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CASE REPORT

Coronary Sinus Diverticulum Complicating CRT Device Implantation: A case report

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ABSTRACT

Background & objectives: Coronary sinus diverticula are rare findings usually associated with the presence of accessory pathways. We report the case of a 44-year-old man, who underwent cardiac resynchronization therapy (CRT) device implant. Coronary sinus diverticulum was an incidental finding while attempting to subselectively cannulate the coronary sinus for left ventricle lead implant. The case was able to be completed without complications.

Key words: Coronary sinus diverticulum, CRT device, anatomical abnormality.

Introduction

Coronary sinus (CS) diverticula are anatomic abnormalities fairly well described in the medical literature. The systematic review of congenital atrial malformations by Binder et al.[1] demonstrated a low incidence of these abnormalities, with the majority of the cases reported in conjunction with the presence of accessory pathways. This paper reports the unusual incidental finding of a CS diverticulum identified during a cardiac resynchronization therapy (CRT) device implant procedure that was not related with the presence of an accessory pathway.

Case Report

We report the case of a 44-year-old patient who presented to our hospital with end stage heart failure. He had a history of ischemic dilated cardiomyopathy (IDCM), S/P PCI to LAD, OMI(Inf.) and a depressed left ventricular ejection fraction (25%). His symptoms were consistent with New York Heart Association (NYHA) class III heart failure and his electrocar-diogram showed a bifascicular block morphology and a wide complex QRS (144 ms), Echocardiography revealed regional wall motion abnormality (RWMA) with dilated left atrium, left ventricle and right ventricular cavity, moderate tricuspid regurgitation, pulmonary hypertension and mild mitral regurgitation. Under conscious sedation a left infraclavicular incision yielded access for creation of a prepectoral pocket. Three venous accesses were obtained with an extra thoracic left subclavian approach at the first rib under fluoroscopic guidance. A pace/sense lead was placed in the right ventricular (RV) apex. CS cannulation was attempted using a long intravascular sheath and a steerable catheter through the left heart delivery system. The catheter was connected to the Siemens AXIOM recording system (Malvern, PA, USA) and the local electrograms were monitored during catheter manipulation. Under fluoroscopic and electrogram guidance, the catheter was advanced in multiple locations presumed to be the CS. Despite fluoroscopic views of the sheath position and local electrogram signals consistent with a CS location, the delivery system could not be advanced any further from what appeared to be the middle of the CS. A contrast venogram was performed through the outer sheath delivery system (Fig. 1). The angiogram revealed the presence of a large-

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calibered blind-ended tubular pouch that communcated with the right atrium. The sheath was pulled back from this position, and further manipulation of the steerable catheter finally allowed successful subselective cannulation of the main CS.

