Case report - Cardiac general

Temporary epicardial pacing wire removal: is it an innocuous procedure?

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Abstract

The safety and efficacy of temporary pericardial pacing wires have been accepted and their use is common after cardiac operations. Complications related to pacing wire removal are unusual but it can be serious and even catastrophic. We report an unusual case of bleeding due to laceration and rent created in the saphenous vein graft wall by the metallic tip of the pacing wire at the time of pacing wire removal.

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1. Introduction

Temporary epicardial pacing wires (TEPW) have been used routinely in the postoperative period following cardiac surgery [1]. Most TEPW are related with low morbidity but serious complications can occur rarely [2].

We report an unusual case of bleeding due to laceration of the saphenous vein graft (SVG) as a direct result of TEPW removal. This is an unusual case where the rent in the SVG wall was inflicted by the metallic tip of the pacing wire at the time of removal, in contrast to the laceration of the SVG branches or clips on the SVG reported earlier [3].

2. Case report

A frail 76-year-old female underwent aortic valve replacement (AVR) (21 mm St Jude Medical Epic, SJM MN, USA) with coronary artery bypass grafting (CABG). She had chronic obstructive airway disease with hyperinflated lungs and both pleurae were opened perioperatively. The left internal mammary artery was anastomosed to the left anterior descending artery. Reversed SVG was used for sequential grafting of two obtuse marginal branches (OM1 and OM3) and a separate SVG to the posterior descending artery (PDA). The two SVGs were anastomosed proximally on the aorta with the SVG to the PDA crossing in front of the right atrial appendage.

After weaning from cardiopulmonary bypass (CPB), as per institutional protocol for heart valve operations, two right atrial and two right ventricular epicardial pacing wires [Quad Polar, 250 cm, Medical Concepts Europe (MCE), MCE Gemert, Netherlands] were inserted. Atrial wires were fixed with 5/0 prolene sutures taking superficial bites on the surface of the heart just to ensure gentle contact with the heart muscles. TEPW were fixed with a technique previously reported to be associated with a low complication rate [4, 5]. No additional sutures were required for haemostasis at the pacing wire sites. The exit site in the epigastrium to the right of the midline was secured with a 2/0 silk suture.

After an uneventful recovery in intensive care she was transferred to the ward. As per institutional protocol, all postoperative cardiac surgical patients receive low molecular weight heparin subcutaneously (sc) as a prophylaxis against deep vein thrombosis (DVT) (Clexane 40 mg sc once daily). The DVT prophylaxis is continued until the day of discharge or when the patient is fully ambulatory. We do not stop the prophylaxis before temporary TEPW removal. The patient was not on any other anticoagulation measures. On postoperative day (POD) 4, the pacing wires were pulled out with gentle traction. No undue force was required and the pacing wires came out easily.

Within 30 minutes of pacing wire removal she became breathless with a drop in her blood pressure which responded to fluid resuscitation. Chest X-ray showed a small right pleural effusion. Echocardiography did not show a pericardial collection. She was acidic with a very high blood sugar level raising doubts of diabetic ketoacidosis.

After 2 hours, she became haemodynamically unstable and a full blood count revealed a drop in haemoglobin to 7.0. She was moved to the operating room and the sternotomy was reopened. A small amount of clots was evacuated from the inferior surface of the heart. There was no...
evidence of right atrial or right ventricular compression. However, 1400 ml of blood was sucked out from both pleurae. A careful search revealed a tear in the SVG to PDA around 5 cm proximal to the distal anastomosis from which blood was spurting. There were no vein branches and no clips in the vicinity of the tear. The tear in the SVG was closed with 7/0 prolene suture and complete haemostasis was achieved.

The patient made a good recovery and was discharged home.

3. Discussion

Up to 48% patients undergoing CABG and up to 83% patient undergoing valve surgery will develop dysrhythmias in the early postoperative period [2, 6]. These arrhythmias can be haemodynamically significant and TEPW can help in optimising cardiac function [2].

