Archives of Cardiovascular Disease (2014) 107, 42—47

Available online at ScienceDirect www.sciencedirect.com

Elsevier Masson France EM|consulte www.em-consulte.com/en

REVIEW

Should an implanted defibrillator be considered in patients with vasospastic angina?

Un défibrillateur a-t-il sa place chez les patients présentant un angor spastique ?

Romain Eschalier[a,b,*], Géraud Souteyrand[a,b], Frédéric Jean[a], Antoine Roux[a], Nicolas Combaret[a], Yannick Saludas[a], Guillaume Clerfond[a,b], Nicolas Barber-Chamoux[a], Bernard Citron[a], Jean-René Lusson[a,b], Pedro Brugada[c], Pascal Motreff[a,b]

[a] *Cardiology Department, Clermont-Ferrand University Hospital, 58, rue Montalembert, 63000 Clermont-Ferrand, France*
[b] *Clermont université, université d'Auvergne, CArdio-Vascular Interventional Therapy and Imaging (CaVITI), Image Science for Interventional Techniques (ISIT), UMR6284, Clermont-Ferrand, France*
[c] *Cardiovascular Division, Free University of Brussels, UZ Brussel-VUB, Brussels, Belgium*

Received 27 March 2013; received in revised form 16 October 2013; accepted 18 October 2013
Available online 25 December 2013

KEYWORDS
Coronary vasospasm;
Implantable defibrillator;
Sudden cardiac death;
Ventricular arrhythmia

Summary Vasospastic angina is a frequent and well-recognized pathology with a high risk of life-threatening ventricular arrhythmias and sudden cardiac death. The diagnosis of vasospastic angina requires the combination of clinical and electrocardiographic variables and the results of provocation tests, such as ergonovine administration. Smoking cessation is the first step in the management of vasospastic angina. Optimal medical treatment using calcium-channel blockers and/or nitrate derivatives can provide protection, but life-threatening ventricular arrhythmias may occur despite optimal medical treatment and several years after the start of treatment. In this review, we evaluate the role of implantable defibrillators as a complement to

Abbreviations: CAS, coronary artery spasm; ICD, implantable cardioverter defibrillator; LTVA, life-threatening ventricular arrhythmia; MACE, major adverse cardiac events; SCD, sudden cardiac death; VF, ventricular fibrillation; VT, ventricular tachycardia.

* Corresponding author. Cardiology Department, Clermont-Ferrand University Hospital, 58, rue Montalembert, 63000 Clermont-Ferrand, France.
E-mail address: reschalier@chu-clermontferrand.fr (R. Eschalier).

1875-2136/$ — see front matter
http://dx.doi.org/10.1016/j.acvd.2013.10.006

optimal medical management in patients with life-threatening ventricular arrhythmias due to vasospastic angina; this role is not well characterized in the literature or guidelines. We discuss the role of implantable defibrillators in secondary prevention in light of three recent cases managed in our departments and a review of the literature. An implantable defibrillator was implanted in two of the three cases of vasospastic angina with ventricular arrhythmias that we managed. We considered secondary prevention by implantable defibrillator to be justified even in the absence of any obvious risk factor. Ventricular arrhythmias recurred during implantable defibrillator follow-up in the two patients implanted.
Conclusion. — In patients with life-threatening ventricular arrhythmias due to vasospastic angina, an implantable defibrillator should be considered because of the risk of recurrence despite optimal medical management.

MOTS CLÉS
Spasme coronaire ;
Défibrillateur automatique implantable ;
Trouble du rythme ventriculaire ;
Mort subite

Résumé
Contexte. — L'angor spastique est une pathologie fréquente et connue de longue date ayant une morbimortalité non-négligeable. Il existe notamment un risque important de mort subite. Le diagnostic repose sur l'association de signes cliniques, électrocardiographiques et par la confirmation diagnostic par un test de provocation au méthergin. L'arrêt du tabagisme est le point essentiel du traitement. Il est associé à un traitement médicamenteux anti-spastique composé d'inhibiteurs calciques et/ou de dérivés nitrés. Malheureusement cette prise en charge est insuffisante et le risque de mort subite reste présent durant plusieurs années après que le diagnostic ait été porté. Dans cette revue, nous évaluons la place du défibrillateur automatique implantable en sus du traitement médicamenteux chez des patients ayant présenté une mort subite récupérée suite à un spasme coronaire dont la place reste floue.
Méthodes. — Nous discutons cette place à la lumière de trois cas que nous avons pris en charge et d'une revue complète de la littérature.

Background

Vasospastic angina is one of the most important functional abnormalities of the coronary artery with a high risk of morbidity (myocardial infarction) and mortality [1,2] (sudden cardiac death [SCD] from severe life-threatening ventricular arrhythmias [LTVAs] [3,4]). Vasospastic angina accounts for 5% of cases of cardiac arrest from severe ventricular arrhythmias. Printzmetal et al. first described vasospastic angina in 1959 [5]. Diagnosis remains difficult and is based on combined evidence, especially as coronary artery spasm (CAS) can occur in the absence of any chest pain [6—8]. Per-critical electrocardiographical signs are highly suggestive, but diagnosis is usually confirmed by spasm-provocation tests during coronary angiography [9], with ergonovine or acetylcholine administration [10].

Endothelial dysfunction associated with loss of nitric oxide secretion remains the main physiopathological factor implicated in vasospastic angina [11,12], but other pathways are being explored [13] without any effective alternative treatments. Currently, calcium-channel blockers usually bring the spastic angina under control and ensure a good long-term prognosis [14], without, however, providing optimal efficacy in all patients. Furthermore, patients with vasospastic angina who survive LTVAs are a particularly high-risk population [15]. As medical management is not completely effective, an implantable cardioverter defibrillator (ICD) may offer a complementary management strategy, particularly in the secondary prevention of LTVAs due to vasospastic angina.

We discuss the role of ICDs in the secondary prevention of SCD from severe LTVAs due to vasospastic angina in light of three recent cases managed in our centre and a review of the literature.

Case studies

First case

A 52-year-old female smoker was admitted for a first non-ST-segment elevation myocardial infarction with angiographically healthy coronary arteries. She was discharged on isosorbide mononitrate (40 mg/day), a calcium-channel blocker (verapamil, 120 mg twice daily), a statin (atorvastatin, 80 mg/day) and aspirin (160 mg/day).

Six months later, the patient was hospitalized for a cardiac arrest; she received early resuscitation manoeuvres and two shocks delivered by a semiautomatic defibrillator for ventricular fibrillation (VF). The post-resuscitation electrocardiogram showed alternation between normal repolarization and a pathognomic pattern of Prinzmetal's angina (Fig. 1A and B). Emergency coronary angiography showed a diffuse —nearly occlusive— spasm of the entire coronary tree (Fig. 2A: circumflex and left anterior descending arteries > 90% spastic occlusion), relieved only by intracoronary isosorbide dinitrate injection (which confirmed the diagnosis of vasospastic angina: the combination of the presence of a > 90% transient occlusion of at least one coronary artery with signs/symptoms of myocardial