Aortic Bleeding One Week after Removal of an Intraoperative Epicardial Temporary Pacing Wire

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Introduction

Intraoperative placement of epicardial temporary pacing wires during cardiac surgery has been routinely used for the treatment of bradyarrhythmias and for maintaining optimal hemodynamics in the early postoperative period.1,2 While the safety and efficacy of the epicardial temporary pacing wires have been accepted, they are associated with rare but sometimes serious complications.

A 56-year-old man had left nephrectomy and resection of a cavoatrial tumor thrombus under a cardiopulmonary bypass assist for left renal cell carcinoma. An intraoperative bipolar temporary epicardial atrial pacing wire was removed on postoperative day 8. The patient collapsed on postoperative day 15. Emergent transthoracic echocardiography and computed tomography scanning with contrast media detected cardiac tamponade. The three-dimensional volume-rendering images from the multislice computed tomography scan demonstrated bleeding from the aortic root. Upon emergency operation, active arterial bleeding from the aortic root distal to the sites of cannulation and cardioplegia was confirmed, and hemostasis with sutures was completed. It is well known that the intraoperative temporary epicardial pacing wire can cause bleeding or arrhythmia, especially when the wire is being removed. However, bleeding usually occurs from the inserted epicardial point of the pacing wire soon after removal of the wire. To our knowledge, this late bleeding complication of the pacing wire is a previously unreported serious iatrogenic complication after cardiac surgery.

Keywords: temporary pacing complications, bleeding, cardiac tamponade, aorta

Case Report

A 56-year-old man suffering from left renal cell carcinoma with cavoatrial tumor thrombus was referred to our department for surgical resection. Upon operation, the left nephrectomy was initially performed through midline laparotomy. Through median sternotomy extended from laparotomy, the liver was mobilized and rotated to expose the intrahepatic portion of the inferior vena cava. Then, cardiopulmonary bypass was established by means of ascending aortic cannulation and two venous cannulations, one from the superior vena cava and the other from the
right femoral vein. The patient was cooled down to 28°C with antegrade cardioplegic cardiac arrest, and the cavoatrial tumor thrombus was successfully removed, although this required partial resection of the inferior vena cava. An intraoperative bipolar temporary epicardial atrial pacing wire (Streamline; Medtronic Inc., Minneapolis, MN) (Fig. 1), fixed with 6-0 polypropylene sutures at the right atrial appendage, and a ventricular pacing wire were inserted. The recovery from operation was uneventful, and the pacing wires were removed on postoperative day 8. The patient suddenly collapsed on postoperative day 15. Emergent transthoracic echocardiography and computed tomography scanning with contrast media were performed. Pulmonary embolism was excluded, but signs of cardiac tamponade, such as large pericardial effusion with collapsed right cardiac chambers, were detected. Emergent percutaneous catheter drainage was performed, and dark, bloody pericardial effusion was collected. The patient collapsed again a few hours after the drainage, and the computed tomography scanning images were carefully reviewed again. Bleeding from the aortic root was detected (Fig. 2A), and the patient underwent an emergency operation. During the operation, active arterial bleeding from the aortic root was confirmed, and hemostasis with 4-0 polypropylene sutures was completed. The bleeding point was proximal to the sites of aortic cannulation and antegrade cardioplegia. The bleeding point was the crossing point of the aorta and the estimated lengthened line presumed from the direction of the remaining sutures for the epicardial atrial pacing wire at the right atrial appendage (Fig. 2B). The patient made a good recovery and was discharged.

Discussion

Intraoperative temporary epicardial pacing wires are routinely placed in patients undergoing cardiac surgery to optimize cardiac function in cases in which patients suffer from hemodynamically significant arrhythmias in the early postoperative period. The use of temporary epicardial pacing wires is associated with low morbidity and mortality. Complications from temporary epicardial pacing wires occur in approximately 0.09% of patients. It is well known, however, that the intraoperative temporary epicardial pacing wire can cause bleeding or rhythm problems, especially when the wire is being removed.

Bleeding usually occurs from the inserted epicardial point of the pacing wire soon after removal of the wire. Our case is particularly interesting because the cardiac tamponade occurred one week after removal of the pacing wire. The bleeding point on the aortic root was different from any cannulation sites. On the basis of careful examination of the computed tomography scanning images, the bleeding point was found to be the crossing point of the aorta and the presumed position of the epicardial temporary atrial pacing wire, as shown in Fig. 2. The tip of the pacing wire was probably attached to the aortic wall perpendicularly rather than parallel, because the

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**Fig. 1** (A) Temporary epicardial pacing wire (Streamline; Medtronic Inc.). (B) The temporary epicardial pacing wire was cut as shown in this figure and fixed with two 6-0 polypropylene sutures over the electrodes at the right atrial appendage. Note the shape of the tip.
pacing wire was cut at the straight portion as shown in Fig. 1B and the angle of the presumed line of the pacing wire and the aorta was seemed to be relatively obtuse. The tip of the pacing wire hit and compressed the aortic wall, and the pressure of the tip caused aortic wall erosion. This erosion gradually got deeper and deeper, continued even after removal of the pacing wire, and finally made a pinhole rupture in the aorta, which caused serious arterial bleeding. For prevention of this lethal complication, the temporary pacing wire should be cut at the helical portion so that the tip of the wire does not directly hit the aortic wall.

To our knowledge, this late bleeding complication of the pacing wire is a previously unreported serious iatrogenic complication after cardiac surgery.

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Disclosure Statement

None.

References