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Original Research Article

ANATOMICAL STUDY OF ORIGIN OF SINOATRIAL NODAL ARTERY IN HUMAN CADAVERIC HEARTS

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ABSTRACT

Introduction: Sinoatrial Nodal artery is an artery which supplies the sinoatrial node, the natural pacemaker center of the heart, usually a branch of right coronary artery but also from left coronary artery in variable percentage in different population.

Aim: The aim of the study was to study the anatomical origin of sinoatrial Nodal artery , from Right coronary artery or left coronary artery in indian human cadavers

Materials and Methods: The study was carried out on 50 formalin fixed Adult Human Cadaveric Heart of Indian population obtained from department of Anatomy subharti medical college Meerut UP INDIA. Specimens with gross congenital anomalies were excluded from the study. The coronary arteries were dissected for the origin of sinoatrial Nodal artery.

Results: Out of total 50 cases studied, sinoatrial nodal artery was originating from right coronary artery in 39 (78%) hearts while in remaining 11 (21.27%) hearts SA nodal artery was arising from left coronary artery. When it is arising from left coronary artery it is a branch of left circumflex artery rather than the main trunk.

Conclusions: In present study of Indian Human cadaveric hearts SA Nodal artery is originating from right coronary artery in maximum (78.0) percent population comparing with the previous studies done globaly. Further studies are needed in Indian population in relation to SA Nodal Artery. Study of origin and distribution of sinoatrial nodal artery helps cardiologist and cardiac surgeons to understand the ischemic etiology of sinus node diseases and corrective steps needed.

KEY WORDS: Sinoatrial Nodal Artery, Right Coronary Artery, Ischemic, Cadaveric Heart.

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INTRODUCTION

The sinoatrial node, or pacemaker of the heart, is a small mass of histologically distinct myocardial cells. It is sub-epicardially 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 [1] (fig-1). The artery supplying sinoatrial node mostly arises from the first segment of the right coronary artery, from its initial 1-2 cm. First branch of right coronary artery is Conal artery and second branch of the RCA is Sinoatrial Nodal artery (fig-2 & 3).

artery is Conal artery and second branch of the

RCA is Sinoatrial Nodal artery (fig-2 & 3). Sinoatrial Nodal artery also arises from left coronary artery (LCA). When originating from the LCA the artery is most commonly a branch of the left circumflex artery rather than from the trunk of the artery [2], (fig-4). Origin of sinoatrial nodal artery from left main trunk has also been reported in few cases [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 Right coronary artery in 65% of people and from circumflex branch of the left coronary artery in 35% of people [3]. Accurate identification of coronary arterial branches is important in the interpretation and description of coronary arteries, especially if surgery or angioplasty is considered.

MATERIALS AND METHODS

The study was carried out in the Department of Anatomy, Subharti Medical College, Meerut, UP in collaboration with Metro Heart Institute Meerut UP. 50 formalin fixed Adult Human Cadaveric Heart of Indian population obtained from department of Anatomy subharti medical college Meerut UP INDIA. Specimens with gross congenital anomalies were excluded from the study. The coronary arteries were dissected and analyzed for the origin of sinoatrial Nodal arteryand Observations were noted. Approval from the ethics committee of Hospital was obtained.

OBSERVATIONS AND RESULTS

Fig. 1: Location of SA Node (SAN), (RAA-Rt .atrial appendage, IVC-Inf. vaina cava, SVC- sup. Vaina cava).

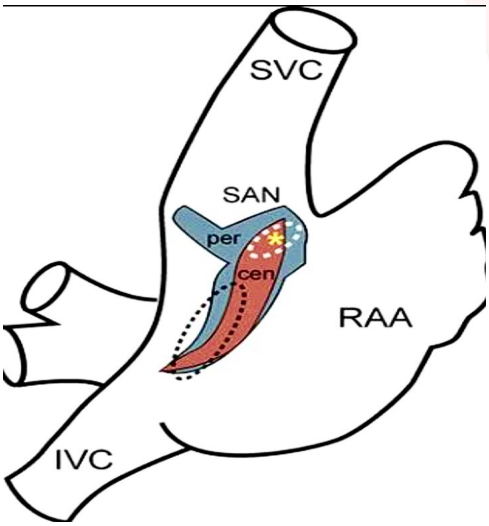

Fig. 2: Sinoatrial Nodal Artery origin from Right coronary artery.

