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Case Report

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A 3-year chronic post-sternotomy sinus tract maintained by a migrating pacemaker wire

Emine Aleyna Eroğlu Polat

Department of Cardiovascular Surgery, Kastamonu Training and Research Hospital, Kastamonu, Turkiye

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Corresponding Author: Emine Aleyna Eroğlu Polat, eminealeynaeroglu@gmail.com

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ABSTRACT

Chronic chest wall discharge following median sternotomy is a complex complication requiring a stepwise therapeutic approach. We present a 26-year-old male patient who underwent emergent mechanical mitral valve replacement for infective endocarditis and developed delayed sternal healing with persistent sterile discharge in the postoperative period. Suspecting a local tissue reaction, the ultra-high-molecular-weight polyethylene (UHMWPE) sternal bands were sequentially removed. Despite extracting all closure materials and excluding infection via negative tissue cultures, the chronic sinus tract discharge persisted for two years, necessitating regular wound care. A multidisciplinary surgical revision was performed to determine the underlying etiology. Exploration revealed that a temporary epicardial pacemaker wire had migrated anteriorly from the mediastinum into the subcutaneous tissue, presumably through a previous sternal band hole. Complete extraction of the retained wire, combined with short-term vacuum-assisted closure therapy, led to rapid and sustained wound healing. This case highlights that delayed sternal healing can be perpetuated by sequential foreign body reactions, and migrating pacemaker wires must be considered in persistent post-sternotomy sinus tracts.

Keywords: Delayed sternal healing, migrating pacemaker wire, UHMWPE sternal band, chronic sinus tract, open-heart surgery

INTRODUCTION

Median sternotomy remains the standard approach for the majority of open-heart surgeries.[1,2] Although traditional steel wires are widely used for sternal closure, non-metallic alternative materials, such as ultra-high-molecular-weight polyethylene (UHMWPE) sternal bands, have gained popularity in selected cases to potentially reduce complications like sternal dehiscence and metal hypersensitivity.[3]

Delayed sternal healing and chronic sterile sinus tracts following cardiac surgery are generally multifactorial conditions.[4] When persistent drainage occurs, initial management often focuses on addressing potential local tissue reactions to the primary closure materials. However, if the delayed healing process persists even after the removal of these materials, other retained surgical components may need to be investigated. In some cases, temporary epicardial pacemaker wires (TPWs) may be left in the mediastinum by cutting them at the skin level. Although generally uncomplicated, these wires can occasionally migrate over time due to respiratory and cardiac movements.[5]

This report presents a case of delayed sternal healing and a chronic sinus tract spanning a total of three years, wherein a local tissue reaction to UHMWPE bands was followed by the anterior migration of a retained temporary pacemaker wire, which appeared to maintain the chronic discharge until its ultimate removal.

CASE REPORT

A 26-year-old male patient (body-mass index: 24.3 kg/m^2, non-smoker, non-diabetic) presented to our emergency department with a cerebrovascular accident secondary to infective endocarditis, fever, and sudden-onset weakness in the right side of his body. Subsequent evaluations revealed infective endocarditis involving the mitral valve. Due to the neurological risks and acute mitral regurgitation secondary to active endocarditis, the patient was taken for emergent surgery. A mechanical mitral valve replacement (MVR) via median sternotomy was performed. For sternal closure, Ortholox® UHMWPE cerclage sternal bands, which were readily available in the clinic, were preferred over conventional stainless-steel wires. The early postoperative period was uneventful; the sternum was stable. Prior to discharge on the 8th postoperative day, an attempt was made to remove the temporary epicardial pacing wires. However, the wires, which were routinely secured to the myocardium with sutures, offered resistance upon pulling. To prevent myocardial injury or bleeding, the wires were cut sterilely at the skin level and left in situ as per standard clinical practice, after which the patient was discharged in good health.

