Cardiac embolism after implantable cardiac defibrillator shock in non-anticoagulated atrial fibrillation: The role of left atrial appendage occlusion

Xavier Freixa, Rut Andrea, Victoria Martín-Yuste, Diego Fernández-Rodríguez, Salvatore Brugaletta, Mónica Masotti, Manel Sabaté

Abstract
Cardioembolic events are one of the most feared complications in patients with non-valvular atrial fibrillation (NVAF) and a formal contraindication to oral anticoagulation (OAC). The present case report describes a case of massive peripheral embolism after an implantable cardiac defibrillator (ICD) shock in a patient with NVAF and a formal contraindication to OAC due to previous intracranial hemorrhage. In order to reduce the risk of future cardioembolic events, the patient underwent percutaneous left atrial appendage (LAA) occlusion. A 25 mm Amplatzer™ Amulet was implanted and the patient was discharged the following day without complications. The potential risk of thrombus dislodgement after an electrical shock in patients with NVAF and no anticoagulation constitutes a particular scenario that might be associated with an additional cardioembolic risk. Although LAA occlusion is a relatively new technique, its usage is rapidly expanding worldwide and constitutes a very valid alternative for patients with NVAF and a formal contraindication to OAC.

INTRODUCTION
Cardioembolic events are one of the most feared complications in patients with non-valvular atrial fibrillation (NVAF) and a formal contraindication to oral anticoagulation (OAC). In these patients, the risk of stroke can generally be predicted using the CHA2DS2-VASc score[1]. However, factors not contemplated in the CHA2DS2-VASc...
VASe score may also play a relevant role. One of these factors might be the presence of implantable cardiac defibrillators (ICD) and the potential risk of thrombus dislodgement after electrical shocks. In the following report, we describe a case of massive peripheral embolism after an ICD shock in a patient with NVAF and a formal contraindication to OAC. In order to reduce the risk of new cardioembolic events, the patient underwent percutaneous left atrial appendage (LAA) occlusion. Although LAA occlusion is a relatively new technique, its usage is rapidly expanding worldwide and constitutes a valid alternative for patients with NVAF and a formal contraindication to OAC.

CASE REPORT

This was a 61-year-old male with a previous history of hypertension, diabetes, stroke, dilated cardiomyopathy and ICD for secondary prevention. The patient also presented chronic NVAF with a CHA2DS2-VASc of 5 treated initially with OAC. Anticoagulation was, however, discontinued after an episode of intracranial hemorrhage and single aspirin treatment was started. Six months after OAC discontinuation, the patient was admitted with a massive abdominal embolism after an appropriate ICD shock requiring mechanical aspiration of emboli in the right hepatic and superior mesenteric arteries. After consultation with the neurology department, reintroduction of OAC was not recommended as a result of the risk of recurrent intracranial bleeding. Transesophageal echocardiography (TEE) showed no thrombus in the LAA and a mean diameter of 22 mm at the landing area. Considering the high risk of thrombus formation as a result of the slow LAA blood flow velocity (0.3 m/s) and the risk of cardioembolic recurrence after another potential ICD shock, percutaneous LAA occlusion with a 25 mm Amplatzer™ Amulet™ was conducted without complications (Figure 1). The patient was discharged the following day under dual antiplatelet therapy. At 3 mo, TEE showed complete LAA sealing and the patient was left on single antiplatelet therapy again.

DISCUSSION

In patients with NVAF, cardioembolic strokes are generally more disabling and more lethal than strokes from other sources\(^2\). Although OAC has been shown to be highly effective in reducing the rate of cardioembolic events and deaths\(^3\), between 30% and 50%\(^4\) of patients present a formal contraindication for OAC, have unstable international normalized ratios or are not fully compliant. Currently, percutaneous LAA occlusion represents a valid alternative in patients with NVAF and a formal contraindication for OAC, but it might also be considered for those at high risk of bleeding or drug cessation (II-b indication)\(^5\). Although the presence of an ICD is not contemplated in the CHA2DS2-VASc score, the authors believe that it should be taken into consideration when assessing the cardioembolic risk in patients with NVAF and no anticoagulation. In fact, the incidence of cardioembolic events after electrical shocks remains high in these patients, ranging between 5% and 7% with every shock\(^6\). In addition, the CHA2DS2-VASc score in patients with ICDs is generally high as a result of the increased cardiovascular comorbidity. The usual high CHA2DS2-VASc score of this population, the unpredictable formation of thrombus in the LAA without anticoagulation, and the increased risk of thrombus dislodgement after ICD shocks constitute a particular scenario that might be associated with a high risk of cardioembolic events. In this sense, the occlusion of the LAA, an anatomical structure related with most cardioembolic events, might be a valid alternative. Although further evidence will be necessary to determine if the presence of ICD constitutes an independent predictor of cardioembolic events in patients with NVAF and the absence of OAC, the present case report is hypothesis generating as it highlights the specific risk of these patients and describes a potential alternative for their management.

COMMENTS

Case characteristics

Secondary prevention for cardiac embolism in a patient with previous peripheral embolism and non-anticoagulated atrial fibrillation.

Clinical diagnosis

Non-anticoagulated atrial fibrillation in a patient with previous implantable cardiac defibrillator and cardiac embolism after electrical shock.

Differential diagnosis

The potential risk of thrombus dislodgement after an electrical shock in patients with atrial fibrillation and no anticoagulation constitutes a particular scenario.

Figure 1 Left atrial appendage before and after occlusion with an Amplatzer Amulet. Left atrial appendage before (A) and after (B) percutaneous occlusion.
that might be associated with an additional cardioembolic risk.

**Imaging diagnosis**
Previous intracranial hemorrhage.

**Pathological diagnosis**
Non-valvular atrial fibrillation (NVAF) with formal contraindication to anticoagulation due to previous intracranial bleeding.

**Treatment**
Percutaneous left atrial appendage (LAA) occlusion.

**Experiences and lessons**
Although LAA occlusion is a relatively new technique, its usage is rapidly expanding worldwide and constitutes a valid alternative for patients with atrial fibrillation and a formal contraindication to oral anticoagulation (OAC).

**Peer review**
The authors reported a case with non-valvular atrial fibrillation and a formal contraindication to OAC, who had undergone percutaneous LAA occlusion after the occurrence of massive abdominal embolism. This case report is interesting and suggestive but there are several questions to be solved.

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