Chronic Swelling Over Cardiac Implantable Electronic Device Sites: A Multicenter Case Series.

Naga Venkata K Pothineni

Cesar A Bonilla

Mohammad A Ebrahim

Andrew E Epstein

F Javier Garcia-Fernandez

See next page for additional authors

Published In/Presented At

Pothineni, N., Bonilla, C. A., Ebrahim, M. A., Epstein, A. E., Garcia-Fernandez, F. J., Guzman, C. E., Joshi, H., Nasir, J. M., Singh, A., Supple, G. E., & Schaller, R. D. (2020). Chronic Swelling Over Cardiac Implantable Electronic Device Sites: A Multicenter Case Series. *Circulation. Arrhythmia and electrophysiology*, *13*(12), e009253. https://doi.org/10.1161/CIRCEP.120.009253

Circulation: Arrhythmia and Electrophysiology

RESEARCH LETTER

Chronic Swelling Over Cardiac Implantable Electronic Device Sites

A Multicenter Case Series

Naga Venkata K. Pothineni, MD; Cesar A. Bonilla, MD; Mohammad A. Ebrahim, MD; Andrew E. Epstein, MD; F. Javier Garcia-Fernandez, MD; Carlos E. Guzman, MD; Hari Joshi, MD; Javed M. Nasir, MD; Abhijeet Singh, MD; Gregory E. Supple, MD; Robert D. Schaller, DO

Chronic swelling of a cardiac implantable electronic device (CIED) pocket, often referred to as a seroma, is thought to be benign. We describe the clinical course and outcomes of a series of patients with chronic stable CIED swelling. All patients provided informed procedural consent, and the study was approved by the institutional review board of the Hospital of the University of Pennsylvania.

Inclusion criteria included the presence of swelling of a CIED pocket for >6 months with no apparent cause. Data on device type, swelling duration, initial management, and clinical course were collected. A total of 11 patients (10 male, mean age 48.5±21.9 years) were included. Five had a dual-chamber permanent pacemaker, 2 had an implantable cardioverter-defibrillator, and 4 had a cardiac resynchronization therapy device. Duration of swelling ranged from 6 months to 7 years (mean 2.6±2.7 years) and 60% had no symptoms while 40% reported pain or heaviness. Swelling size ranged from a diameter of 3 to 10 cm (mean 6.9±3; Figure [A]), none had systemic infection, and none tested (6/11) had abnormal inflammatory biomarkers (erythrocyte sedimentation rate or C-reactive protein). Three had an ultrasound showing fluid, 3 underwent computed tomography (1 with rim-enhancing fluid), one had negative positron emission tomography, and one had a tagged white blood cell scan showing increased uptake (Figure [B]).

Initial management strategies included needle aspiration in 2 showing clear and bloody fluid, respectively, without evidence of infection and both had resolution. Four underwent pocket exploration, showing brown fluid in 2, red gelatinous fluid in one (Figure [C]), and purulence in one (Figure [D]). Of these, one (red gelatinous) had resolution and one (brown) had transient decrease in swelling with later recurrence and extraction for presumed infection. One (brown) ultimately underwent extraction for presumed infection based on a positive white blood cell scan, pain, and *Propionobacterium acnes* grown from the pocket and one (purulence) was felt high risk for extraction and chronic suppressive antibiotics were started. In 4 patients, clinical monitoring was initiated with stable swelling in one over a 1-year follow-up. The second patient developed discomfort after 6 months, underwent pocket evacuation showing dark red fluid, and experienced resolution. Two developed erosion over the lateral pocket edge at 7 months and 7 years, respectively, one growing *Staphylococcus epidermidis*. One underwent successful extraction as initial management where a thick creamy fluid, thought to be lymphatic, was found (Figure [E]). Overall, 6/11 had presumed or confirmed infection, 5 of which were extracted. A total of 5 patients underwent extraction with resolution and 4/5 underwent contralateral CIED implantation.

In this multicenter case series, cause and fluid characteristics of chronic CIED pocket swelling were variable with 45% eventually requiring extraction. Despite infection in 6/11, clinical and laboratory signs of infection were initially absent.

Key Words: defibrillators ■ extraction ■ infection ■ pacemakers ■ seroma

Correspondence to: Robert D. Schaller, DO, Section of Cardiac Electrophysiology, University of Pennsylvania, 3400 Spruce St, Philadelphia, PA 19104. Email robert.schaller@pennmedicine.upenn.edu

This manuscript was sent to N.A. Mark Estes III, MD, Guest Editor, for review by expert referees, editorial decision, and final disposition.

For Sources of Funding and Disclosures, see page 1507.

Circulation: Arrhythmia and Electrophysiology is available at www.ahajournals.org/journal/circep

Nonstandard Abbreviations and Acronyms

CIED	cardiac implantable electronic device

A seroma refers to a sterile accumulation of clear fluid in response to tissue inflammation commonly seen after surgery.[1] One patient in our series had creamy white fluid suggestive of chyloma with previous reports suggesting anomalous thoracic duct drainage into the left subclavian vein with injury during device implantation.[2] Chronic hematoma with collection of bloody fluid as well as abscess with purulent fluid represent other causes in our series. Regardless of cause, it appears that any chronic CIED swelling could be an atypical presentation, or a nidus, for infection. Prompt recognition and escalation of diagnostic studies should be considered in this rare scenario. The data that support the findings of this study are available from the corresponding author upon reasonable request.