During the first-month follow-up, a noticeable non-purulent wound discharge was observed at the sternotomy line, despite the sternum being completely intact and stable. The patient remained afebrile, and systemic inflammatory markers, including white blood cell count (6.13×10^3/μL), C-reactive

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protein (6 mg/L), and erythrocyte sedimentation rate (12 mm/h), were completely within normal limits. An allergy test performed during this period yielded a positive result, providing objective evidence for a hypersensitivity reaction. Furthermore, repeated superficial swab cultures and a subsequent deep tissue culture obtained from the wound bed were entirely negative for bacterial or fungal growth, definitively excluding an underlying chronic infection. Based on the positive allergy test, with close monitoring of sternal healing, the sequential removal of the sternal bands was planned and performed between the 2nd, 4th, and 6th postoperative months to eliminate the offending material.

Following the complete removal of the sternal bands, the skin partially closed; however, a low-volume sterile drainage from a localized sinus tract persisted. Over the subsequent two years, the patient visited our clinic for routine dressing follow-ups. Early thoracic computed tomography (CT) scans performed during this period did not suggest any focus of infection or foreign body reaction; the pacing wires were observed within the mediastinal space. However, due to the persistent drainage, a final thoracic CT scan was performed to re-evaluate the etiology. This scan revealed a linear, hyperdense image originating from the ventricle and migrating anteriorly into the subcutaneous tissue through the old wire transit hole left by the removed sternal band (**Figure 1**).



Figure 1. Sagittal thoracic CT image demonstrating the migrating temporary epicardial pacemaker wire. The green arrow and the 'A' marker indicate the linear, hyperdense radiopaque pacemaker wire located in the anterior mediastinum, extending just posterior to the sternal body and migrating toward the subcutaneous tissue

CT: Computed tomography

One month ago, a multidisciplinary surgical revision was performed concurrently with the plastic surgery department. During the deep exploration, the migrating temporary pacemaker wire, which had created a focus of mechanical irritation, was completely extracted from the subcutaneous tissue (**Figure 2A, B**). Following the procedure, a short, 4-day course of vacuum-assisted closure (VAC) therapy was applied. By the 10th postoperative day, the chronic sinus tract had completely closed. At the 1-month postoperative follow-up, the patient's chest wall was fully healed, and he remained asymptomatic (**Figure 2C**). A detailed chronology of the clinical events is summarized in **Table**.

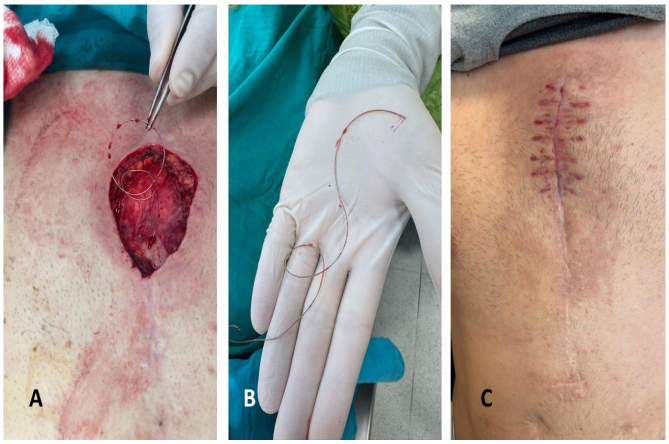


Figure 2. Intraoperative photographs demonstrating the surgical revision. (A) The sinus tract from which the migrating pacemaker wire emerged, showing the wound bed with bone wax application. (B) The fully extracted temporary pacemaker wire, illustrating the total length of the retained portion. (C) The final appearance of the surgical site following wire removal

