



# Incomplete Removal and Accidental Retention of Temporary Epicardial Pacing Wires in the Chest after Heart Surgery: A Case Report

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## Abstract

Temporary pacemaker wires are commonly used for the diagnosis and treatment of arrhythmias in the acute postoperative period. We herein describe a 65-year-old woman with a history of coronary artery bypass graft surgery who was referred to the hospital with a purulent discharge in the lower third of the sternal region while on antibiotics. Two years later, following treatment failure, 2 sternal wires were removed. Several years after the surgery, the patient developed a purulent discharge. On suspicion of rib osteomyelitis, the last left cartilage attached to the sternum was excised and removed together with an infectious tract.

During the operation, the right ventricle was torn, and tampons were used to control bleeding. The patient was placed under cardiopulmonary bypass via the cannulation of the left femoral artery and the right femoral vein. The sternum was opened, and the rupture site was repaired. A temporary epicardial pacing wire was found at the site of the right ventricular rupture. Several days later, the patient was taken from the intensive care unit to the operating room due to a pulsatile hematoma in the left groin and a diagnosis of a pseudoaneurysm of the femoral artery. After a week, the purulent discharge at the lower sternum improved, and the patient was discharged. At 1 month's post-discharge follow-up, the infection was eradicated.

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## Introduction

Temporary epicardial pacing wires (TEPWs) are commonly used following most cardiac surgeries.<sup>1</sup> A TEPW can maintain heart rhythm and rate and, thus, optimize cardiac output when the patient is separated from cardiopulmonary bypass after the operation.<sup>1-3</sup> The use of a TEPW is not without complications, which can occur when

the wire is inserted or removed and may include bleeding, arrhythmias, and wire retention.<sup>4,5</sup>

In this case report, we describe a surgical patient whose TEPWs were not completely removed and were accidentally retained in the chest.

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## Case Report

A 65-year-old woman with a history of coronary artery bypass graft surgery (CABG) was referred to the hospital with a purulent discharge in the lower third of the sternal region while on antibiotic treatment. The antibiotic therapy had, however, failed to resolve the purulence. Under general anesthesia, 2 sternal wires were removed after 2 years. The patient was eventually referred to a thoracic surgeon on suspicion of rib osteomyelitis and left cartilage infection 7 years later. Under general anesthesia, the surgeon removed the last left cartilage attached to the sternum along with an infectious tract.

After the operation, the patient's right ventricle was torn, and tampons were used to control the bleeding. She was transferred to the cardiac surgery center under general anesthesia. Under cardiopulmonary bypass, a cardiac surgeon inserted the left femoral artery and the right femoral vein, opened the sternum, and repaired the rupture. Because the rupture of the right ventricle was severe, a cortex patch was used to repair it. In contrast to the findings of chest X-rays and computed tomography scans, bone fragments were discovered at the rupture site, which could have contributed to the persistent discharge and infection in the postoperative period. After 24 hours, the sternum was closed, and the skin near the lower sternum was raised. Due to blood accumulation and infection, a drain was used. After 2 days, the patient developed a pseudoaneurysm at the left femoral artery cannulation site, and she was taken to the operating room. Afterward, the purulent discharge was reduced in severity, and the patient was discharged in good general health.

After 1 month, the patient was followed up. The infection had completely disappeared, and she was in good general condition.

## Discussion

An external pacemaker temporarily stimulates the heart with epicardial pacing wires. During the final stages of heart surgery, the right atrium or the right ventricle is sutured to ensure temporary pacing when required. An epicardial pacing wire consists of a stainless conductor and an insulating sheath.<sup>4</sup> Before discharge, the temporary pacemaker is removed gently, and the risk of complications caused by the temporary pacemaker is low.<sup>6, 7</sup> It has been shown that removing a TEPW can lead to serious complications such as bleeding, coronary artery injuries, myocardial injuries, and death in a small number of patients (0.4%).<sup>5-7</sup>

In addition to early complications such as irritation, pain, and erosion related to retained TEPWs, there have also been reports of delayed effects, including the formation

