

## Case Report

# Post Mortem Coronary Angiographic Visualization of a Rare Sinus Node Artery Anatomical Variant

GERASIMOS GAVRIELATOS<sup>1</sup>, CHRISTOS E. NERANTZIS<sup>2</sup>

<sup>1</sup>Cardiac Catheterisation Department, Herz-Zentrum, Bad Krozingen, Germany; <sup>2</sup>Forensic Medical Service of Athens, Greece

**Key words:**

**Anomalous coronary arteries, sinus node artery variation, atrial blood supply.**

The incidence of sinoatrial artery variants and their significance have been repeatedly reported in the literature. Herein we describe a rare post mortem angiographic finding which concerns a unique and previously unreported case where the sinus node artery had an abnormal origin from the proximal conus artery. Although it was asymptomatic, any possible involvement with invasive or surgical procedures and its clinical consequences should be considered.

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*Address:*  
Gerasimos Gavrielatos

*Cardiac Catheterization  
& Interventional  
Cardiology Department  
Herz Zentrum  
15 Sundrig Str.  
79189 Bad Krozingen,  
Germany  
e-mail: [makisgab@yahoo.gr](mailto:makisgab@yahoo.gr)*

**T**he comprehensive anatomical awareness of the blood supply to the sinus node (SN) area is a well investigated topic.<sup>1-4</sup> The incidence of sinoatrial artery variants and their significance have been repeatedly reported in the literature.<sup>5,6</sup> Herein we describe a unique and previously unreported case where the SN artery originated from the proximal conus artery.

## Case presentation

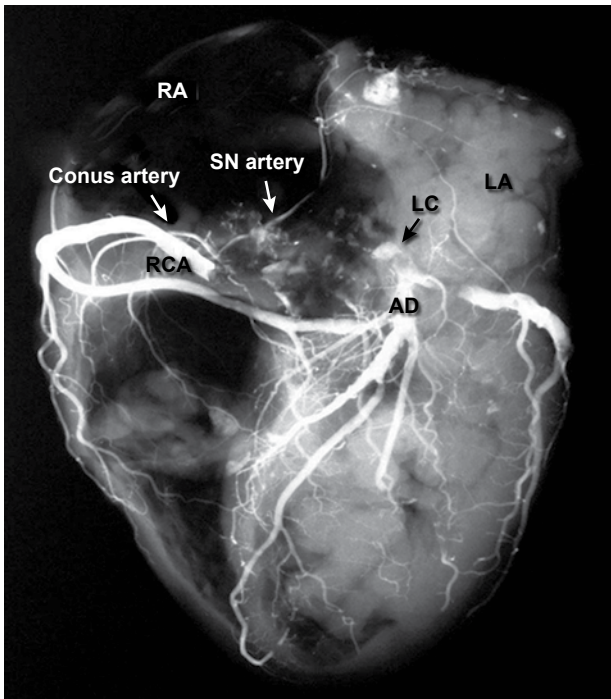
The human hearts in our study were obtained from autopsies of victims of car accidents. Post mortem coronary angiography was carried out using radiopaque medium (BaSO<sub>4</sub>) injection, with a different colour for each coronary artery, so that the arteries could be studied by naked eye and by X-rays in different aspects. In the reported case we found the anteroposterior projection to be the most useful in identifying the origin and course of the SN arteries.

The case reported here concerned an asymptomatic 32-year-old male cadaver, victim of a car accident, without known cardiac history. The SN arose from the

proximal part of the conus artery. The latter originated with a separate ostium from the right aortic sinus behind the right coronary artery (RCA) orifice. After its origin, the SN artery coursed upwards and to the left into the anterior interatrial groove, then along its upper portion, supplying blood to the anterior left atrium, the interatrial septum and the right atrium; then, following a counterclockwise direction around the superior *vena cava* orifice, it was distributed to the SN area. The conus artery, along with branches from the anterior descending artery, contributed to the formation of the Vieussens ring, crossing the upper portion of the right ventricular outflow tract.

## Discussion

According to previous studies, the SN artery arises from the RCA in 54% of cases, from the circumflex artery in 42%, from both arteries in 2%, and in 2% the origin is undetermined.<sup>1</sup> An extremely rare variation is the SN artery that originates from the initial part of the conus artery. The latter arises with a separate ostium from the right aortic sinus, participating in the



**Figure 1.** Anteroposterior X-ray view showing the origin and course of a sinus node (SN) artery supplying blood to the anterior and upper portion of the left atrium, and the interatrial septum, in a right dominant coronary artery type. It also supplies the SN area with a branch encircling the superior *vena cava* orifice counter-clockwise. The SN artery arises from the very proximal part of the conus artery. The conus artery, with branches from the initial part of the anterior descending artery, participates in the formation of Vieussens' ring. The latter supplies blood to the outflow tract of the right ventricle with branches from the initial segment of the anterior descending artery. SN – sinus node; RCA – right coronary artery; RA – right atrium; LA – left atrium; AD – anterior descending artery; LC – left coronary artery.

formation of the Vieussens ring.<sup>6,7</sup> In the above described anatomical peculiarity, the SN artery perfused a large part of the left atrial wall, the interatrial septum and part of the right atrium, belonging to the cases of group B, according to our previously published classification.<sup>4</sup> As a result, the specific uncommon variation in SN origin and course seemed not to have influenced the normal function of the SN and the patient was asymptomatic. We have recently reported another anatomical variation of SN artery in an asymptomatic patient.<sup>8</sup>

It is essential for anatomists, and mainly for car-

diac surgeons and interventional cardiologists, to be aware of these variations when applying their surgical or invasive procedures. All SN artery variations should be taken into account when planning the safest right atrial incision, particularly when the nodal artery crosses the lateral margin of the right appendage, or courses over the roof of the left atrium.

The origin and route of the SN artery should be identified by preoperational coronary angiography, which can credibly distinguish any alternative course or abnormal variant. Nowadays, coronary computer tomography or cardiac magnetic resonance imaging provides excellent visualisation of the coronary tree, with safety, avoiding invasive procedures.<sup>9</sup>

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