

Infectious endocardial intracardiac defibrillator lead, infectious pericarditis, and delayed constrictive pericarditis

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The usage of Implantable Cardiac Defibrillator (ICD) since 1980s is becoming more popular these days. The rate of both, endocarditis and constrictive pericarditis are low but it still needs attention. We are reporting a rare case of ICD endocarditis as a result of toe infection in a diabetic patient. This was followed by infectious pericarditis after device removal by open heart surgery and then delayed constrictive pericarditis.

Key words: Constrictive, defibrillators, endocarditis, implantable, pericarditis, *Staphylococcus aureus*

INTRODUCTION

Since 1980, when the first implantable Cardiac Defibrillator (ICD) was implanted, the use of Cardiovascular Implantable Electronic Devices (CIED) including permanent pacemaker and ICD has become more popular. With growing indications, the number of ICD implantations has grown rapidly.^[1]

Infectious endocarditis is a rare complication following implantation of these devices. In suspected cases, Transthoracic echocardiography (TTE) is recommended in order to confirm the diagnosis.^[2,3] Complete hardware removal has to be done in patients with established CIED infection.^[2] Leads are extracted, either percutaneously or by open technique. The incidence of both endocarditis and pericarditis due to ICD lead infection is low. But, the incidence of constrictive pericarditis due to ICD lead infection in dual active fixation method is rare.

CASE REPORT

A 62-year-old man with history of diabetes and opium addiction for 20 years was admitted in 2007 at Sina hospital, Isfahan, Iran, for evaluation of arrhythmia. Three brothers had sustained sudden death. Coronary angiography failed to reveal any significant coronary artery disease. However, left ventricular (LV) function

was severely reduced with ejection fraction of 20%. There were no intracardiac clots. The patient was placed on anti-arrhythmia drugs (Amiodarone, 400 mg, orally, three times in day) and discharged.

One year later, the patient was admitted with Repeated VT with severe LV dysfunction arrhythmia which did not respond to medical therapy. Generator Medtronic maximo II Vr.

Lead Medtronic 6947-65 cm³ wires.

Coronary sinus, Right ventricle, Right atrium (RA) ICD was implanted.

One year following the implantation, the patient was admitted with toe infection. TTE was unremarkable, TEE showed large vegetations on the ICD lead in RA and also vegetations on the anterior leaflet of tricuspid valve. Mild (Tricuspid regurgitation) TR was present. Left ventricular ejection fraction (LVEF) was 30% [Figure 1]. The result of the blood culture was positive for *Staphylococcus aureus* which was Methicillin sensitive.

The decision was made to remove the device surgically through median sternotomy in February 2011. Pericardium was normal with no fluid collection or adhesions. The patient was placed on cardiopulmonary bypass. RA was opened. Large vegetations were seen on the anterior leaflet of the tricuspid valve. These were excised and the leaflet was repaired. ICD lead was completely removed. It was

Videos available on www.journals.mui.ac.ir/jrms

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fully covered by vegetations. The generator was also removed by separate incision. The cultures of excised vegetations were positive for *Staphylococcus aureus*, e.g., Video 1, Figure 2. The patient was discharged after two weeks of treatment with good general condition.

One month after the surgery, the patient returned to hospital with chest pain, malaise, and no fever. CT scan showed pericardial effusion, e.g., Figure 3. Left thoracotomy was done and copious amounts of purulent fluid were drained. The culture was negative. He was discharged on 7th postoperative day.

One month later, the patient returned with severe lower extremity edema. CT scan revealed mild pericardial effusion with few gas bubbles. No evidence of mediastinitis was found. The sternum was stable. Echocardiography showed

Echo findings were as follows:

Moderate pulmonary arterial hypertension (PAP = 45-50 mmhg), Moderate circumferential pericardial effusion with

high-density material (18 mm) at pericardium [Figures 4-8]. He was scheduled for surgery with diagnosis of constrictive pericarditis. Thick and fibrotic pericardium was resected. Purulent pericardial fluid was drained [Figure 9].

During ten months follow-up after pericardiectomy, dyspnea and edema improved significantly with no evidence of life-threatening arrhythmias.

