Anterior myocardial infarction complicating right ventricle septal pacing

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Introduction:

Right ventricle (RV) septal pacing has emerged as a more favorable pacing site compared to apical RV pacing.[1–3] Concern over proximity of anterior septal sites to the coronary arteries has been raised. We report a case of myocardial infarction owing to actively fixating the RV lead into the left anterior descending (LAD) coronary artery.

Case report

A 73-year-old woman underwent implantation of a dual-chamber pacemaker at an outside hospital using active fixation bipolar right atrial and RV leads (model 5076; Medtronic, Minneapolis, MN) for symptomatic paroxysmal atrial fibrillation and tachycardia-bradycardia syndrome. Four weeks later she was admitted with shortness of breath and left pleural effusion. She underwent thoracentesis of transudative fluid and presented 2 weeks later to our institution with worsening dyspnea without chest pain. Chest radiography showed moderate left pleural effusion. Electrocardiography showed atrial paced rhythm with left anterior fascicular block, poor R-wave progression, and anterior T-wave inversion. Cardiac enzymes were normal. Interrogation of the pacemaker showed normal parameters and normal sensing and pacing thresholds for both leads. Echocardiogram showed distal apical akinesis with immobile layered thrombus and decreased left ventricular ejection fraction at 45% without pericardial effusion. Left heart catheterization revealed left dominant system with subtotal occlusion of the distal LAD artery at a site corresponding to the helix of the RV lead (Figure 1) with no other stenosis. Thallium-201 viability study showed fixed apical defect. The patient was started on warfarin and was discharged with therapeutic international normalized ratio. Repeat echocardiogram 5 weeks later showed resolution of the apical thrombus with recovery of left ventricular ejection fraction to 60%. The patient was brought to the cardiac catheterization laboratory for revision of the RV lead. Left coronary angiogram was performed and the left coronary artery was engaged to provide fast access in case of the need for emergent percutaneous coronary intervention in the event of coronary extravasation. The epigastric area was prepped and draped for possible need for pericardiocentesis in case of hemopericardium caused by bleeding from the coronary artery or the RV after pulling the RV lead. Pericardial space was continuously monitored via intracardiac echo catheter. Cardiothoracic surgery back-up was also available. The RV lead helix was slowly retracted under fluoroscopic monitoring and the lead was removed without difficulty with gentle steady traction. Repeat left coronary artery angiogram showed no evidence of extravasation or other new findings. Intracardiac echo showed no pericardial effusion. New bipolar passive fixation RV lead was implanted without complications.

KEY TEACHING POINTS

- Myocardial infarction is a potential complication of pacemaker implantation using active fixation right ventricle (RV) lead owing to direct mechanical damage to the coronary artery.
- Acute myocardial infarction should be considered when evaluating chest pain following pacemaker implantation.
- Care should be taken to avoid anterior septal position when using RV active fixation lead.

Discussion

This case represents an unusual pacemaker complication of myocardial infarction caused by screwing the RV lead into the LAD artery. Myocardial infarction was likely caused by traumatic disruption of the coronary artery endothelium with resultant coronary thrombosis. Coronary angiograms suggest spontaneous recanalization. The transudative left pleural effusion was likely due to Dressler syndrome.

Despite lack of consistent evidence for its clinical benefit,[1,4,5] RV septal pacing has been preferred over RV apical pacing in hopes of decreasing the deleterious effects of apical pacing. No significant difference in pacing parameters

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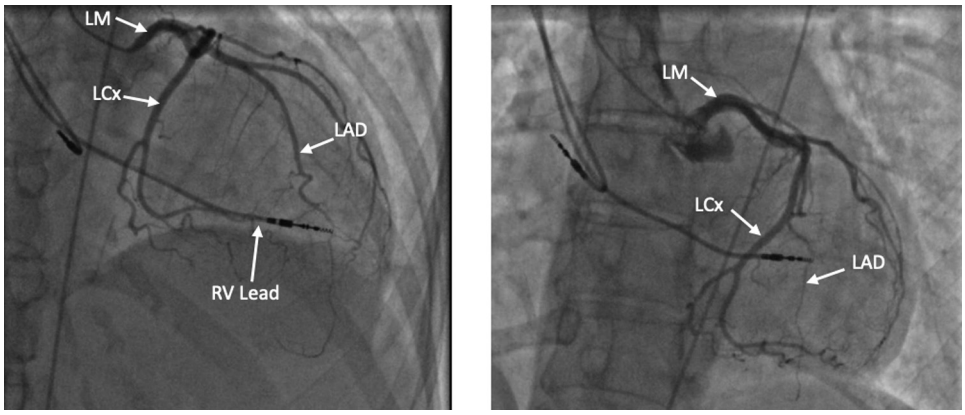

Figure 1 Right anterior oblique caudal view (left) and left anterior oblique view (right) showing the relationship of the tip of right ventricle (RV) lead to the left anterior descending artery (LAD). LCx = left circumflex; LM = left main.

or complications has been noted between apical and septal pacing sites.[6,7] However, large numbers of patients with septal pacing were found to have anterior rather than mid-septal positions.[8] Active fixation rather than passive fixation leads are the leads of choice for septal pacing. Proximity of the pacing leads in anterior positions with concern for potential compromise to the LAD has been reported.[9]

This case represents a rare complication of an active fixation RV lead implanted high anteriorly in the interventricular septum and actively fixated into the distal LAD artery. Being aware of this potential complication and targeting mid to posterior septal areas for RV pacing would minimize this risk. Evaluation of RV lead in right anterior oblique projection can help assure a safe distance from the anterior cardiac border that corresponds to the course of the LAD artery (Figure 2).

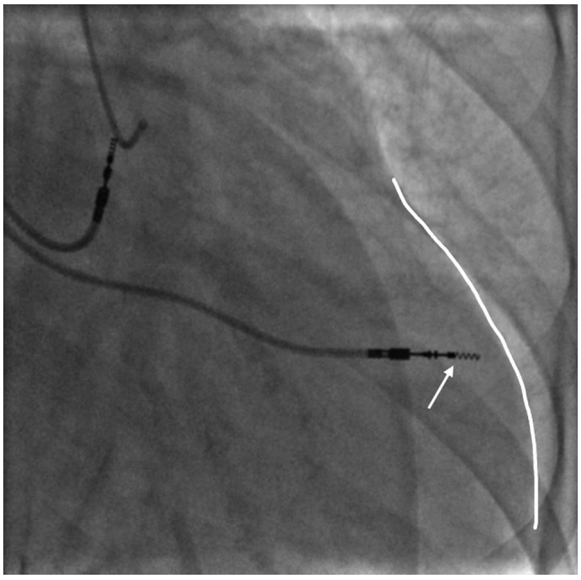

Figure 2 Right anterior oblique view showing the relationship of the tip of the right ventricle lead (*arrow*) to the anterior cardiac border (*solid white line*).

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