

MINI-FOCUS ISSUE: ELECTROPHYSIOLOGY

BEGINNER

IMAGING VIGNETTE: CLINICAL VIGNETTE

Transient Asystole From Pacing Inhibition During Percutaneous Coronary Intervention



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ABSTRACT

A 68-year-old man with a biventricular implantable cardioverter-defibrillator who was pacemaker dependent was admitted for percutaneous coronary intervention. The patient had an asystolic cardiac arrest as a result of electromagnetic interference during an orbital atherectomy. We should keep electromagnetic interference from the machine in mind when performing orbital atherectomy. (**Level of Difficulty: Beginner.**) (J Am Coll Cardiol Case Rep 2021;3:144-5) © 2021 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

A 68-year-old man with a biventricular implantable cardioverter-defibrillator and a history of dilated cardiomyopathy, as well as previous percutaneous mitral edge-to-edge valve repair for functional mitral regurgitation, was admitted for an elective percutaneous coronary intervention (PCI). Coronary angiography showed significant stenosis in the left anterior descending (LAD) artery (**Figure 1A**). Because intravascular ultrasound investigation revealed a circumferentially calcified lesion, we performed a pre-stenting orbital atherectomy using the Diamondback 360 Coronary Orbital Atherectomy System (Cardiovascular Systems Inc., St. Paul, Minnesota) (**Figure 1B**). However, immediately after the procedure began, the patient had an asystolic cardiac arrest. A surface electrocardiogram showed minute fluctuations of baseline and intermittent complete atrioventricular block without ventricular escape beats (**Figure 1C**). A coronary angiogram showed that the LAD artery was neither obstructed nor perforated. The intracardiac electrogram confirmed fast and irregular right ventricular sensing, which was unmatched by actual ventricular activities (**Figure 1D**). The irregular noise amplitude had a broad range between 2 and 5 mV, whereas the right ventricular amplitude was 6.1 mV. Thus, the pacing mode was changed from DDD to VOO to mitigate for ventricular oversensing. Subsequent orbital atherectomy and implantation of the Resolute Onyx zotarolimus-eluting stent (Medtronic Inc., Santa Rosa, California) were uneventful (**Figure 1E**).

There are multiple causes of ventricular oversensing, including electromagnetic interference (EMI), lead fracture, P- or T-wave sensing, and myopotential detection (1,2). In our case, EMI from the Diamondback 360 Coronary Orbital Atherectomy System induced pacing inhibition, resulting in transient asystole. Although it is known that extremely low-frequency daily-life electromagnetic fields do not disturb the sensing capabilities of implantable cardioverter-defibrillators, strong 50-Hz electromagnetic fields may cause inappropriate sensing, potentially leading to false detection of arrhythmic events (3). To the best of our knowledge, there have been no reports of EMI accompanied by transient cardiac arrest caused by an orbital atherectomy system. To avoid such a preventable event, we should keep EMI from the machine in mind when performing PCI in patients with cardiac implanted electronic devices.

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The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the [Author Center](#).

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AUTHOR DISCLOSURES

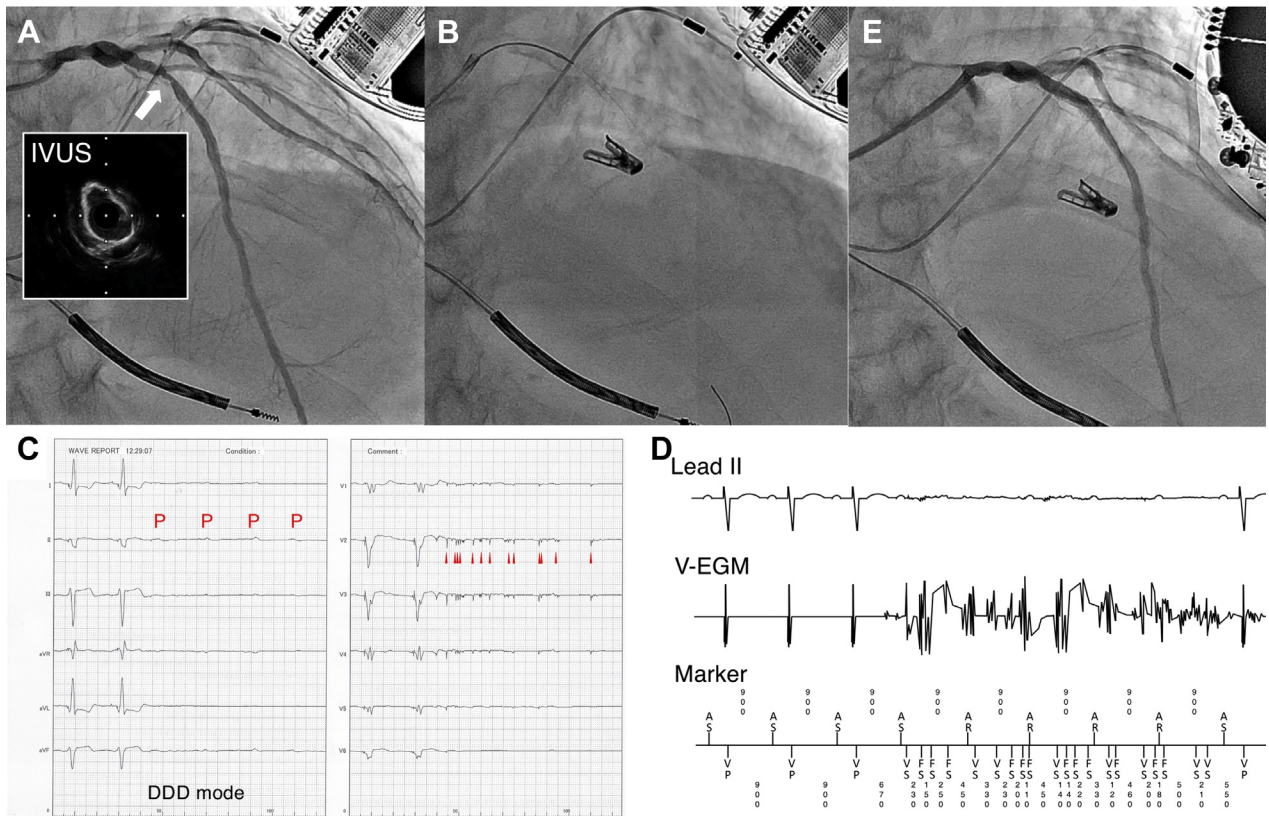
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ABBREVIATIONS AND ACRONYMS

EMI = electromagnetic interference
LAD = left anterior descending
PCI = percutaneous coronary intervention

FIGURE 1 Electromagnetic Interference–Induced Inappropriate Sensing of Ventricular Arrhythmic Events During Orbital Atherectomy



(A) Coronary angiography showing stenosis in the bifurcation site of the left anterior descending (LAD) artery and the diagonal branch (**arrow**). Intravascular ultrasound (**inset**) shows severe circumferential calcification of the lesion. **(B)** Orbital atherectomy with the Diamondback 360 Coronary Orbital Atherectomy System. **(C)** Electrocardiography during orbital atherectomy showing minute fluctuations of baseline (**arrowheads**) and intermittent complete atrioventricular block without ventricular escape beats. **(D)** Schematic image of device interrogation showing fast and irregular right ventricular sensing unmatched by actual ventricular activities. **(E)** Final coronary angiogram showing successful stent implantation and proper blood flow in the left anterior descending coronary artery. V-EGM = ventricular electrogram.

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