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Leadless Pacemaker Placement Complicated by Right Ventricular Perforation Requiring Sternotomy

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Abstract

Introduction: The implantation of leadless pacemakers has grown substantially. Studies have demonstrated not only their safety, but also lower rates of complications. The incidence of cardiac injury has been found to be 0.1-1.5% with the Micra Transcatheter Pacing System. The need for surgical intervention for cardiac injury is exceptionally rare.

Case: We describe a case of leadless pacemaker placement which was complicated by right ventricle perforation. The patient required emergent sternotomy and repair of the perforation.

Discussion: Despite the safety profile of leadless pacemakers, cardiac injury remains a concern. Although the incidence of pericardial effusions is similar between conventional and leadless pacemakers, the latter are more likely to require procedural intervention. Risk factors for perforation include lead design, provider experience and patient-related factors with increased risk associated with active fixation leads, female gender, age >75, BMI <25, chronic lung disease and use of steroids.

Conclusions: While cardiac perforation is an uncommon result of leadless pacemaker placement, surgical drainage and repair of the injury is more frequently needed in comparison to conventional pacemakers.

Patient History

Our patient is a 93 year old woman with a BMI of 19 and history of hypertension, hyperlipidemia and peripheral arterial disease.

She presented with lightheadedness and was found to have symptomatic Mobitz type 2 heart block. Transthoracic echocardiography showed an ejection fraction of 65% with grade 1 diastolic dysfunction and mild aortic regurgitation.

She presented to our hospital for placement of a Micra leadless pacemaker.

Leadless Pacemaker Placement

The procedure was performed under local anesthesia with monitored anesthesia care. The pacemaker sheath was advanced under fluoroscopy through the right femoral vein to the right ventricle. Following confirmation of the appropriate position along the right ventricular septum, the device was deployed.

Immediate hemodynamic instability was noted and a large pericardial effusion with immobility of the left ventricle was seen on fluoroscopy.

Emergent pericardiocentesis was performed with drainage of 450 ml of blood. Vascular access was obtained for autotransfusion and protamine was given for heparin reversal.

Images

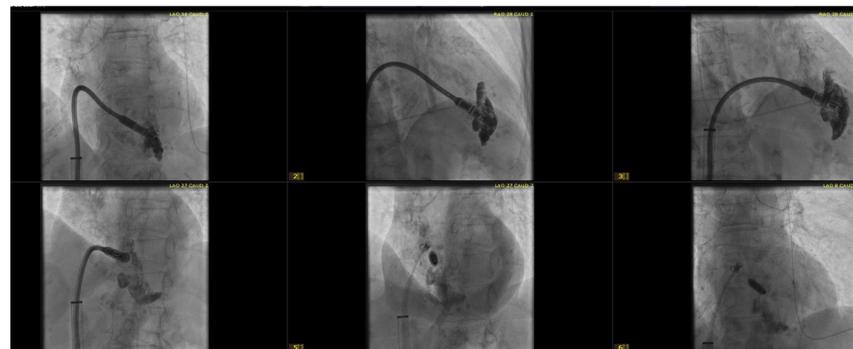


Figure 1. Fluoroscopy images of leadless pacemaker placement



Figure 2. Echocardiography images of pericardial effusion

Right Ventricle Repair

She developed pulseless electrical activity and required two rounds of cardiopulmonary resuscitation. The pericardial drain was no longer functioning and transthoracic echocardiography showed a large clot compressing the right atrium and ventricle suspicious for a right ventricle perforation.

The cardiothoracic surgery team was called and the decision was made to proceed with emergent exploratory sternotomy.

Intraoperatively, the pacemaker was seen protruding through the right ventricular wall with active bleeding. The perforation was repaired with a bovine pericardial patch and a dual chamber epicardial pacemaker was placed.

Transesophageal echocardiography showed a preserved EF with no regional wall abnormalities and normal right ventricular function.

The patient was transferred to the intensive care unit in stable condition. She was extubated later that day and discharge home on postoperative day 9.

References

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