CASE REPORT

A transient ischaemic attack due to the lead of an implantable defibrillator in the left heart

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Abstract

A frequently underdiagnosed complication of pacemaker and implantable cardioverter defibrillator lead implantation is the unintentional advancement of the leads into the systemic circulation. We report a case encountered in our clinic in a 70-year old man evaluated in a neighbouring clinic with symptoms of transient ischaemic attack with initially unclear aetiology. Posterior–anterior chest X-rays suggested that the lead was in the left heart. This finding was confirmed by transthoracic and transoesophageal echocardiography.

Keywords: Implantable cardioverter defibrillator • Transient ischaemic attack • Embolism

CASE REPORT

A 70-year old male patient was hospitalized in the Department of Neurology at a local hospital with a motor aphasia and symptoms of right-sided central facial nerve paralysis for 4 h leading to the diagnosis of a transient ischaemic attack. Two episodes of acute myocardial infarction during the past 6 years and impaired left ventricular (LV) function (ejection fraction of 25%) were remarkable in his medical history. He had undergone a redo coronary artery bypass graft surgery with uncomplicated recovery 8 months earlier. Two months prior to his current admission, he underwent implantation of an implantable cardioverter defibrillator (ICD) in accordance with the Multicenter Autonomic Defibrillator Implantation Trial II (MADIT II) criteria. The implantation was initially performed by cardiologists, but due to difficulties encountered in navigating the lead into the appropriate position in the heart, he was referred to the Vascular Surgical Department of the same clinic, where the implantation was performed by a vascular surgeon. Both participants according to operative records available to us described the procedure as being challenging. More details related to the encountered difficulties were not available.

On admission to the aforementioned hospital, an electrophysiological study showed neither previous arrhythmia nor ICD shocks. The initial chest X-ray was suggestive of a malpositioned ICD lead in the LV (Fig 1a). Both transthoracic and transoesophageal echocardiogram revealed an echodense structure entering the ascending thoracic aorta and subsequently traversing the plane of aortic valve annulus into the LV outflow tract confirming the findings of the chest X-ray (Fig 2). Furthermore, no intracardiac thrombus, rather only minimal atherosclerosis were seen in the ascending thoracic aorta. No sessile thrombus was observed on both the aortic and ventricular pacemaker lead and a continued impairment of the LV function with an ejection fraction of 25% was recorded. It was hypothesized that the patient who was solely on antiplatelet therapy (Aspirin) lacking another possible risk for emboli, a transient micro thrombus formation must have taken place on the pacemaker lead surface which may have embolized into the brain circulation. The patient was admitted to our clinic for lead extraction. Since the ICD implantation was 2 months earlier and ingrowth of epicardial tissues was not very probable, a manual extraction was planned primarily. We initially placed him on low-dose heparin to be discontinued on the day of surgery.

During surgery, the ICD lead was then dissected free of tissues. In the event of need for open cardiac surgery for removal of the lead, a heart–lung machine was on stand-by. The subclavian artery was exposed after which a purse-string suture for closure of the arterial entry hole after extraction was placed. Manual retraction of the lead was tried and fortunately gentle traction progressed successfully since no resistance was sensed. A correct re-implantation of his ICD under fluoroscopy was carried out successfully afterwards and the result was confirmed by post-interventional posterior–anterior chest X-ray (Fig 1b). The postoperative course was uneventful.

DISCUSSION

Despite standardized procedures and improvements in the technique of pacemaker implantation surgery, life-threatening complications may still occur. Even in the hands of experienced physicians, pacemaker leads can be misplaced into the systemic circulation during implantation [1–3]. The exact incidence of this complication is unknown. It may be underestimated and therefore under-reported in cases where the incidence remained
asymptomatic. In our case, the incidence was not suspected during initial implantation and the problem remained undiagnosed for 2 months at first without complications. Reported cases of unintentional malpositioning of pacemaker leads indicate that perforation of the interatrial septum, passage through patent foramen ovale or atrial septum defects are the most common routes of malplacement [4–6]. Ventricular septum perforation, coronary sinus and unrecognized direct entrance into arterial vessels are exceedingly rare [7–9]. A pacemaker catheter malpositioned into the systemic circulation should be removed as soon as possible, otherwise anticoagulation with warfarin and target INR of >2.5 instead of antiplatelets should be considered in cases where an immediate surgical retraction is not feasible in order to reduce the risk of embolic complications which may arise from thrombus formation on the lead [10]. There are a few reported cases of patients who remained asymptomatic with aspirin therapy for extended period of time. Our patient and others in some reports have experienced thromboembolic events despite antiplatelet therapy, which suggests that antiplatelet therapy may not be enough for prophylaxis in such patients. However, we suggest a patient-adjusted therapy either with antiplatelets or warfarin depending on patient-related risk factors in any single case as no controlled clinical trial exists currently. Unlike pacemaker leads placed correctly into the right heart, removal of leads placed into the arterial system poses an increased risk of cerebral thromboembolic complications. An increased risk of bleeding remains in case of arterial puncture. Therefore, lead extraction if need be should preferably, instead of percutaneous extraction, be performed by means of cardiac surgery or percutaneous LV lead extraction with on-site cardiothoracic surgery back-up. If the pacemaker or ICD has been in place in the LV for an extended period of time and there is no urgency for immediate extraction (e.g. an infectious process, thromboembolic events or insufficient threshold levels), retention of the lead in place may be considered. In such cases, patients should be treated with sufficient anticoagulation using warfarin. Regular medical consultations and monitoring should also be initiated. In patients who are scheduled for heart surgery, simultaneous lead extraction should be planned. We recommend both posterior–anterior and side view chest X-rays followed by echocardiography by high index of suspicion for malpositioned ICD or pacemaker leads. This may be precipitated by the appearance of right bundle branch block on paced beats of echocardiogram.

Conflict of interest: none declared.

REFERENCES


