattern of blood supply to the SA node comparable with that given in literature and other published reports was observed. Gray's anatomy states that the artery of the sino atrial node is an atrial branch, distributed largely to the myocardium of both atria, mainly the right. Its origin is variable; it comes from the circumflex branch of the left coronary in 35%.[4] Snell's anatomy has a similar view, stating that the artery of the sino atrial node supplies the node and the right and left atria and in 35% of individuals it arises from the left coronary artery.[5] The second branch of first segment of right coronary artery, the SANA, according to Uemura (1999), as mentioned by Kalpana, arises from RCA in more than 60% and from LCA in less than 44% of specimens.[6] The SA nodal artery originated more frequently from the right coronary artery (58%) than from the left and also in specimens in which the SA nodal artery originated from the left coronary, it was a branch of the circumflex artery (30%) than from the main trunk of the artery.[3]

Table 2: Comparison of percentagewise arterial distribution pattern of SA node

Sr. No.	Study done by	Artery to SA node	
		RCA %	LCA %
1	Caetano and Lopes (1995) [3]	58	42
2	Kalpana (2003) [6]	56	35
3	N Hima Bindu (2006) [7]	66	28
4	**Onciu M (2006) [8]**	**74**	**16**
5	**Siri A M (2008) [9]**	**77.5**	**22.5**
6	Lakshmi Ramanathan(2009)[10]	53	42.66
7	Arda Sanh Okmen (2009) [11]	85	14
8	**Present study (2011)**	**71.25**	**28.74**

Conclusion

The SA node is the pacemaker of the heart situated at the junction of the superior vena cava and the right atrium. In the present study the blood supply to it was from the sinoatrial branch of the right coronary artery in 71.26% of cases and from the left coronary artery in 28.14% of cases. In cases in which the SA node is supplied by the left coronary artery it is most often a branch of the circumflex artery rather than from the main trunk. The analysed data about the blood supply of the SA node is similar to that reported in the literature. Thus knowing the variations in the blood supply of SA node will help the surgeon in taking due caution during cardiac surgeries.

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