

İmplantation of an ICD Lead to an Unusual Site

Ahmet Korkmaz¹, Ozcan Ozeke², Meryem Kara², Firat Ozcan², Serkan Cay³, Serkan Topaloglu², and Dursun Aras²

¹1. Ankara City Hospital Department of Cardiac Electrophysiology Üniversiteler Mahallesi Bilkent Cad. No:1 Çankaya Ankara/Turkey 06800

²University of Health Sciences, Ankara City Hospital, Department of Cardiology, Division of Arrhythmia and Electrophysiology, Ankara, 06800, TR

³University of Health Sciences, Ankara City Hospital

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Abstract

Implantable cardioverter-defibrillators (ICDs) are routinely used for primary and secondary prevention of arrhythmia-related deaths in patients with heart failure and reduced left ventricular ejection fraction. Various early and late complications have been well described in the literature during transvenous ICD implantation. This case report describes an unusual site ICD lead implantation.

Title page

Case report

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Ahmet Korkmaz¹

Özcan Özeke²

Meryem Kara¹

Firat Özcan²

Serkan Cay²

Serkan Topaloglu²

Dursun Aras²

1. Ankara City Hospital, Department of Cardiology, Ankara, Turkey.

2. University of Health Sciences, Ankara City Hospital, Department of Cardiology, Division of Arrhythmia and Electrophysiology, Ankara, Turkey.

Corresponding author:

Ahmet Korkmaz, drahmtrkrmz07@gmail.com

Ankara City Hospital, Department of Cardiology, Ankara, Turkey.

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Introduction

Implantable cardioverter-defibrillators (ICDs) are routinely used for primary and secondary prevention of arrhythmia-related deaths in patients with heart failure and reduced left ventricular ejection fraction(1-2) Various early and late complications have been well described in the literature during transvenous ICD implantation(3-4). This case report describes an unusual site (coronary sinus) ICD lead implantation.

Case report

A 70-years-old man with a ischemic cardiomyopathy underwent ICD implant at an outside institution for primary prevention of sudden cardiac death three years ago. The ICD was a Medtronic Maximo II VR with a dual-coil VVI ICD lead. Two weeks ago the patient experienced a shock. The electrocardiography showed NSR (Figure 1). Device interrogation demonstrated that the stored intracardiac electrograms (EGMs) of the events are shown in Figures 2-3. The analysis of the episode revealed a sudden change to very rapid and irregular myocardial activity with EGM alternans that reach VF zone and a shock is delivered that restores sinus rhythm (Figure 3).Chest X-ray and fluoroscopy showed the active ICD lead was in the coronary sinus (Figure 4). There was no ventricular capture with pacing from ICD (Figure 5).This could only be explained by sensing of atrial signal during an acute AF in the ICD lead, probably due to inappropriate lead implantation to the coronary sinus during the first procedure. The patient has been treated with new single coil active ICD lead implantation to the right ventricle and old ICD electrode left in place (Figure 6).

Discussion

The most common causes of inappropriate ICD therapies are supraventricular tachycardia, especially AF or atrial flutter with rapid ventricular response, T-wave oversensing, and lead dysfunction (noise and myopotentials)(5). Dislodgement and migration of cardiac implantable electronic device leads are not uncommon, however leads placement in inappropriate areas is extremely rare.

The coronary sinus (CS) has become a clinically important structure especially through its role in providing access for different cardiac procedures(6). Accurate knowledge of the coronary venous anatomy is essential for electrophysiologists performing left ventricular pacing procedures or radiofrequency ablation. In our case ICD lead implantation into the coronary sinus with AF led to inappropriate unsynchronized shock that returned AF to normal sinus rhythm. Probably, due to the normal R wave sensitivity and the tests of pacing threshold being performed without ECG in device controls, it was not noticed that the lead was not at the proper location. Another reason may be that chest x-rays are not interpreted correctly.

In some cases, implantation of the lead into the coronary sinus can be needed.Various conditions requiring implantation into the coronary sinus are as follows; anatomical barriers that preclude the passage through the valve such as atresia, stenosis and mechanical prosthesis, failed implantation into the ventricle, presence of persistent left superior vena cava with absence of right sided vein making the implantation near impossible, presence of abnormal ventricular substrate resulting in abnormal elevation of the capture threshold, and high defibrillation threshold(7-10).

Conclusion

Perioperative and postoperative ICD care is important to prevent any untoward harm to patients. Routine postoperative interrogation of the ICD should be done by the cardiac electrophysiologist and following the simple and basic rules sometimes ECG and chest X-ray can demonstrate lead misplacement or displacement.

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