Dysfunction of an ICD-Electrode Due to the Implantation of a Vena Cava-Stent

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Abstract
A 51-year-old patient was admitted to our hospital following detection of an over sensing of his automatic implantable cardioverter defibrillator (AICD), there appeared to be a dysfunction of the electrode due to the implantation of a vena cava-stent. After stent implantation, the lead was pressed against the SVC wall. We deactivated the ICD-function because of the disturbed signals. A stenosis persisted, so we decided to implant another stent. We bridged the time between the deactivation of the VT-detection and the implantation of the new electrode with a Life Vest. After the redilatation, we re-implanted a new right ventricular electrode.

ABBREVIATIONS
AICD: Automatic Implantable Cardioverter Defibrillator; SVC: Superior Vena Cava; VT: Ventricular Tachycardia

INTRODUCTION
We present a case of ICD lead-related SVC syndrome treated successfully with venous stenting. We bridged the time between the deactivation of the VT-detection and the implantation of the new electrode with a Life Vest. This case report supports the recommendation of lead extraction prior to stenting in SVC syndrome.

CASE PRESENTATION
A 51-year-old patient was admitted to our hospital following detection of an over sensing of his automatic implantable cardioverter defibrillator (AICD). On the electrocardiogram (ECG) we detected a heart rate of 77bpm with regular atrial and ventricular pacing. In another control of the AICD-function on the day of admittance, we detected over sensing of the ventricular electrode, with disturbed signals. The RV-impedance was 361Ω, shock impedance 58Ω. The AICD had not delivered a shock. Six weeks prior, the patient had been to another hospital due to a major thrombosis of the superior vena cava (SVC), resulting in superior inflow congestion. The outcomes were recanalisation and stent implantation.

In summary, there appeared to be a dysfunction of the electrode due to the implantation of the vena cava-stent.

The AICD had been implanted eight years prior, due to recurring ventricular tachycardia. On the day of admittance, the patient had a sinus rhythm at 45bpm.

A digital subtraction angiography (DSA)-phlebography (Figure 1), showed an open stent, reaching from the left vena brachiocephalica into the SVC and thereby blocking the right vena brachiocephalica. There was still good drainage from both sides into the SVC. We detected a stenosis at the end of the stent in the left vena brachiocephalica. We decided to redilatate the distal end of the stent and then re-implant the electrode.

We inactivated the VT/VTS-detection and the patient was supplied with a Life Vest. After the redilatation, we re-implanted a new right ventricular electrode, leaving the old one unattached.

This was a very demanding procedure because the old electrode was stuck in between the stent and the vessel intima. The old electrode could not have been removed without damaging the stent. The proximal end of the stent was very small; access

Figure 1 An open stent, reaching from the left vena brachiocephalica into the SVC and thereby blocking the right vena brachiocephalica.
was only possible with a coated wire. Nonetheless, we were able to implant a new RV-electrode and achieve a good result.

**DISCUSSION**

SVC syndrome is a common complication following transvenous AICD implantation [1]. The diagnosis of SVC syndrome is based on clinical signs. The Heart Rhythm Society has provided a consensus report on indications for transvenous lead extractions in 2009. There is a class I recommendation for lead removal in patients with superior vena cava stenosis or occlusion with limiting symptoms (level of evidence C) [2]. Endovascular procedures are associated with the risk of lead damage. Chan et al have already described the approach involving lead removal, stent implantation, and reimplantation [3]. In this case, after stent implantation, the lead was pressed against the SVC wall. We deactivated the ICD-function because of the disturbed signals. A stenosis persisted, so we decided to implant another stent. We bridged the time between the deactivation of the VT-detection and the implantation of the new electrode with a Life Vest.

**REFERENCES**