Table. Chronology of clinical events

Date/timeframe	Clinical event
Month 0	Mechanical MVR surgery and initial discharge (post-op day 8)
Month 1	Onset of sterile drainage; negative cultures; normal WBC, CRP, ESR; positive allergy test
Month 2 to 6	Sequential removal of UHMWPE sternal bands
Month 6 to year 2	Persistent chronic sinus tract; early CT scans show pacing wire intact in the mediastinum
Year 2 (recent)	Final thoracic CT scan revealing anterior migration of the pacing wire
1 month ago	Multidisciplinary plastic surgery revision and pacing wire extraction
Post-op day 0-4	Application of VAC therapy
Post-op day 10	Complete closure of the sinus tract
Current	Last follow-up: chest wall fully healed, patient asymptomatic

MVR: Mitral valve replacement, Post-op: Postoperative, WBC: White blood cell, CRP: C-reactive protein, ESR: Erythrocyte sedimentation rate, UHMWPE: Ultra-high-molecular-weight polyethylene, CT: Computed tomography, VAC: Vacuum-assisted closure

DISCUSSION

Post-sternotomy chronic sinus tracts can present a challenging diagnostic process for cardiovascular surgeons.[1,2,4] When wound drainage is persistent, but cultures remain consistently sterile and systemic inflammatory markers are low; non-infectious etiologies tend to come to the forefront. As recently highlighted by Tanaka et al.,[3] UHMWPE bands are considered an effective, non-metallic alternative for sternal closure. In our clinic, we do not routinely use UHMWPE bands in all patients; however, in this young patient undergoing emergent surgery for infective endocarditis, we opted to use this readily available material given the absence of any known or diagnosed preoperative allergy history.

In this case, the initial step that triggered the delayed sternal healing process was suspected to be a local tissue reaction to these polymer bands. However, even after the complete extraction of the offending closure materials, healing was not fully achieved. The sternal tract left behind by the removed bands provided an anatomical conduit for the retained temporary epicardial pacing wire to migrate anteriorly into the subcutaneous tissue. This migration acted as the secondary and primary perpetuating factor, causing the chronic discharge to persist and prolonging the delayed wound healing for years.

The mechanical resistance encountered during the removal of temporary pacing wires is the primary reason for their retention. Studies evaluating the biomechanical factors of temporary wire removal in the literature have shown that while the procedure is generally safe, the tension required for safe extraction can sometimes be quite high.[5,6] Accordingly, in our case, the significant resistance encountered prior to discharge necessitated cutting the wire sterilely at the skin level and leaving it in situ to prevent acute myocardial injury or bleeding complications; however, this inadvertently set the stage for its late anterior migration.

Complications associated with retained temporary pacing wires are rare but well-documented in the literature. Although cutting the wires flush with the skin surface is generally considered benign, comprehensive reviews indicate that this practice is not always safe and can lead to severe late complications.[6] Despite most cases remaining uncomplicated, it has been reported that following a long dormant period, migrating wires can travel intravascularly to the pulmonary artery or right heart, or extravascularly to the skin surface, peritoneal, and pelvic cavities, occasionally causing bronchocutaneous fistulas or mass formations.[6-9] In the context of the chest wall, chronic sinus tract formation due to a migrating wire is a highly uncommon phenomenon. Continuous cardiopulmonary movements are thought to propel the wire along the path of least resistance. In this instance, the tract left behind by the removed sternal bands guided the wire, and the continuous mechanical irritation caused by it prevented the closure of the chronic sinus tract.

Furthermore, while the extraction of the mechanical irritant was the primary step for definitive resolution, it is important to acknowledge that the subsequent application of short-term vacuum-assisted closure therapy significantly accelerated wound bed preparation and granulation;[10] the VAC therapy played a synergistic role in the rapid clinical resolution observed within 10 days.

Based on our experience, while superficial treatments and conservative follow-ups are common initial steps, we recommend that early high-resolution CT scanning become a standard diagnostic approach for chronic sinus tracts lasting longer than 3-6 months to improve patient comfort and prevent unnecessary, prolonged dressing costs. Since delayed sternal healing can be perpetuated by sequential foreign body reactions, migrating pacing wires must be kept in mind in the differential diagnosis of persistent post-sternotomy sinus tracts.