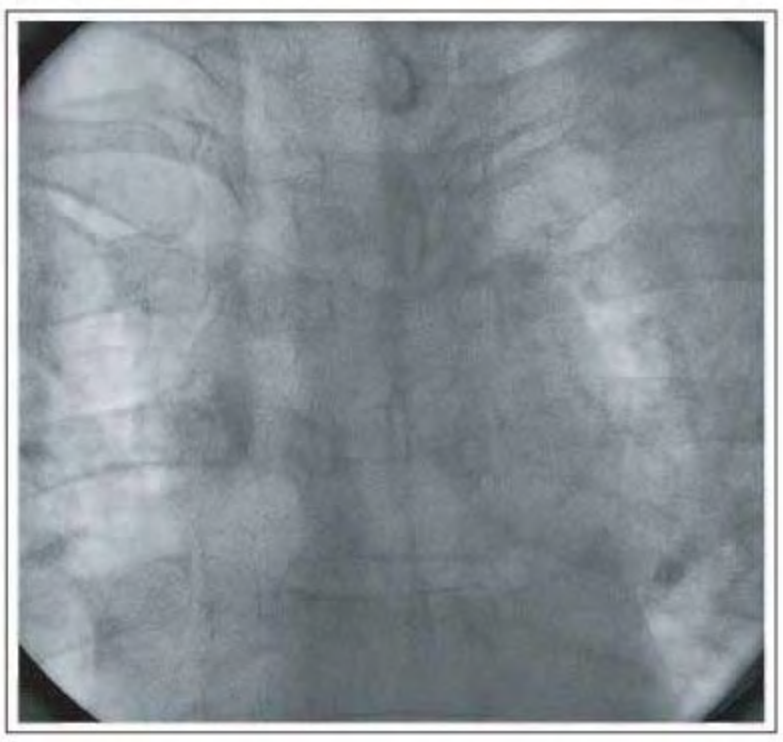

Figure 1. Contrast venogram performed through the outer sheath delivery system revealing the presence of a large caliber blind-end tubular pouch that drained into the right atrium.

The outer sheath was then readvanced to the left lateral portion of the CS and a new angiogram was performed (Fig. 2). The new system location was demonstrated to be in the main CS body. At the end of the injection, a CS diverticulum was visualized draining the contrast material into the CS ostium. The device implant was then successfully completed with no further difficulties. Post CRT-p echocardiography was done which revealed improved ejection fraction (35%) with mild pulmonary hypertension (PASP-45 mmHg). The patient was discharge with antiplatelet, anti ischemic drugs, diuretics and after 4 weeks of follow-up his condition improved dramatically.

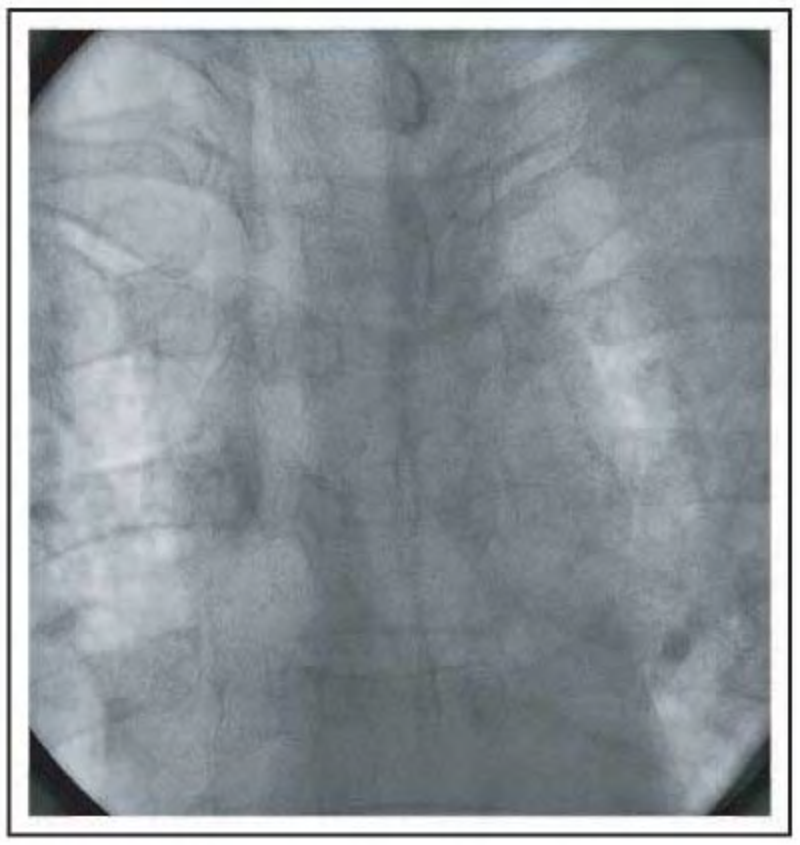

Figure 2. Contrast venogram performed from the main CS body. At the end of the injection, a CS diverticulumas visualized draining the contrast material into the CS os.

