A challenging lead endocarditis

C. Mihl, Z. Geyik, E.C. Cheriex, and J.M. van Opstal*

Department of Cardiology, Maastricht University Medical Centre, PO Box 5800, 6202 AZ Maastricht, The Netherlands

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Pacemaker/implantable cardioverter-defibrillator (ICD) lead endocarditis remains a challenging diagnosis in cardiology. Several parameters can be involved in the clinical path leading to the definite diagnosis. Clinical appearance and physical findings, together with transoesophageal echocardiography and serum levels of inflammatory parameters, are necessary in the workup towards the diagnosis. It is highly unlikely that ICD-lead vegetation is accompanied by positive blood cultures solely. We describe a case of ICD-infected endocarditis with positive blood cultures for *Staphylococcus epidermidis* without any physical findings or raised inflammatory parameters in serum plasma levels. In this case, three-dimensional echocardiography demonstrated an added value to two-dimensional echocardiography.

**Keywords**
- Endocarditis
- Infective
- Transoesophageal echocardiography
- 3D echocardiography
- Lead
- ICD
- Inflammatory
- Plasma

**Introduction**

This case report describes a case of implantable cardioverter-defibrillator (ICD)-lead endocarditis with positive blood cultures for *Staphylococcus epidermidis* without any physical findings or raised inflammatory parameters in serum plasma levels. Highly suspicious abnormalities, suggesting lead vegetations, were seen by transoesophageal echocardiography, which was later proved both pathologically and microbiologically.

**Case description**

A 63-year-old man was seen at our outpatient clinic. His medical history revealed a large anterior myocardial infarction in 1994 and ICD implantation following sustained ventricular tachycardia in 2004. Shortly after, a second ventricular lead was implanted because of malsensing of the original lead. At the visit he expressed complaints of fever, chills, and night sweats in the past year. In January 2008 he was admitted to another hospital with the diagnosis *S. epidermidis* bacteraemia. A focus for this bacteraemia could not be found. A transthoracic echocardiography at that time did not show evident signs of endocarditis. Two- and three-dimensional transoesophageal echocardiograms were performed, which showed a large vegetation encompassing both ventricular leads just above the tricuspid valve (Supplementary data, Movies A and B and Figure 1).

Because of the large size of the vegetation, the ICD and leads were removed by thoracotomy. Figure 2 shows two removed leads concrescenced with fibrous tissue removed during surgery. Culture of these leads also demonstrated vegetation of *S. epidermidis* on the extracted tissue. Post-explantation, the patient received intravenous antibiotics. After cessation of the antibiotics, he remained symptom free. Blood cultures remained negative and a new ICD was implanted at the contralateral side.

**Comment**

Pacemaker and ICD devices are increasingly used in today’s clinical practice. An underappreciated complication and treatment...
dilemma arises when intracardiac leads become infected from a systemic bacterial infection. The most common bacteria causing pacemaker endocarditis are Staphylococci. Del Rio et al. found that electrode lead endocarditis occurred in <1% of pacemaker and ICD implants.1 Conservative treatment without explantation of all hardware failed in all patients, and surgical treatment during antibiotic therapy was effective in eradication of infection but was associated with a 12.5% mortality.

C-reactive protein is the classical acute phase plasma protein, serum levels of which are extensively used in routine clinical practice to monitor the acute phase response, and therefore the extent and activity of many infections and inflammatory disorders.2

The clinical usefulness of serial C-reactive protein measurements in monitoring the response to therapy in patients with septicemia is well documented.3 Hogevik et al. found that C-reactive protein is raised in 98–100% of all cases with confirmed infective endocarditis.4 Also WBC count proved useful in the assessment of patients with infective endocarditis.5 Massoure et al. found elevated C-reactive protein or sedimentation rate was present in 96.6% of all patients. Fever proved to be the most important clinical sign and was found in 78% of patients.6

Klug et al.7 conducted a study on 52 patients with endocarditis related to pacemaker-lead infection and found in the chronic group, erythrocyte sedimentation rate and C-reactive protein were increased in 97.4 and 94.7% of all patients, respectively.7 However, as in our case, even low C-reactive protein can be associated with endocarditis and if clinical suspicion exists, imaging remains the cornerstone of diagnosing lead-related endocarditis.

**Supplementary data**

Supplementary data are available at European Journal of Echocardiography online.

**References**


**Figure 1** Three-dimensional transesophageal echocardiogram; arrow indicating two leads in right atrium adhered together with tissue surrounding both leads.

**Figure 2** Lead extraction and removal of ICD by thoracotomy. A view of the right atrium shows two leads concresced with fibrous tissue and vegetation during surgery. The tip of one of the leads is visible in the right atrium. The extracted tissue and two leads are displayed at the bottom of this photo.