DISCUSSION

Constrictive pericarditis following ICD implantation is rare.^[4] With less frequent use of patch electrodes, the rate of constrictive pericarditis has decreased. Koich keno *et al.*^[4] reported a case of delayed pericarditis 23 days after ICD implantation with active fixation atrial lead method, but no endocarditis. They believed that constant contact of the atrial screw with pericardium was the cause of pericarditis. We believe that pericarditis in our patient was the result of ICD infection.

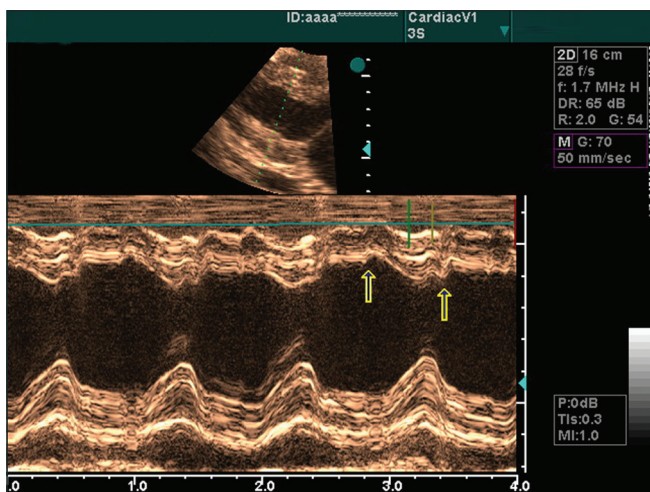


Figure 1: Septal motion abnormality (septal Bounce)



Figure 2: Vegetation of Ant. leaflet of Tricuspid valve, Infected Implantable Cardiac Defibrillator leads

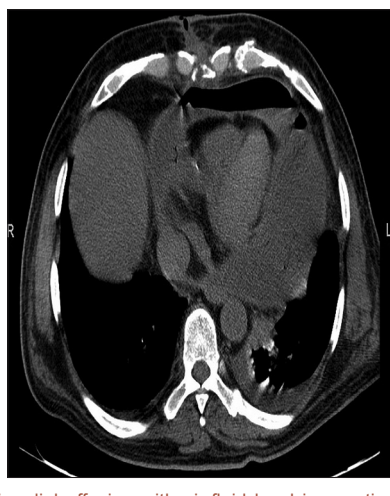


Figure 3: Pericardial effusion with air-fluid level in a patient with previous Implantable Cardiac Defibrillator (non-contrast chest CT. Mediastinal window)

