A long sinus node artery with an unusual origin and course: A case report

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SUMMARY

The purpose of this study was to expand our knowledge of anatomical variations in the blood supply to the sinus node. Gross anatomical examination and postmortem angiographic evaluation and dissection were performed in 600 human hearts in the last forty years. These cases were derived from victims of various accidents. Angiographic findings of previous unreported cases revealed that the sinus node artery was originated distant from the aorta, outside of the atrioventricular sulcus, from the posterior right diagonal artery. Knowledge of this anatomical variation, although not accompanied with symptoms, is essential for the interventional cardiologists and cardiac surgeons for their medical procedures, as well as for anatomists.

Key words: Heart – Coronary arteries – Sinus node – Sinus node artery – Right atrium

INTRODUCTION

The origin and course of the sinus node artery (SNA) in normal hearts have been well investigated (James, 1961; Nerantzis et al., 1983). In most of the cases the SNA originates from the proximal 2-3 cm of the right coronary artery (RCA) and from the proximal 1-2 cm of the left circumflex (branch of the left coronary artery (LCA). From either right or left origin the SNA courses in a direct route along the anteromedial atria wall to the base of the superior vena cava, whose orifice it encircles either clockwise or counterclockwise, and therefore supplies with blood the SN area, and the myocardium of a large part of the right, left atrium, and the interatrial septum. The sinus node (SN) is the pacemaker of the heart. An integral part of it is the SNA. The SNA has no constant origin, but has a constant termination, which is used as a good guide to the location of the SN. We present here a variation in which the SNA originated outside of the atrioventricular sulcus, from the posterior right diagonal (PRD) artery (Nerantzis et al., 1994), an anatomical finding never reported before.
ported case, the posteroanterior projection was the most useful for the identification of the origin, course, distribution, and termination of the SNA.

Fig. 1. The SNA arose from the right coronary artery (RCA) in 371 cases, and in one from its branches the PRD, totally 372 cases (62%). The SNA arose from the left circumflex, branch of the LCA in 216 cases; in one case the left circumflex and SNA have the same origin (Nerantzis et al. 2009); and in another one case the SNA originated from the proximal part of the conus artery (Gavrielatos and Nerantzis, 2011), totally 218 cases (36%). Both coronary arteries were giving one branch each to the sinus node area in 10 cases.

Fig 1. The posteroanterior X-ray view of the heart shows, with four large white arrowheads the origin, course of the sinus node artery (SNA) through the posterior part of the right ventricle, right atrium (RA), interatrial sulcus, again RA to the sinus node area. The higher large white arrowhead shows the sinus node area.

Two large black arrowheads show the origin, course and end of the posterior right diagonal artery (PRD) artery. A white arrow shows branch of the SNA supplying with blood the adjacent areas. The figure shows also the right coronary artery (RCA), the acute marginal (AM) artery (pointed with black-white arrow), the left coronary artery (LCA), the left anterior descending (LAD) artery, two short posterior descending (PD) arteries coursing in both sides of the upper part of the interventricular sulcus, pointed with two small discontinued black arrows.
In conclusion, detailed anatomical knowledge of the blood supply to the SN is essential because of the wider implementation of cardiac surgery, interventional cardiology therapies for arrhythmias, in order to avoid damage of this vessel during their medical procedures. We believe that such a complication could result in the destruction of the artery, damage of the collateral circulation, dysfunction of the atrial myocardium and the onset of arrhythmias of various degrees and types as mentioned by Gaudino et al. (2003). On the contrary, there is another study suggesting that cutting of the SNA did not influence the sinus node function, as it receives blood supply from more than one source (Kawashima and Sasaki, 2003).

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REFERENCES


