

Extravascular ICD as a Viable Solution after CIED Lead Extraction: a case report.

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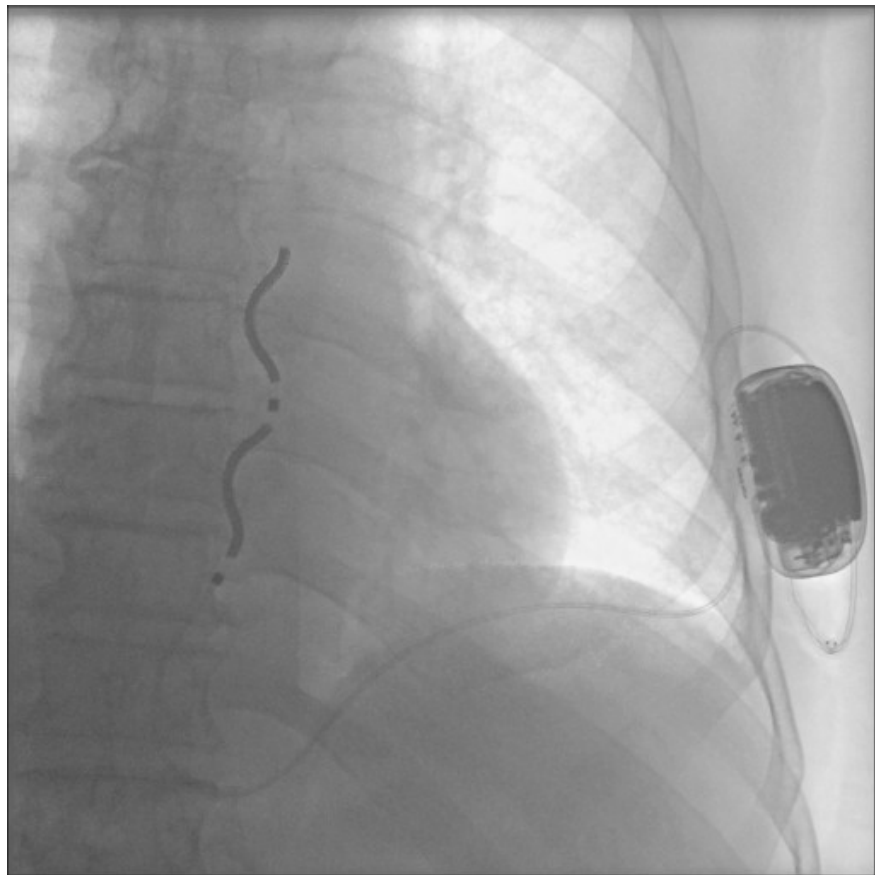
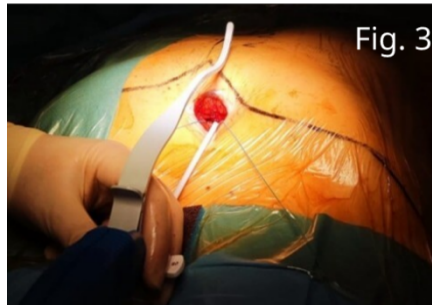
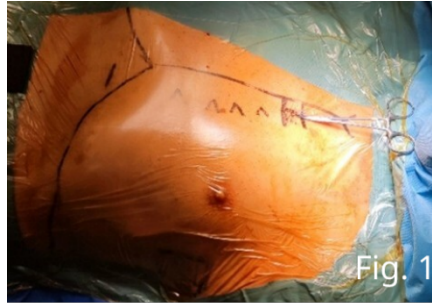
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Abstract

Post-implant infections of pacemakers or defibrillators represent a significant complication, impacting patient morbidity and mortality. This case report describes a 75-year-old man with multiple comorbidities who developed pocket erosion of a previously implanted biventricular defibrillator, complicated by *Staphylococcus Haemolyticus* infection. Following device extraction and targeted antibiotic therapy, an extravascular implantable cardioverter defibrillator (EV-ICD) Aurora EV-ICD was implanted. The procedure was successfully performed, with a two-month follow-up showing no signs of infection or device displacement. EV-ICD emerges as a safe and effective alternative in high-risk patients, minimizing complications associated with vascular access and endocardial lead implantation.

INTRODUCTION

Pacemaker or defibrillator post-implantation infections remain one of the most relevant complications, with an annual probability of around 1.3% and a significant impact on patient morbidity and mortality. [1-3] Although antibiotic prophylaxis and antibiotic-impregnated sheaths have been shown to reduce the incidence of such events, these measures do not eliminate the risk. [4] When an infection occurs, complete extraction of the cardiac implantable electronic device (CIED) is strongly recommended [2]. During reimplantation, it is crucial to use a new access site and a different location for the CIED device [5]. In this context, the new extravascular implantable cardiac defibrillator (EV-ICD) represents a viable and safe alternative to reimplanting traditional pacemakers or transvenous implantable cardioverter defibrillators (ICD).





