Temporary Epicardial Pacing Wire Migration into the Right Heart, 10 Months after Coronary Artery Bypass Surgery

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ABSTRACT

Migrations of retained temporary epicardial pacing wires (TEPWs) are rare and critical complications of cardiac surgery. A 73-year-old man who had received coronary artery bypass graft (CABG) with retained TEPW 10 months previously visited the outpatient clinic. In routine echocardiography, we observed an artificial structure in the right heart. We performed computed tomography (CT), identified TEPW in the right heart, confirmed the TEPW migration process by comparing it with previous CTs, and removed it via catheter intervention. We report this rare case because we identified TEPW in the heart, determined its migration process, and removed it without complications.

INTRODUCTION

Temporary epicardial pacing wires (TEPWs) are widely used at the last stage of cardiac surgery in case of postoperative arrhythmia, and removal is carried out before discharge [Khorsandi 2012]. The overall incidence of major complications related to TEPW removal is low, but when complications occur, they can be significant (bleeding, cardiac tamponade, or hemopericardium) [Del Nido 1989]. Occasionally, therefore, the wires are cut just at the skin level in case of bleeding tendencies, and resistance is encountered [Carroll 1998]. Retained TEPWs can lead to early and delayed complications, however, such as irritation, pain, infection, and distant migration. Distant migration of retained TEPWs is a rare but serious complication [Shaikhrezai 2012]. We found that a retained TEPW had migrated from the pericardial space into the right heart 10 months after coronary artery bypass graft (CABG) surgery.

CASE PRESENTATION

A 73-year-old male, who underwent coronary CABG (left internal thoracic artery to left anterior descending coronary
RV muscle. We inserted the curved catheter (Performa® Judkins Right Catheters 4.0, Merit Medical, South Jordan, UT), hooked it to the middle of the TEPW, and pulled the wire to move one of its ends in the RV muscle to the infra vena cava. After that, using the snare (Multi-Snare® Micro Sets 4 mm, PFM Medical, Cologne, Germany), the TEPW was captured and removed without any significant resistance (Figures 3a, 3b, 3c, and 3d). The patient was discharged the day after this procedure without further complications.

**DISCUSSION**

TEPWs are routinely used at the last stage of cardiac surgery because they are helpful in the postoperative management of low cardiac output, arrhythmia, and conduction abnormalities [Khorsandi 2012; Del Nido 1989]. We commonly remove the wire by gentle traction before discharge, and the overall incidence of TEPW-related complications is low. In a small number of patients (0.4%), however, TEPW removal can result in critical complications, such as coronary graft and myocardium injury, bleeding, and mortality [Khorsandi 2012; Del Nido 1989; Carroll 1998; Elmistekawy 2019]. Therefore, in case of bleeding tendencies resulting from antiplatelet and warfarin medications, TEPWs are cut just at the skin level and retained [Carroll 1998; Shaikrezai 2012]. Retained TEPWs may cause early complications such as irritation, pain, and erosion, and there have been reports of delayed complications associated with retained TEPWs, such as abscess formation, infection, and distant migration [Shaikrezai 2012; Elmistekawy 2019].

The migration of retained TEPWs is an extremely rare but serious complication [Shaikrezai 2012; Elmistekawy 2019]. Retained wires can migrate to other structures with no clear mechanism. It is possible that they migrate into the chest structure with chest and diaphragm movement. In some reports, abnormal migration of TEPWs was found in places other than the circulation system [Kondo 2014; Ghazali 2018]. Another potential mechanism is direct penetration to the myocardium, migration with cardiac pulsation into the cardiac structures, and flow in the circulation system [Gayanilo 2014; Sugiyama 2018; Mukaihara 2015]. This mechanism could be confirmed by observing changes in the CT of our case. In just 10 months, the TEPW, which was initially located primarily in the pericardium and partially embedded in the epicardium, had migrated entirely into the right heart. However, the TEPW did not travel to the pulmonary artery with blood flow, but rather moved to the RA against blood flow.

As in our case, if the retained TEPW is found in the circulatory system, it can be removed by catheter intervention without complications [Gayanilo 2014; Sugiyama 2018]. However, some cases of retained TEPWs in the circulation system or other structures could require surgical removal [Kondo 2014; Ghazali 2018; Mukaihara 2015].

The optimal site to reduce the migration of retained TEPWs is not clear. The RV anterior wall, the most common site for TEPW insertion, has a high rate of dislodgement (27.8%), due to the retrosternal chest tube and heartbeat, which may increase the possibility of TEPW migration [Hurle 2002]. Conversely, considering the high conductivity and the low TEPW dislodgment rate, some authors recommend the diaphragmatic ventricle wall to be the optimal site for TEPW insertion [Hurle 2002]; however, in that location, TEPWs may also be affected by the movement of the diaphragm.

We have reported this case because we found the TEPW in the right heart and removed it via catheter without complications. We confirmed the TEPW’s 10-month migration process.
and the mechanism from the pericardial space and epicardium into the RV and RA through well-documented CT images.

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