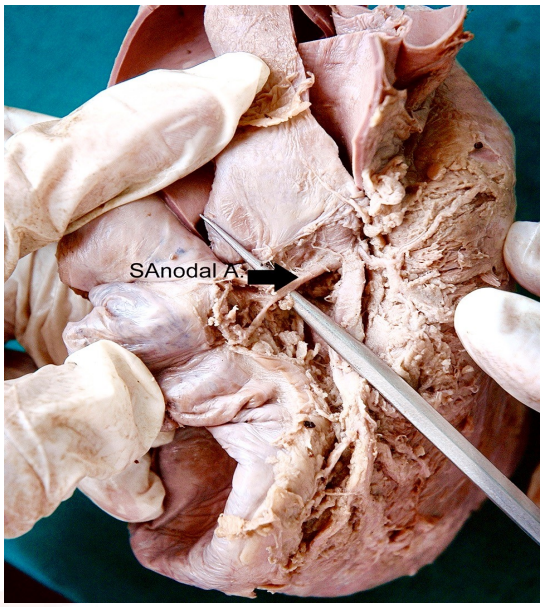

Fig. 3: Coronary Angiogram- Origin of Sinoatrial Nodal Artery (SAna) from proximal right coronary artery.

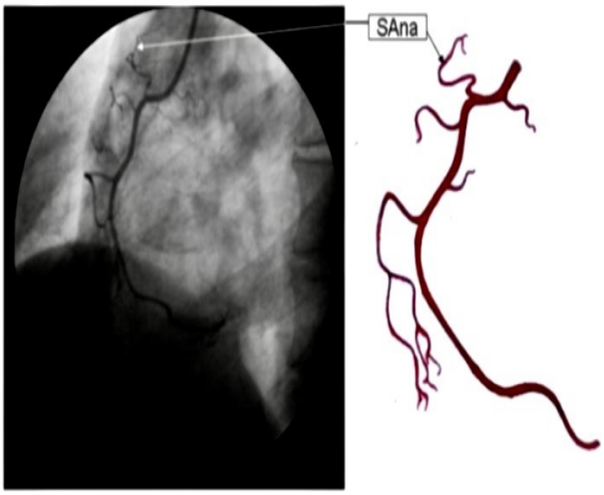

Table 1: Origin of Sinoatrial Nodal Artery.

	Human Cadaveric Heart	
origin of SA nodal artery	Total Number (50)	%
Right coronary artery	39	78
Left coronary artery	11	22

Out of the 50 cadaveric hearts studied, in 39 (78 %) cases sinoatrial nodal artery was originating from proximal segment of the right coronary artery and in 11 (22%) cases sinoatrial nodal artery was originating from the left coronary artery. The sinoatrial nodal branch of the right coronary artery originating from the proximal segment of the artery as second branch. In cases where sinoatrial 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)

DISCUSSION

Table 2: Comparison of percentage wise arterial distribution pattern of Sinoatrial Nodal Artery origin.

Sr. No.	Study done by	Artery to SA node	
		RCA %	LCA %
1	Caetano and Lopes (1995) [2]	58	42
2	Kalpana (2003) [6]	56	35
3	N Hima Bindu (2006) [7]	66	28
4	Onciu M (2006) [8]	74	16
5	Sirl 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 (2016)	78	22

The present study of sinoatrial nodal artery in Indian cadaveric hearts, 39 out of 50 hearts (78 %) received SA nodal artery from the proximal segment of right coronary artery and 11 out of 50 hearts (22 %) from the left coronary artery. when SA nodal artery was a branch of the left coronary, it arised most commonly from the circumflex branch of the left coronary artery and not from the main trunk of the artery. Few cases of sinoatrial nodal artery origin from left main trunk has also been reported [2]. Thus a constant pattern of blood supply to the SA node comparable with that given in literature and other published reports was observed. In present study of northern Indian population SA Nodal artery is originating from right coronary artery in maximum (78) percent population comparing with the previous studies done globaly. 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 came from the circumflex branch of the left coronary in 35% and from right coronary artery in 65% cases (3). 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 sinoatrial nodal artery 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 [2]. (Table-2)

CONCLUSION

The SA node is the pacemaker of the heart situated at the junction of the superior vena cava and the right atrium. The present study of Indian human cadaveric hearts the blood supply to SA node was from the sinoatrial nodal branch of the right coronary artery in 78% of cases and from the left coronary artery in 22 % 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, but in present study of northern Indian population SA Nodal artery is originating from right coronary artery in maximum (78) percent of cadaveric human hearts comparing with the previous studies done globaly. Further studies are needed in relation to SA Nodal Artery.

Thus knowing the variations in the blood supply of SA node and study of origin and distribution of sinoatrial nodal artery helps cardiologist and cardiac surgeons to understand the ischemic etiology of sinus node diseases and corrective steps needed.

ABBREVIATIONS

SA- Sino Atrial
LCA- Left Coronary Artery
RCA- Right Coronary Artery

Conflicts of Interests: None

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