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Malignant ventricular arrhythmias in spontaneous coronary artery dissection: when secondary prevention is required

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Spontaneous coronary artery dissection (SCAD) has long been considered a rare cause of acute myocardial infarction (AMI), traditionally deemed to occur mainly during pregnancy or soon after. However, an increasing awareness of this peculiar condition among cardiologists – together with the improvements of intracoronary imaging – led to a significant increase in SCAD diagnoses over the last decade. In fact, even though SCAD accounts only for 1-4% of all cases of acute coronary syndrome (ACS),[1-2] this prevalence rises up to 35% when exclusively considering women aged <50 years.[2] Surprisingly, most cases are not related to a recent pregnancy.[3] Other well-known risk factors for SCAD, besides female sex, include genetics, concomitant multidistrict arteriopathy, such as fibro-muscular dysplasia (FMD), and physical, environmental and emotional precipitants.[4] SCAD optimal treatment is still debated, due to the lack of high-level data from large multicentric registries or randomized trials. The available evidence encourages to adopt in most cases a conservative strategy, and to limit percutaneous coronary intervention (PCI) with stent implantation only to unstable patients with compromised distal flow and demonstrable ongoing ischemia.[5] Although AMI due to SCAD is associated with a more favorable prognosis than ACS due to coronary artery plaque rupture,[4-5] SCAD patients present a non-negligible risk of adverse cardiovascular (CV) outcomes, including angina, SCAD recurrence and incident malignant ventricular arrhythmias (VA).[6-7] In particular, according to several reports, the occurrence of VA and sudden cardiac death (SCD) ranges from 3% to 11% of all SCAD[8] cases, and patients presenting with ventricular tachycardia/ventricular fibrillation (VT/VF) are more likely to experience in- and out-of-hospital complications.[9] Nevertheless, it is uncertain which patients could benefit the most of SCD secondary prevention with implantable cardioverter devices (ICD), and the latest American and European consensus documents did not shed any light on this issue.[5-10] Several peculiarities of the natural history of SCAD contribute to make the risk-benefit ratio of ICDs highly controversial. First of all, current guidelines[11] suggest to provide with an ICD only patients with VT/VF due to not reversible causes, but SCAD tends to heal completely over time, and left ventricular dysfunction – when present – usually reverses in a few months from the index event. Furthermore, SCAD patients are usually young-middle aged women, and it is well-known that the risk of ICD-related complications exponentially increases over time. On the other hand, SCAD relapse is not uncommon, as discussed above, especially in patients with non-modifiable risk factors, such as FMD or genetic predisposition, and the longer life expectancy of these young patients increases the odds of VT/VF recurrence.

In this regard, the paper by Giacalone et al., published in *It J Gender-Specific Med*, vol 8, issue 2, offers an interesting overview of 4 cases of SCAD presenting with VT/VF, illustrating examples of SCAD management during the acute phase and early in- and out-of-hospital outcomes.[12] All 4 patients were middle-aged women who were taken to the emergency room following resuscitated out-of-hospital cardiac arrest, and all got an urgent coronary angiogram, which revealed the presence of SCAD. One of these subjects received a subcutaneous-ICD (s-ICD) for SCD secondary prevention, because concomitant extra coronary arteriopathy was found at computerized tomography (CT), and no recurrent CV events were registered at the 1-year follow-up. In contrast, two other patients were deemed at low risk of SCAD recurrence and, consequently, ICD implantation was not performed, while in the fourth cerebral death occurred, due to the prolonged resuscitation period. Although the presentation as a case series highly reduces the robustness of the data provided, this article emphasizes an issue of utmost importance, which deserves the attention of the scientific community. Moreover, in our opinion, the novelty of this article lies in the proposal of an algorithm aimed to estimate the risk of SCAD and malignant arrhythmias recurrence on the basis of clinical, angiographic and imaging features. In particular, the authors underline the importance of a multimodality cardiac imaging, comprehensive of transthoracic echocardiography, to assess the left ventricular ejection function (LVEF) in the acute phase and before discharge, as well as cardiac magnetic resonance (CMR) after clinical stabilization for scar detection and quantification. Furthermore, cerebral CT or MR should be routinely performed in patients deemed at increased risk of FMD, since the presence of multidistrict arteriopathy predisposes to SCAD and the conse-

quent recurrence of VT/VF. On the other hand, subjects who presented the index episode in the context of physical/emotional stressors or pregnancy are less likely to suffer from arrhythmic relapses. To summarize, Giacalone et al. propose as possible predictors of malignant arrhythmias at follow-up: a reduced LVEF at presentation which does not improve before discharge; high scar burden at CMR; concomitant FMD; and the absence of modifiable precipitating factors. Althought interesting, this algorithm clearly needs to be validated in large prospective studies, which could also provide additional information to allow a better stratification of the arrhythmic risk in these patients. Moreover, the collection of additional data on this issue could guide clinicians and electrophysiologists in the choice between intracavitary and subcutaneous devices implantation when secondary prevention of SCD death is deemed necessary.

Hopefully, over the next few years, results from large multicentric American (NCT04496687) and European (NCT04457544) registries will improve our knowledge of the pathophysiology, optimal management and prognosis of SCAD, in order to provide patients suffering from this peculiar condition with a personalized treatment.

Keywords. Spontaneous coronary artery dissection, ventricular arrhythmias, sudden cardiac death, secondary prevention, gender medicine.

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