CONCLUSION

As a result, delayed sternal healing can be a complex process driven by sequential reactions and mechanical factors. Although UHMWPE bands are a valuable alternative for sternal closure, they can rarely trigger local allergic reactions, as suspected in this case. More importantly, retained temporary epicardial pacing wires may not always remain benign; they can migrate through pre-existing sternal defects and act as a secondary nidus that prevents complete wound healing. This case highlights that in patients with persistent, culture-negative post-sternotomy sinus tracts, the use of early and, when necessary, repeated high-resolution CT imaging is essential for the differential diagnosis, monitoring of retained foreign bodies, and achieving sustained resolution through a multidisciplinary surgical approach.

ETHICAL DECLARATIONS

Informed Consent

Written informed consent was obtained from the patient included in this report. Signed consent forms are retained by the authors and are available upon request.

Peer Review Process

This manuscript was subject to external peer review.

Conflict of Interest

The author declares no conflicts of interest related to this study.

Financial Disclosure

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Author Contributions

The author is solely responsible for the entirety of conception, execution, analysis, and writing of the manuscript.

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REFERENCES

1. Raab S, Girdauskas E, Reindl S. Treatment of the infection in deep sternal wound infections-a single center cohort study. *J Thorac Dis*. 2026;18(2):137. doi:10.21037/jtd-2025-aw-2201
2. Stoodley L, Lillington L, Ansryan L, et al. Sternal wound care to prevent infections in adult cardiac surgery patients. *Crit Care Nurs Q*. 2012;35(1):76-84. doi:10.1097/CNQ.0b013e31823b1e5f
3. Tanaka H, Kawaguchi T, Kimura J, et al. Ultra-high-molecular-weight polyethylene cables for sternal closure in a metal-allergic patient with Stanford type a acute aortic dissection: a case report. *Clin Case Rep*. 2026;14(6):e72870. doi:10.1002/ccr3.72870
4. Douville EC, Asaph JW, Dworkin RJ, et al. Sternal preservation: a better way to treat most sternal wound complications after cardiac surgery. *Ann Thorac Surg*. 2004;78(5):1659-64. doi:10.1016/j.athoracsur.2004.04.082
5. Elmistekawy E, Gee YY, Une D, Lemay M, Stolarik A, Rubens FD. Clinical and mechanical factors associated with the removal of temporary epicardial pacemaker wires after cardiac surgery. *J Cardiothorac Surg*. 2016;11:8. doi:10.1186/s13019-016-0414-2
6. Wald G, Van YR, Pain KJ, Otterburn DM. Retained temporary epicardial pacing wires: a systematic review and treatment algorithm. *Ann Plast Surg*. 2020;85(S1 Suppl 1):S44-S49. doi:10.1097/SAP.0000000000002326
7. Park S, Lee J, Byun YS, Jung IH, Chung E. Temporary epicardial pacing wire migration into the right heart, 10 months after coronary artery bypass surgery. *Heart Surg Forum*. 2020;23(2):E168-E170. doi:10.1532/hsf.2781
8. Roy CG, Pozzessere NA. Bronchial penetration of migrated temporary epicardial pacing wire with bronchoscopic extraction. *Respir Med Case Rep*. 2022;37:101624. doi: 10.1016/j.rmcr.2022.101624
9. Duda M, Parker W, Lui NS. Retained intrapulmonary epicardial pacing wire migrates through left hilum. *Ann Thorac Surg Short Rep*. 2023;1(2):270-271. doi:10.1016/j.atssr.2023.03.002
10. Lim HA, Shin J, Jo MS, Chang YJ, Cho DG, Sim HT. Delayed sternal closure using a vacuum-assisted closure system in adult cardiac surgery. *J Chest Surg*. 2023;56(3):206-212. doi:10.5090/jcs.22.134