Short Communication

Right Atrial Sensing for VDD Pacing Through a Persistent Left Superior Vena Cava

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Summary

This report describes a pacing lead insertion through a persistent left superior vena cava in the VDD pacing mode, with a large retrograde lead course allowing the optimal positioning of the sensing electrodes in the right atrium.

Key words: persistent left superior vena cava, single-lead VDD pacing, right atrial sensing

Introduction

Successful single-chamber or dual-lead pacing through a persistent left superior vena cava (PLSVC) has been reported frequently. Single-lead VDD pacing through a PLSVC has rarely been documented in the literature, and, in this situation, atrial sensing was achieved specifically from within the coronary sinus.^{1, 2} This report describes atrial sensing from the right atrium.

Case Report

A 74-year-old patient admitted for syncopal high-degree auriculoventricular block with no evidence of sinus node dysfunction was submitted to a single-lead VDD permanent im-

plantation. Following the left subclavian puncture, the guide wire was passed down a PLSVC and the coronary sinus. An auriculoventricular lead (Model 1368, St. Jude Medical, Sylmar, Calif., USA) was used (overall length: 650 mm, distance between atrial electrodes and tip: 130 mm). A large retrograde course of the lead in the right atrium was used to achieve placement of the atrial electrodes before entering the right ventricle. This lead course configuration allowed the appropriate positioning within the mid to high right atrium. It also facilitated the lead introduction into the right ventricle and the tip stabilization at the apex (Fig. 1). The atrial electrogram mean amplitude was 3 mV with no cross-sensing. The generator was VDR Model 5430 (St. Jude Medical). One week post implant the baseline examination and the Holter function of the pacemaker confirmed permanent atrial detection. During the pacing threshold measurement, loss of ventricular capture occurred at 0.25 V/0.40 ms.

Discussion

Atrial, ventricular, and dual chamber pacing through a PLSVC have often been reported in the literature; however, VDD single-lead pacing through a PLSVC has rarely been described. The lead course through this venous anomaly offers an immediate placement of the sensing electrodes in the coronary sinus.^{1, 2} However, with sensing from within the coronary sinus, positioning of the ventricular electrodes may be difficult. The overall lead length or the distance between atrial and ventricular electrodes may prove unsuitable to achieve both coronary venous sensing and ventricular positioning. Placement of the pacing electrodes in the middle cardiac vein has also been described.³ It is possible to enter the right ventricle through a PLSVC in two different ways. In some cases, after emerging from the coronary sinus, the lead forms a sharp angle as it enters the right ventricle across the tricuspid valve. To avoid the difficulties of ventricular insertion with too sharp an angle between the coronary ostium and the tricuspid valve, it may be useful to achieve a large retrograde loop in the right atrium. In our case, with a commonly used single auriculoventricular

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FIG. 1 Anteroposterior view showing the lead course. After emerging from the coronary ostium, the lead formed a very large retrograde loop in the right atrium, allowing optimal placement of the sensing electrodes.

lead, the latter method was appropriate both for placement of the atrial electrodes in the right atrium and for the lead tip stabilization after passive fixation at the apex of the right ventricle.

Conclusion

A persistent left superior vena cava does not prevent right atrial sensing during single-lead VDD pacing.

References

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Images in Cardiology: Vieussens' Ring

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FIG. 1 Right anterior oblique (RAO) 30° projection of the RCA showing the large conus branch passing upwards to the LAD.

FIG. 2 RAO 50° projection of the RCA focusing on the conus branch, the occlusion of the LAD, and its peripheral perfused part.

A 39-year-old male presented with stable angina of several months' duration. Past medical history was without any cardiac event. Stress tests and hemodynamics were normal. Coronary angiography showed a proximal occlusion of the left anterior descending (LAD) artery and a large conus branch of the right coronary artery (RCA) passing upward to provide collateral flow to the LAD. This phenomenon is known as Vieussens' ring and develops as a collateral flow

system with antegrade perfusion between the RCA and the left main artery.¹ In a follow-up period of 10 months during which there was no mechanical revascularization, no cardiac event or recurrent angina occurred.

Reference

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