ARTICLE INFORMATION

Affiliations

Section of Cardiac Electrophysiology, Hospital of the University of Pennsylvania, Philadelphia (N.V.K.P., A.E.E., G.E.S., R.D.S.). Cardiac Electrophysiology, AdventHealth Medical Group, Orlando, FL (C.A.B.). Pediatric Department, Kuwait University, Chest Diseases Hospital, Kuwait (M.A.E.). Section of Cardiac Electrophysiology, Department of Cardiology, Hospital Universitario de Burgos, Spain (F.J.G.-F.). Hospital Christus Muguerza Alta Especialidad, Monterrey, Mexico (C.E.G.). Cardiac Electrophysiology, Lehigh Valley Heart Institute, Bethlehem, PA (H.J.). David Grant Medical Center, Travis AFB, CA (J.M.N.). SUNY-Stony Brook University Hospital, NY (A.S.).

Sources of Funding

This study was funded in part by the J and J Fund in Electrophysiology.

Disclosures

None.

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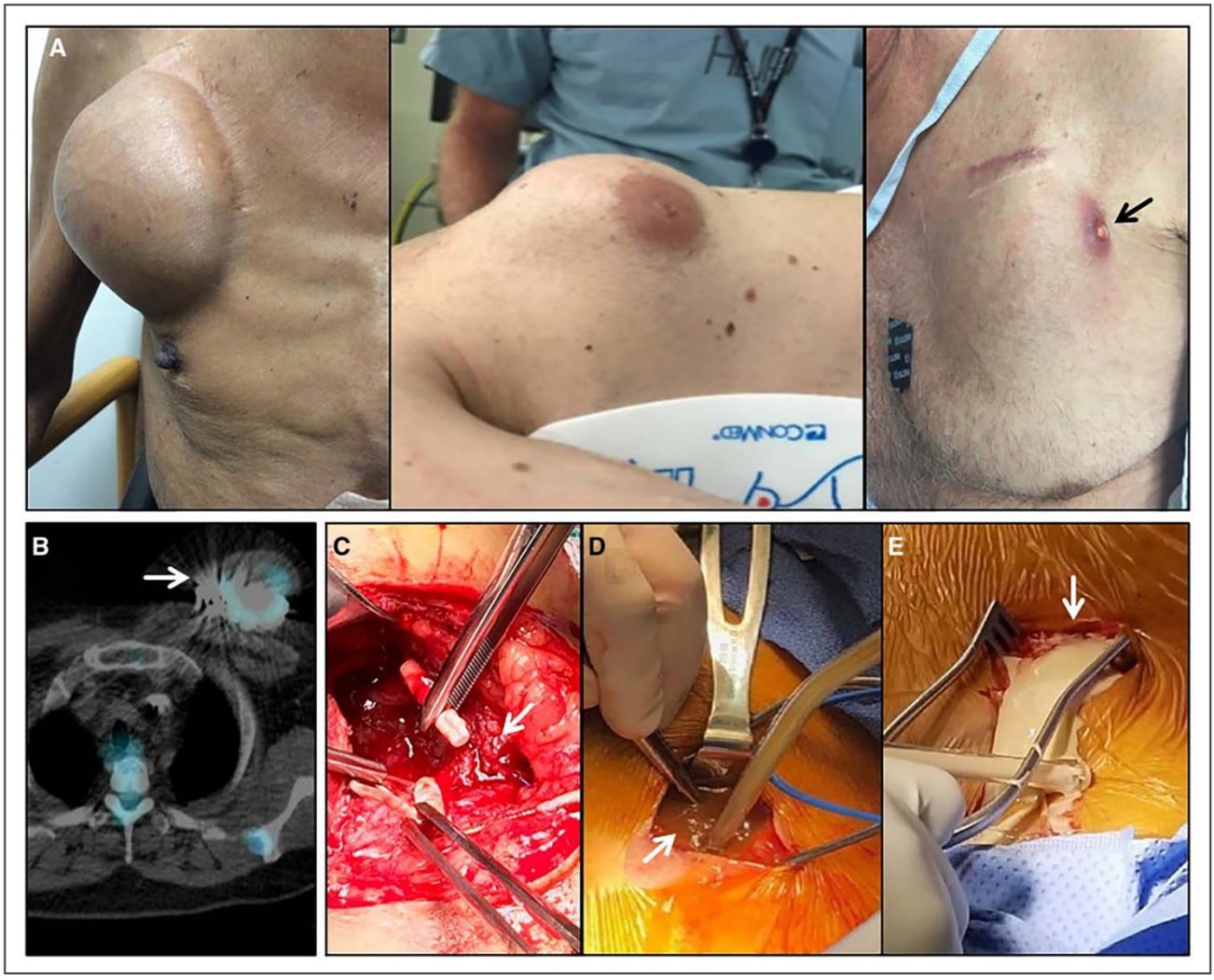

Figure. Cardiac implantable electronic device (CIED) pockets with evidence of chronic swelling.
A, Representative examples of CIED swelling. Note eventual erosion of the lateral pocket edge (black arrow). **B**, Tagged white blood cell scan with increased uptake over the device site. **C**, Pocket containing red gelatinous, (**D**) purulent, and (**E**) chylous fluid.