of abscesses, infections, and endocarditis caused by other microbes.<sup>5-8</sup> Benson et al<sup>9</sup> reported a diaphragmatic hernia with abdominal organs into the thoracic cavity through a diaphragmatic defect caused by a retained TEPW. Kapoor et al<sup>10</sup> reported the development of compressing mediastinal hematomas in the right atrium 12 weeks following heart surgery due to a TEPW. Worth et al<sup>11</sup> described a retained TEPW from the right ventricle to the left pulmonary artery. In another study, Sheikh et al<sup>12</sup> found that the migration of a TEPW through the tricuspid valve led to severe tricuspid regurgitation, which was eventually surgically corrected through the removal of the wire and repair of the valve. In a case of post-CABG bronchocutaneous fistula caused by a retained TEPW, Sakellaridis et al<sup>13</sup> reported intravenous antibiotic treatment and wound debridement, as well as the removal of the TEPW. In a patient with persistent dyspnea 6 years after secondary heart surgery, Horng et al<sup>14</sup> reported TEPW migration to the upper lobe of the right lung and pulmonary consolidation, requiring a thoracotomy to remove the wire. A case of cardiac arrest following ventricular tachycardia caused by the migration of a retained TEPW in a patient who had undergone CABG showed that this could only happen when the TEPW was maintained for at least 3 years.<sup>15</sup> In a study by Matwiyoff et al,<sup>16</sup> an incision necessary to remove a residual TEPW caused the formation of an abscess in the lower sternum. These reports show that TEPWs should be removed entirely or by incision.

## Conclusion

Overall, retained temporary epicardial pacing wires are associated with numerous complications; their prompt removal is, therefore, crucial if they are not required. Temporary epicardial pacing wires remaining years after heart surgery can show various symptoms and cause complications, leading to a higher mortality rate and the need for more surgery. Any temporary epicardial pacing wires retained in the body should be recorded in the patient's file before discharge, and the surgeon should be informed of and consider the issue in the case of postoperative complications.

## References

1. Reade MC. Temporary epicardial pacing after cardiac surgery: a practical review: part 1: general considerations in the management of epicardial pacing. *Anaesthesia* 2007;62:264-271.
2. Reade MC. Temporary epicardial pacing after cardiac surgery: a practical review. Part 2: Selection of epicardial pacing modes and troubleshooting. *Anaesthesia* 2007;62:364-373.
3. Hodam RP, Starr A. Temporary postoperative epicardial pacing electrodes. Their value and management after open-heart surgery. *Ann Thorac Surg* 1969;8:506-510.



4. Batra AS, Balaji S. Post operative temporary epicardial pacing: when, how and why? *Ann Pediatr Cardiol* 2008;1:120-125.
5. Elmistekawy E. Safety of temporary pacemaker wires. *Asian Cardiovasc Thorac Ann* 2019;27:341-346.
6. Khorsandi M, Muhammad I, Shaikhrezai K, Pessotto R. Is it worth placing ventricular pacing wires in all patients post-coronary artery bypass grafting? *Interact Cardiovasc Thorac Surg* 2012;15:489-493.
7. Del Nido P, Goldman BS. Temporary epicardial pacing after open heart surgery: complications and prevention. *J Card Surg* 1989;4:99-103.
8. Shaikhrezai K, Khorsandi M, Patronis M, Prasad S. Is it safe to cut pacing wires flush with the skin instead of removing them? *Interact Cardiovasc Thorac Surg* 2012;15:1047-1051.
9. Benson CC, Valente AM, Economy KE, Hoffman-Sage Y, Bevilacqua LM, Podovei M, Opatowsky AR. Discovery and management of diaphragmatic hernia related to abandoned epicardial pacemaker wires in a pregnant woman with {S,L,L} transposition of the great arteries. *Congenit Heart Dis* 2012;7:183-188.
10. Kapoor A, Syal S, Gupta N, Gupta A. Right paracardiac mass due to organized pericardial hematoma around retained epicardial pacing wires following aortic valve replacement. *Interact Cardiovasc Thorac Surg* 2011;13:104-106.
11. Worth PJ, Conklin P, Prince E, Singh AK. Migration of retained right ventricular epicardial pacing wire into the pulmonary artery: a rare complication after heart surgery. *J Thorac Cardiovasc Surg* 2011;142:e136-138.
12. Sheikh M, Bruhl SR, Omer S, Schwaan T, Grubb B, Cooper C, Kanjwal Y. Transmyocardial voyage of a temporary epicardial lead: an unusual long-term complication. *Pacing Clin Electrophysiol* 2012;35:e185-186.
13. Sakellariadis T, Argiriou M, Panagiotakopoulos V, Charitos C. Bilateral sternobronchial fistula after coronary surgery--are the retained epicardial pacing wires responsible? A case report. *J Cardiothorac Surg* 2009;4:26.
14. Horng GS, Ashley E, Balsam L, Reitz B, Zamanian RT. Progressive dyspnea after CABG: complication of retained epicardial pacing wires. *Ann Thorac Surg* 2008;86:1352-1354.
15. Meier DJ, Tamirisa KP, Eitzman DT. Ventricular tachycardia associated with transmyocardial migration of an epicardial pacing wire. *Ann Thorac Surg* 2004;77:1077-1079.
16. Matwiyoff GN, McKinlay JR, Miller CH, Graham BS. Transepidermal migration of external cardiac pacing wire presenting as a cutaneous nodule. *J Am Acad Dermatol* 2000;42:865-866.