

Impact of Abandoned Leads on Cardiovascular Implantable Electronic Device Infections

A Propensity Matched Analysis of MEDIC (Multicenter Electrophysiologic Device Infection Cohort)

Thomas A. Boyle, BS,^a Daniel Z. Uslan, MD, MBA,^b Jordan M. Prutkin, MD, MHS,^c Arnold J. Greenspon, MD,^d Larry M. Baddour, MD,^e Stephan B. Danik, MD,^f Jose M. Tolosana, MD, PhD,^g Katherine Le, MD,^e Jose M. Miro, MD, PhD,^g James E. Peacock, MD,^h Muhammad R. Sohail, MD,^e Holenarasipur R. Vikram, MD,ⁱ Roger G. Carrillo, MD,^a for the MEDIC Investigators

ABSTRACT

OBJECTIVES This study sought to evaluate the impact of abandoned cardiovascular implantable electronic device (CIED) leads on the presentation and management of device-related infections.

BACKGROUND Device infection is a serious consequence of CIEDs and necessitates removal of all hardware for attempted cure. The merits of extracting or retaining presumed sterile but nonfunctioning leads is a subject of ongoing debate.

METHODS The MEDIC (Multicenter Electrophysiologic Device Infection Cohort) prospectively enrolled patients with CIED infections at 10 institutions in the United States and abroad between January 1, 2009, and December 31, 2012. Within a propensity-matched cohort, relevant clinical information was compared between patients who had 1 or more abandoned leads at the time of infection and those who had none.

RESULTS Matching produced a cohort of 264 patients, including 176 with no abandoned leads and 88 with abandoned leads. The groups were balanced with respect to Charlson comorbidity index, oldest lead age, device type, sex, and race. At the time of admission, those with abandoned leads were less likely to demonstrate systemic signs of infection, including leukocytosis ($p = 0.023$) and positive blood cultures ($p = 0.005$). Conversely, patients with abandoned leads were more likely to demonstrate local signs of infections, including skin erosion ($p = 0.031$) and positive pocket cultures ($p = 0.015$). In addition, patients with abandoned leads were more likely to require laser extraction ($p = 0.010$).

CONCLUSIONS The results of a large prospective registry of CIED infections demonstrated that patients with abandoned leads may present with different signs, symptoms, and microbiological findings and require laser extraction more than those without abandoned leads. (J Am Coll Cardiol EP 2017;■:■-■) © 2017 by the American College of Cardiology Foundation.

From the ^aDepartment of Surgery, Division of Cardiothoracic Surgery, University of Miami, Miami, Florida; ^bDepartment of Medicine, Division of Infectious Diseases, David Geffen School of Medicine at University of California Los Angeles, Los Angeles, California; ^cDepartment of Medicine, Division of Cardiology, University of Washington, Seattle, Washington; ^dDepartment of Medicine, Division of Cardiology, Cardiac Electrophysiology Laboratory, Thomas Jefferson University Hospital, Philadelphia, Pennsylvania; ^eDepartment of Medicine, Divisions of Infectious Diseases and Cardiovascular Diseases, Mayo Clinic College of Medicine, Rochester, Minnesota; ^fDepartment of Medicine, Division of Cardiology, Massachusetts General Hospital, Boston, Massachusetts; ^gCardiology and Infectious Disease Services, Hospital Clinic, Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS), University of Barcelona, Barcelona, Spain; ^hDepartment of Medicine, Section of Infectious Diseases, Wake Forest School of Medicine, Winston-Salem, North Carolina; and the ⁱDepartment of Medicine, Division of Infectious Diseases, Mayo Clinic, Phoenix, Arizona. This study was funded in part by a grant from the American Heart Association. Data from the Hospital Clinic of Barcelona, Spain, were supported in part by a grant from the Ministerio de Sanidad y Consumo, the Instituto de Salud Carlos III, and Spanish Network for Research in Infectious Diseases grant REIPI RD06/0008, Madrid, Spain. Dr. Greenspon has received honoraria from or is consultant for Medtronic, Boston Scientific, and St. Jude Medical. Dr. Baddour has received royalty payments from UpToDate, Inc., for authorship duties. Dr. Peacock owns common stock in Pfizer. Dr. Sohail has

**ABBREVIATIONS
AND ACRONYMS****CIED** = cardiac implantable
electronic device**ICD** = insertable cardioverter-
defibrillator**MRSA** = methicillin-resistant
*Staphylococcus aureus***MSSA** = Methicillin-sensitive
Staphylococcus aureus

The application of cardiovascular implantable electronic devices (CIEDs) is growing rapidly due to improved technology, expanded indications, and an aging population in developed countries (1-4). Moreover, procedures to remove or revise those devices, which include insertable cardioverter-defibrillators (ICDs), permanent pacemakers, and cardiac resynchronization therapy devices, are experiencing a similar rise (5-10).

