Coronary sinus as an alternative ventricular pacemaker lead option for persistent left sided superior vena cava

A 70 year old patient with sinus node dysfunction, chronic atrial fibrillation, and single chamber permanent pacemaker in situ presented with syncope. He also has known persistent left sided superior vena cava. Device interrogation revealed intermittent increases in right ventricular pacing threshold, which was thought to be the most likely cause of his syncope. This was not reproducible with positional manoeuvres. Venography revealed that left-sided venous drainage to the heart was patent, and that the right sided venous system also drained into the left system. A decision was made to implant a new ventricular lead via the left side.

Venous access was uncomplicated via the left axillary vein. Multiple attempts using both active fixation and passive right ventricular leads were unsuccessful in crossing the tricuspid valve into the right ventricle. However during lead manipulation it was found to be possible to intubate a lateral branch of the coronary sinus (Figure 1A). A 90 degree subselector coronary sinus sheath was used to delineate venous anatomy with contrast injection and subsequent selective intubation of the side branch(Figure 1B). This revealed a large main coronary sinus body with a side branch. A bipolar left ventricular pacing lead was passed into this lateral side branch, which achieved stable left ventricular pacing parameters (Figure 1C). The existing ventricular pacing lead and new left ventricular pacing lead were connected to a dual chamber generator with the existing RV lead connected to the atrial port. This was programmed with a very short A-V delay to effectively deliver 'on-demand' biventricular pacing. Should the right ventricular lead fail in the future, the left ventricular pacing provides a backup pacing option.

This case serves as a reminder that the coronary sinus is an alternative pacing site option in single chamber pacemakers in patients with atypical anatomy.

Figure 1: Fluroscopic still AP views taken during new ventricular pacing lead placement in patient with persistent left sided superior vena cava. Previous existing right ventricular lead at bottom '6 o clock' position. 1A; During new ventricular lead manipulation a side branch of the coronary sinus was found. 1B; Contrast venography via 90 degree subselector coronary sinus sheath confirms presence of side branch. 1C; Final position of bipole coronary sinus pacing lead.