

# Seminars in Thoracic and Cardiovascular Surgery

## Commentary: The Location of the Conduction System in Atrioventricular Septal Defect – Will It Alter the Way We Operate?

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<b>Abstract:</b>	<b>BRIEF SUMMARY</b> With their three-dimensional imaging technique, Yoshitake et al. showed that damage resulting in heart block during surgery for atrioventricular septal defect might even occur when taking superficial bites around the location of the conduction system. Sutures for the patch repair should be placed well away from the conduction tissues.

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Conflict of interest statement: none

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## **CENTRAL PICTURE LEGEND**

Professor Victor T. Tsang, FRCS

## **CENTRAL MESSAGE**

Precise measurements of the conduction system in atrioventricular septal defect shows that sutures securing the patch repair should be placed well away from the conduction tissue to avoid heart block.

## **BRIEF SUMMARY**

With their three-dimensional imaging technique, Yoshitake et al. showed that damage resulting in heart block during surgery for atrioventricular septal defect might even occur when taking superficial bites around the location of the conduction system. Sutures for the patch repair should be placed well away from the conduction tissues.

## **BODY**

When it comes to surgical repair of atrioventricular septal defect (AVSD), preferences for repair techniques differ among surgeons and suture placement to secure the patch repair is primarily based on individual experience and knowledge gathered from histological and electrophysiological studies. These factors are subject to debate, especially since careful suture placement is essential for preventing iatrogenic heart block. Luckily, this severe complication is rare already but it should nevertheless be the goal to minimize its occurrence further. This difficult task was the topic of investigation by Yoshitake et al.<sup>1</sup>, aiming to visualize the conduction system and to provide precise measurements of its location in patients with AVSD with common atrioventricular junction.

To do so, a phase-contrast computed tomography-based technique that had previously been demonstrated to be feasible was used by the authors<sup>2,3</sup>. With this elegant technique, with which heart specimens could be kept intact, the authors concluded that the atrioventricular node was closely related to the coronary sinus and right atrial endocardium and that the component of the septum covered by the inferior bridging leaflet was the most at risk during repair. The very strong message is that damage to conduction tissue might even occur when taking superficial bites around the location of the conduction system. Moreover, the ascending component of the ventricular septum was devoid of conduction tissue, facilitating safe resection of obstructions within the subaortic outflow tract.

Following their aim to visualize and provide precise measurements of the conduction system in AVSD, the authors concluded that their findings will help the surgeon avoid intraoperative damage to conduction tissue, hopefully minimizing the risk of atrioventricular dissociation. First and foremost, they accomplished their goal of visualizing and providing precise measurements of the conduction system. However, one might argue if these findings will lead to a clinically significant decrease in the risk of damage to conduction tissue. From our perspective, the results provided by the authors have great implications for surgical repair. The sutures to secure the patch repair should be placed completely away from the area of conduction tissues as described, letting the coronary sinus drain into the left atrium, or, in the setting of a left superior vena cava, leaving the coronary sinus draining in the right atrium using a deviated patch technique<sup>4</sup>.

This brings us to the strengths and weaknesses of the study. With a sample size of 18 patients' heart specimens (14 – 883 days old), of whom in 16 the atrioventricular node and in 14 the coronary sinus could be identified, there is quite a spread in age, and possibly heart size and conduction system proportions. This is partly corrected for with the confidence intervals but the numbers might be too small to effectively make conclusions on differences in the course of the conduction system that can be extrapolated to the larger patient population. Of course, the difficulty of acquiring these samples is completely understandable, and this does not render the results or technique used insignificant in the least. The possibility to create three-dimensional imaging of the conduction system from the surgeon's point of view, in any cardiac anomaly, is compelling and could prove to be a very valuable teaching tool for surgeons. Furthermore, some cardiac lesions are still surrounded by a lot of uncertainty regarding the course of the conduction system. Now that their technique is validated, its full potential might be unlocked when looking at these less well-understood anomalies<sup>5</sup>.

Word count: 564

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