The use of TEPW is associated with low morbidity and mortality [1]. However, after pacing wire removal patients are at risk of arrhythmias, haemorrhage and tamponade from atrial and ventricular lacerations, injury to SVG, retained wire etc. [6, 7]. The incidence of major complications following TEPW removal is 0.04% [1]. The risk of complications is higher in redo cardiac surgery and anti-coagulated patients [1]. Patients vital signs should be monitored following wire removal to allow prompt identification of potential complications [1].

Pacing wires during should be removed during the day and not on the day of discharge to ensure that any complication can be dealt with more efficiently [5]. In our institution pacing wires are removed on the fourth POD (a day before discharge) with gentle transcutaneous retraction. Excessive force used at the time of TEPW removal can lead to haemorrhage, lacerations of the myocardium and damage to bypass grafts [1, 2]. If resistance is encountered, the pacing wires should be cut flush with the skin surface with a gentle traction [3]. The retained wires rarely cause problems [1, 3].

Pacing wires should be placed behind rather than in front of the SVG to avoid the potential complications relating to graft compression and/or injury [1]. Right atrial wires often need careful positioning particularly when two grafts are anastomosed proximally to the right aspect of the aorta [5]. Puskas et al. suggested that routine use of TEPW following CABG may be unnecessary [1, 8]. Significant predictors for postoperative pacing include diabetes mellitus, preoperative arrhythmias and need for pacing while coming off CPB. If patients with these risk factors were excluded only 2.6% patients of CABG will require pacing [2]. Our patient had an AVR as well and hence placement of TEPW was considered appropriate. In our institution, the incidence of pacing wire-related bleeding is around 0.01% which is less than that reported in the literature. Incidence of patients requiring drainage for late tamponade (excluding early chest reopening during intensive care stay) is <1% of the total cardiac surgical patients. With this case report we take the opportunity to re-appraise the usual recommendations regarding placement of pacing wires and their removal.

In contrast to previous reports of laceration of branches or clips applied on the SVG [3], our patient had a rent in the wall of the SVG inflicted by the metallic tip of the pacing wire at the time of pacing wire removal. There were no SVG branches or clips in the vicinity of the rent. The blood was collecting in both pleural spaces rather than the pericardium. This report highlights that an innocuous looking step of pacing wire removal can lead to a life threatening complication. An unusual cause of bleeding and significant haemodynamic compromise is illustrated and we emphasise the need for close monitoring of patients for early detection of potential complications.

References


eComment: Re: Temporary epicardial pacing wire removal: not an innocuous procedure

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We read with great interest the article by Mishra and colleagues reporting on the complication related to temporary pacing wires (TPWs) removal [1]. Temporary epicardial pacing wires (TPWs) placement is a common practice in cardiac surgery. In many centers prophylactic TPWs are routinely inserted for the management of temporary rhythm disturbances despite infrequent but significant complications such as tamponade, bleeding, infection and even death [2].

The case report by the authors relates to a patient who had aortic valve replacement and coronary bypass grafts. Whilst we fully concur with the use of TPW following valve surgery and on-pump CABG, this case highlights the risks associated with this strategy. We take this opportunity to share our experience of change in our practice of TPW use in OPCAB patients.

It has been suggested that off-pump CABG (OPCAB) may be associated with reduced requirement and use of TPWs and as a consequence its routine insertion might be unnecessary [3]. We have audited in our department the frequency of use of TPWs following OPCAB surgery and found that there is no need for routine placement of TPW in this group of patients.

On the other hand we also note a significant percentage of the patients who had hospital stay prolonged in the process of TPWs removal and the subsequent observation period. Although our study was limited by sample size and lack of randomization, careful assessment of its results gives a
strong message against routine insertion of TPWs in OPCAB in the absence of indications like significant preoperative or and intraoperative rhythm disturbances. Thus, the routine use of TPW has been stopped in our practice [4]. Further audit has revealed no adverse outcomes and we continue to monitor this practice.

References