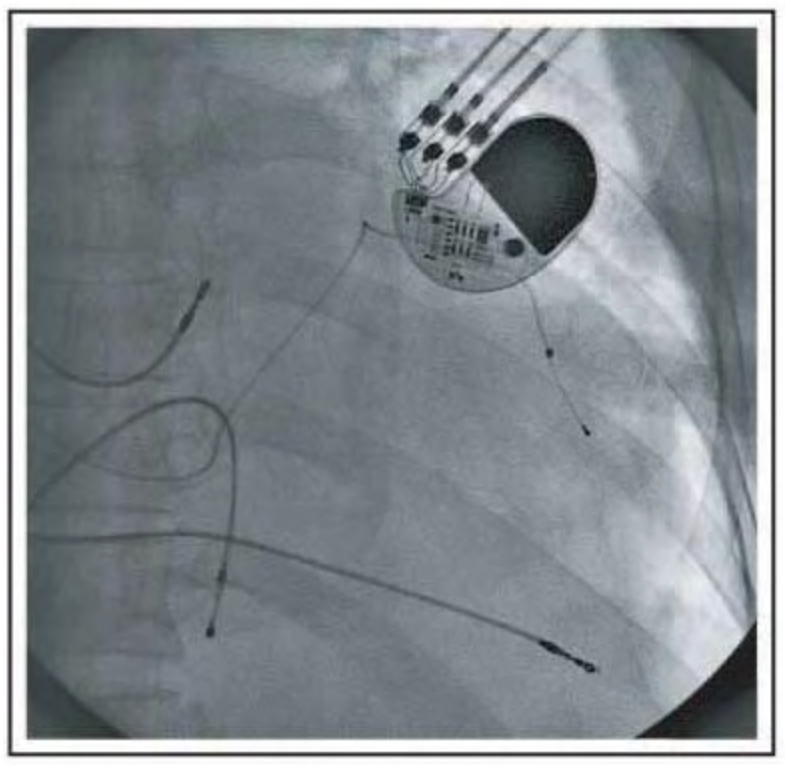

Figure 3. After CRT implantation.

Discussion

CS diverticula are uncommon.[1,2] They were initially described in association with accessory pathways and congenital heart disease.[3-5] In 2000, Binder et al. published a meta-analysis of 105 reported cases of congenital abnormalities of the right atrium and the CS, where they found the presence of CS diverticula in 24(22%) of the reported cases. Most of the reports in the literature are associated with congenital CS anomalies during surgical or catheter ablations of accessory pathways. There are few reports of casual findings of CS diverticula not associated with Wolf-Parkinson-White syndrome that may provide a hint to the true incidence of this entity.[5,7] The current knowledge about the anatomic-pathologic characteristics of these congenital anomalies is provided by case reports from the initial surgical experience for treatment of arrhythmias related to the presence of accessory pathways. In general, CS diverticula are composed of myocardial tissue epithelialized in the endo- and epicardial surfaces. These structures may have an epicardial vascular system in continuity with the normal heart system.

The muscle layers are often associated with the left atrial or left ventriclular tissue and such muscular bridges between these two heart structures may constitute the accessory pathways themselves.[3,6] There are no data regarding the natural history of untreated CS diverticula. As mentioned, most of the reported data are derived from treatment of accessory pathways, but very few reports are available regarding general incidence and natural history.[7] This is a report of a CS diverticulum complicating a BiV/ICD device implant. The presence of this entity should be considered as a potential complicating factor in cases of difficult CS cannulation for final left ventricular lead implantation. The awareness of this potential finding may prevent excessive manual manipulation that may cause unwanted complications. In addition, unnecessary termination of procedures may be prevented.

Conclusion

This is an original contribution about the incidental finding of CS diverticulum during a CRT device implant that should be valued as an illustration for the implanting cardiologist and may shed some light about this unusual finding and a stimulus for further reporting of these anomalies.

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