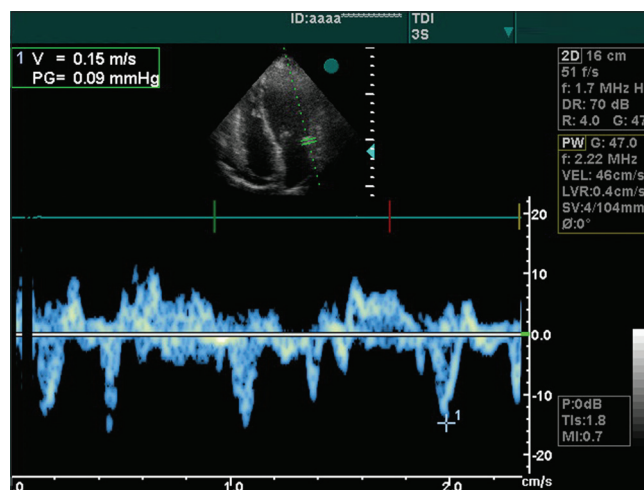


Figure 4: Mitral valve inflow deceleration time

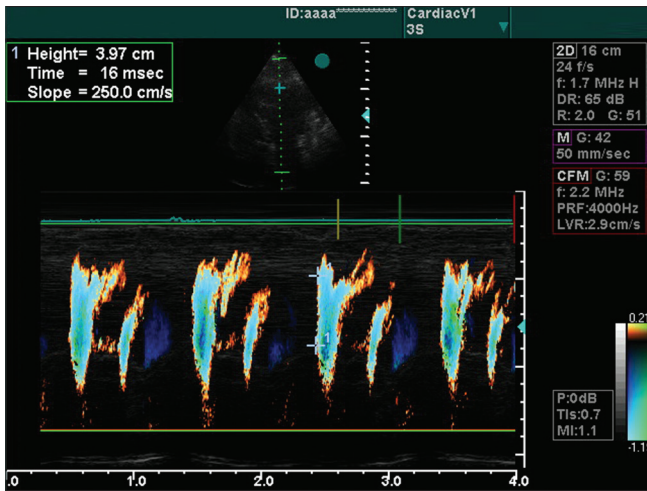


Figure 5: Constrictive pericarditis mitral valve velocity propagation

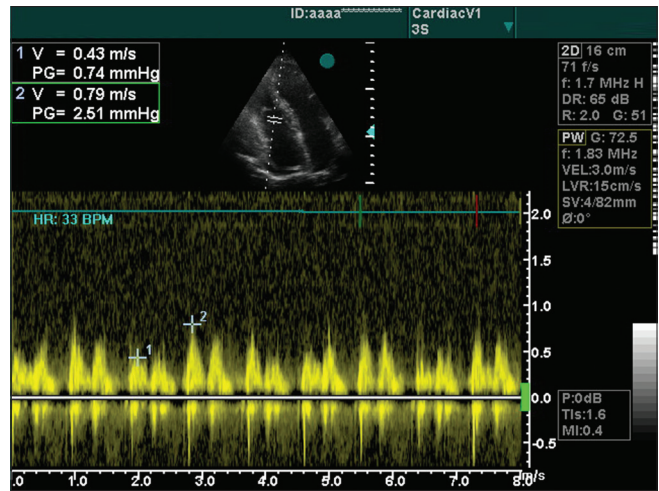


Figure 6: Significant respiratory variation in tricuspid inflow

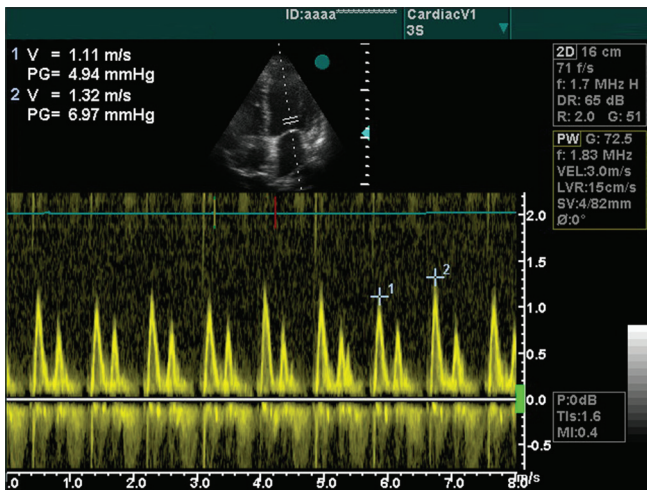


Figure 7: Significant respiratory variation in mitral inflow

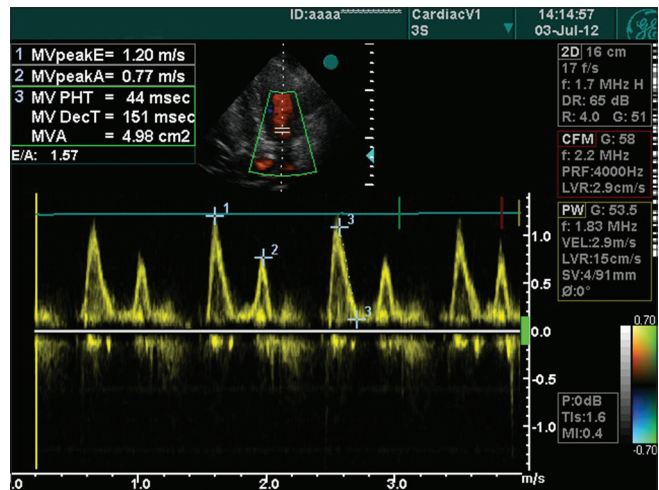


Figure 8: Severe diastolic dysfunction in mitral valve (Doppler)



Figure 9: Surgical Removal of vegetation of Ant. leaflet of Tricuspid valve. Generator and lead removal

Ellen Bogan *et al.*^[5] reported five cases of pericarditis. All patients had mild pericardial effusions. They believe that mechanical injury was the main reason for pericarditis.

In all cases of reported ICD infection with large vegetations, the device was completely removed.^[6] ICD-related endocarditis is an uncommon but a serious complication,

the incidence ranging from 0.5 to 2% with high mortality rate close to 35%.^[4,7] The most common bacteria causing ICD infection is *Staphylococcus aureus* as it was in our case.^[8]

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