A major impetus for surgical revision is CIED infection, which can present as a pocket infection, bacteremia, endocarditis, or some combination thereof. Infections have complicated between 0.5% and 7% of all device-related procedures (8,10-12), and their incidence may be increasing faster than the rate of implantation (13). Regardless of how it presents, CIED infection can cause serious morbidity or death related to infection or its management (14,15). In addition to early identification and initiation of antimicrobial therapy, expeditious removal of all CIED hardware is needed to hopefully reduce the infection complication rate (16).

When a device is being revised or replaced for reasons other than infection, old or nonfunctioning leads are often capped and abandoned. The extent of this practice is not fully known, but at 1 high-volume center equipped for lead extraction, 39% of patients who underwent lead revisions for noninfectious indications had leads capped rather than extracted (17). The decision to extract a sterile but nonfunctioning lead requires weighing the small (11) but immediate risks of extraction with the potential but largely uncharacterized risks of abandonment. Published discussions of the long-term risks associated with abandoned leads (ALs) include stenosis, hardware fracture, migration, and pocket pain. To date, the impact of ALs on future CIED infections has received less attention (17-19). A single-center study of lead extractions recently demonstrated more complications and suboptimal outcomes in patients with ALs (20,21). The present study used a prospective, multicenter registry to evaluate the impact of

previously ALs on the presentation and management of device infections.

METHODS

The MEDIC (Multicenter Electrophysiologic Device Infection Cohort) registry was a cooperative international effort that prospectively enrolled subjects with known CIED infections between January 1, 2009, and December 31, 2012. The registry consisted of demographic, clinical, laboratory, management, and outcome data from patients at 10 medical centers. The study protocol was approved at each site by its respective institutional review board.

STUDY PROTOCOL. With few exceptions, multiple blood cultures and pocket cultures were taken from each patient. Patients received a transthoracic echocardiogram to assess for vegetation, and many received a transesophageal echocardiogram as well. In a number of cases, patients received computed tomography studies to evaluate for septic pulmonary emboli. If at all possible, percutaneous or surgical device removal was attempted. Extracted leads were cultured, and patients received antibiotic therapy in accordance with published guidelines (16).

DEFINITIONS. All patients in the registry had a diagnosis of device infection based on, at a minimum, signs of local inflammation at the generator pocket. Patients were further characterized based on results of microbiological and imaging studies. Leukocytosis was defined as leukocyte values of $>11.0 \times 10^9$ cells/L. Infective endocarditis was assessed according to the modified Duke criteria (22), which include persistent bloodstream infection with positive blood cultures and visible presence of vegetation on echocardiography. Vegetation findings were defined as oscillating masses in contact with device leads or valves and detectable in at least 2 echocardiographic planes. Infective endocarditis may also be diagnosed in subjects with negative blood cultures, if there is evidence of vegetation and sufficient minor criteria are met. Patients without positive cultures were included if they showed local inflammatory markers such as

received a research grant from Medtronic, Inc.; and is a consultant for Medtronic, Inc. and Boston Scientific. Dr. Carrillo has received research funding from or is a consultant for Spectranetics, Abbott, Medtronic, St. Jude Medical, Sorin group, and Sensormatic. Dr. Miró has received research funding from Institut d'Investigacions Biomèdiques August Pi i Sunyer; and has received research funding from or is a consultant for Angelini, AbbVie, Bristol-Myers Squibb, Cubist, Genentech, Medtronic, Merck, Novartis, Gilead Sciences, and ViiV healthcare. Dr. Tolosana is a consultant for Boston Scientific, Medtronic, St. Jude Medical, and Biotronik. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

Manuscript received July 10, 2017; revised manuscript received September 14, 2017, accepted September 21, 2017.

Download English Version:

<https://daneshyari.com/en/article/8664527>

Download Persian Version:

<https://daneshyari.com/article/8664527>

[Daneshyari.com](https://daneshyari.com)