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REFERENCES

1. Shawon MSR, Sotade OT, Hill M, Strachan L, Challis G, Ooi SY, Jorm LR. Real-world evidence on the association between cardiac implantable electronic device infection and all-cause mortality. *Europace*. 2023 Aug 2;25(9):euad274. doi: 10.1093/europace/euad274. PMID: 37703326; PMCID: PMC10521903.
2. Boarescu PM, Roşian AN, Roşian ŞH. Transvenous Lead Extraction Procedure-Indications, Methods, and Complications. *Biomedicines*. 2022 Nov 1;10(11):2780. Doi: 10.3390/biomedicines10112780. PMID: 36359300; PMCID: PMC9687878.
3. Modi V, Shah K, Ferraro B, Gasimli-Gamache L, Nanda S, Stevens S, Shirani J. Cardiac implantable electronic device implantation and device-related infection. *Europace*. 2023 Aug 2;25(9):euad208. doi: 10.1093/europace/euad208. PMID: 37572046; PMCID: PMC10422690.
4. Mittal S, Wilkoff BL, Kennergren C, Poole JE, Corey R, Bracke FA, Curnis A, Addo K, Martinez-Arraras J, Issa ZF, Redpath C, Moubarak J, Khelae SK, Boersma LVA, Korantzopoulos P, Krueger

- J, Lande JD, Morss GM, Seshadri S, Tarakji KG. The World-wide Randomized Antibiotic Envelope Infection Prevention (WRAP-IT) trial: Long-term follow-up. *Heart Rhythm*. 2020 Jul;17(7):1115-1122. doi: 10.1016/j.hrthm.2020.02.011. Epub 2020 Feb 19. PMID: 32087357.
5. Blomström-Lundqvist C, Traykov V, Erba PA, Burri H, Nielsen JC, Bongiorno MG, Poole J, Boriani G, Costa R, Deharo JC, Epstein LM, Saghy L, Snygg-Martin U, Starck C, Tascini C, Strathmore N; ESC Scientific Document Group. European Heart Rhythm Association (EHRA) international consensus document on how to prevent, diagnose, and treat cardiac implantable electronic device infections-endorsed by the Heart Rhythm Society (HRS), the Asia Pacific Heart Rhythm Society (APHRS), the Latin American Heart Rhythm Society (LAHRS), International Society for Cardiovascular Infectious Diseases (ISCVID) and the European Society of Clinical Microbiology and Infectious Diseases (ESCMID) in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS). *Europace*. 2020 Apr 1;22(4):515-549. doi: 10.1093/europace/euz246. PMID: 31702000; PMCID: PMC7132545.
6. Krahm AD, Longtin Y, Philippon F, Birnie DH, Manlucu J, Angaran P, Rinne C, Coutu B, Low RA, Essebag V, Morillo C, Redfearn D, Toal S, Becker G, Degrâce M, Thibault B, Crystal E, Tung S, LeMaitre J, Sultan O, Bennett M, Bashir J, Ayala-Paredes F, Gervais P, Rioux L, Hemels MEW, Bouwels LHR, van Vlies B, Wang J, Exner DV, Dorian P, Parkash R, Alings M, Connolly SJ. Prevention of Arrhythmia Device Infection Trial: The PADIT Trial. *J Am Coll Cardiol*. 2018 Dec 18;72(24):3098-3109. doi: 10.1016/j.jacc.2018.09.068. PMID: 30545448.
7. Beurskens NEG, Tjong FVY, Dasselaar KJ, Kuijt WJ, Wilde AAM, Knops RE. Leadless pacemaker implantation after explantation of infected conventional pacemaker systems: A viable solution? *Heart Rhythm*. 2019 Jan;16(1):66-71. doi: 10.1016/j.hrthm.2018.07.006. Epub 2018 Jul 6. PMID: 30129440.
8. Coppola G, Ciaramitaro G, Madaudo C, Di Caccamo L, Testa G, Castelluccio E, Rizzuti G, Torre S, Novo G, Galassi AR, Corrado E. Management of a patient with multiple device replacements and extractions: When the leadless pacemaker is a viable solution. *Pacing Clin Electrophysiol*. 2023 Mar;46(3):268-270. doi: 10.1111/pace.14605. Epub 2022 Nov 9. PMID: 36269180.
9. El-Chami MF, Johansen JB, Zaidi A, Faerstrand S, Reynolds D, Garcia-Seara J, Mansourati J, Pasquie JL, McElderry HT, Roberts PR, Soejima K, Stromberg K, Piccini JP. Leadless pacemaker implant in patients with pre-existing infections: Results from the Micra postapproval registry. *J Cardiovasc Electrophysiol*. 2019 Apr;30(4):569-574. doi: 10.1111/jce.13851. Epub 2019 Jan 28. PMID: 30661279; PMCID: PMC6850680.
10. Medtronic. Aurora EV-ICD MRI SureScan DVEA3E4 device manual.
11. Friedman P, Murgatroyd F, Boersma LVA, Manlucu J, Knight BP, Clémenty N, Leclercq C, Amin A, Merkely B, Birgersdotter-Green UM, Chan JYS, Biffi M, Knops RE, Engel G, Muñoz Carvajal I, Epstein LM, Sagi V, Johansen JB, Sterliński M, Steinwender C, Hounshell T, Abben R, Thompson AE, Zhang Y, Wiggenhorn C, Willey S, Crozier I; Extravascular ICD Pivotal Study Investigators. Performance and Safety of the Extravascular Implantable Cardioverter Defibrillator Through Long-Term Follow-Up: Final Results From the Pivotal Study. *Circulation*. 2025 Jan 28;151(4):322-332. doi: 10.1161/CIRCULATIONAHA.124.071795. Epub 2024 Sep 26. PMID: 39327797; PMCID: PMC11771354.
12. Sterns LD, Auricchio A, Schloss EJ, Lexcen D, Jacobsen L, DeGroot P, Molan A, Kurita T. Antitachycardia pacing success in implantable cardioverter-defibrillators by patient, device, and programming characteristics. *Heart Rhythm*. 2023 Feb;20(2):190-197. doi: 10.1016/j.hrthm.2022.10.015. Epub 2022 Oct 19. PMID: 36272710.



