CASE REPORT

Successful percutaneous extraction of an inadvertently placed left ventricular pacing lead

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A 74-year-old patient was referred for a rapidly increasing pacing threshold 9 months after DDD pacemaker implantation because of symptomatic total atrioventricular (AV) block. She had a history of hypertension, diabetes with micro-angiopathy and a recent transient ischaemic attack.

The paced electrocardiogram on admission had a right bundle branch block pattern and 3-dimensional transoesophageal echocardiography demonstrated passage of the lead through an atrial septal defect with a left ventricular position in addition to moderate atherosclerosis of the ascending aorta. No thrombus could be detected on the lead. Percutaneous extraction is usually not recommended because of the risk of mobilization of thrombus material. However, the risk of stroke during removal using cardiopulmonary bypass in this patient was considerably increased because of the presence of multiple independent risk factors. Therefore, percutaneous extraction using a locking device was selected and performed without complications: follow-up was uneventful.

A right ventricular lead was implanted during the same procedure and the patient was discharged the next day. Further follow-up was uneventful.

Introduction

Malplacement of endocardial pacemaker leads in the left ventricle has been occasionally reported and is associated with an excess risk of thrombo-embolic complications[1–6]. Treatment has focussed on anticoagulant therapy with warfarin or removal using cardiopulmonary bypass surgery. Percutaneous removal has been reported on only one occasion because of the perceived risk of thrombo-embolic complications during this procedure[7]. We report on a patient with successful percutaneous removal guided by 3-dimensional (3-D) transoesophageal echocardiography.

Case report

A 74-year-old female patient underwent a DDD pacemaker implantation because of symptomatic complete AV-block. She had a history of long standing hypertension and sustained a transient ischaemic attack 1 year before implantation. In addition she had diabetes for more than 25 years complicated by retinopathy. Six months after implantation she was referred because of an increasing pacing threshold resulting in intermittent capture at 7.5 V/1.0 ms. The paced QRS-complex showed a RBBB configuration (Fig. 1) with a posterior position of the ventricular lead on chest X-ray (Fig. 2). The 3-D transoesophageal echocardiogram (TOE) confirmed a left ventricular position of the lead that traversed through an atrial septal defect. No signs of thrombus formation along the lead were visible but intermediate atherosclerosis in the ascending aorta was present. Because of the co-morbidity in the absence of echocardiographic signs of thrombus it was decided that percutaneous removal of the left sided lead was the best option and successful extraction using an extraction device (Spectranetics® lead locking device) was performed.

A right ventricular lead was implanted during the same procedure and the patient was discharged the next day. Further follow-up was uneventful.

Key Words: Lead extraction, endocardial left ventricular pacing.

Discussion

Malposition of a transvenous pacing lead in the left ventricle was reported for the first time by Stillman and colleagues in 1969 and several case studies have subsequently been reported[4]. In a recent review Van Gelder et al. reviewed 27 patients that have been reported in the literature[8]. Since the incidence of thrombo-embolic complications in these patients is probably relatively high, lifelong anticoagulation with warfarin was recommended as first choice therapy with lead extraction reserved in case of failure or during concomitant surgery. Only one case of successful percutaneous extraction has been reported and this procedure is not recommended because of potential mobilization of thrombotic material during lead manipulation[8]. Earlier reports have demonstrated that TOE is not reliable in predicting thrombus formation or fibrotic adhesions on

Figure 1 Twelve-lead electrocardiogram (ECG) after implantation during VVI pacing showing ventricular pacing with a right bundle branch block (RBBB) configuration of the stimulated QRS complex.

Figure 2 Frontal and lateral chest X-ray showing a posterior position of the ventricular lead on the lateral projection.

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the lead[8]. Therefore sheaths that can be advanced over the lead may cause systemic emboli and are therefore contraindicated in the presence of a left ventricular position of a pacing lead. Several factors contributed to the decision to perform percutaneous extraction in this patient. Oral anticoagulant therapy was relatively contraindicated because of the presence of retinopathy associated with a history of diabetes. Since 2-D echocardiography provides only limited information careful 3-D TOE was performed which did not reveal any signs of thrombus formation on the lead. A dedicated extraction device was used providing stable traction along the entire lead body because of it’s perceived lower risk of possible thrombus mobilization. In addition the duration of implantation was relatively short (6 months) and therefore extensive manipulations were not expected. Finally, stroke after cardiopulmonary bypass had to be considered. In a study of almost 6000 patients prospectively followed for clinical evidence of stroke, Salazar et al. reported an overall incidence of 3.6%[9]. In a recent review pre-operative factors for assessment of adverse neurological outcome after cardiac surgery revealed that patient’s age, hypertension, diabetes mellitus, a previous stroke or transient ischaemic attack, proximal aortic atherosclerosis and female gender were independent risk factors, all of which were present in the current case[10].

Thus, percutaneous extraction of an inadvertently placed left ventricular lead is feasible in selected cases provided careful echocardiographic examination, preferably using 3-D TOE, demonstrates absence of thrombotic material. A technique without the use of a sheath may also be preferable.

References