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Editorial

Specialized clinics for patients with spontaneous coronary artery dissection

Since the first description of spontaneous coronary artery dissection (SCAD) at autopsy examination 9 decades ago major advances have enriched our understanding of this elusive and still underrecognized clinical entity [1–6]. SCAD is a relatively rare cause of acute coronary syndrome (ACS) but accounts for up to 25 % of acute myocardial infarctions (MI) in premenopausal women [1,2]. Enhanced clinical awareness, widespread use of urgent coronary angiography in ACS patients, and improved recognition of diagnostic angiographic and intracoronary imaging patterns explain the increasing number of patients diagnosed with SCAD [1–6]. The outside-in hypothesis (initial bleeding within the vessel wall) is gaining ground to the inside-out hypothesis (initial intimal tear) as the main underlying mechanism, according to recent studies [1–6]. The strong association with fibromuscular dysplasia (FMD) and data on shared genetic variants suggest an underlying generalized vascular disorder [1–6]. Furthermore, conservative initial management is advocated for these patients [1,2,6]. However, evidence regarding the value of the existing medical therapies in patients with SCAD is still minimal and merely based on observational data. Notably, there is a lack of randomized clinical trials addressing the potential benefit of any medication in these patients [1,2,7]. Initial observational studies reported favourable effects of beta-blockers and deleterious effects of statins on recurrence rates, but these findings were not confirmed in subsequent studies [1–4]. Similarly, recent studies suggest a potential deleterious effect of prolonged dual antiplatelet therapy (DAPT) further supporting the initial wall bleeding hypothesis [1,2,4,8].

Uncertainties also overshadow the long-term management of these patients [1,2,9,10]. There are international consensus documents but no clear guidelines on SCAD [1,2]. Non-specialized physicians may be tempted to treat these patients as patients with MI secondary to atherosclerotic coronary artery disease (CAD). However, a heightened awareness of the distinct and unique characteristics of SCAD among healthcare providers may result in better management and, eventually, in improved quality of life and prognosis [1,2]. Specialized SCAD clinics might have a major role in this regard. Currently, however, only major referral SCAD centres benefit from dedicated SCAD clinics, with very satisfactory results [1–4]. Nevertheless, a direct comparison of care and management of SCAD in specialized clinics versus conventional cardiology clinics is lacking.

1. Particularities of SCAD requiring expert clinical management during follow-up

SCAD etiology, pathophysiology, and prognosis are very different from that of atherosclerotic CAD [1,2]. Therefore, patients with SCAD should not be mismanaged as atherosclerotic CAD. SCAD unique risk factors and associated conditions should be thoroughly investigated. Physical and emotional stress triggers should be revised [1–4]. Psychosocial considerations are particularly important to improve long-term health in these patients. Anxiety and depression are frequent among SCAD survivors who may require supportive care, counselling, behavioural therapy, or professional psychotherapy [1–4,9,10]. We should keep in mind that many of these patients are initially treated by physicians with little familiarity with the condition or who overemphasize uncertainties regarding its etiology, treatment, and prognosis. Patients are usually confronted with questions difficult to address: Why my MI is different? Why the artery causing my MI was left untreated? Can this happen to me again? This may cause frustration, fear, and a profound effect on confidence in the adequacy of their diagnosis and management [1–4]. Most of these patients are otherwise healthy and active young women who have difficulties in understanding how to face the new situation conferred by the unheralded MI and the SCAD diagnosis [1–4,9,10].

Chest pain is extremely common in outpatients with SCAD and addressing chest pain syndromes in women may be particularly challenging [1,2]. Chest pain does not necessarily imply underlying myocardial ischemia but may cause recurrent hospital admissions. Care should be paid to prevent unnecessary coronary angiograms that, in these patients, always portend an enhanced risk of iatrogenic dissections [1,2]. Unfortunately, coronary computed tomography angiography has limited resolution and only allows assessment of proximal coronary segments, yet the disease predominantly affects distal vessels [1,2]. Endothelial and microvascular dysfunction should be also considered [1,2].

Medical treatment should be carefully revised during follow-up visits. In contradistinction with the established value of beta-blockers, DAPT, and statins in patients with atherosclerotic MI, their role in SCAD remains unsettled [1–4]. Beta-blockers, may affect the quality of life of young females and exacerbate depressive symptoms. DAPT may not be required in most SCAD as it has been associated with poorer outcomes in some studies [4,8]. Menorrhagia can be an issue in young females taking antiplatelet agents although heavy menstrual bleeding is infrequent.

Informed, shared decisions on contraceptive therapies versus risks of future pregnancies are important for premenopausal women [11–13]. Recommendations for pregnancy follow-up and delivery should be provided by specialized multidisciplinary teams. Counselling is required for the management of menopause and postmenopausal hormone replacement therapy [11–13].

Last but not least, patients with SCAD should be referred for cardiac

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rehabilitation and psychosocial support with patient-centered recovery goals [14,15]. Of concern, the lower overall referral of women with atherosclerotic MI to cardiac rehabilitation programs is further compromised in SCAD by misconceptions about the lack of value in young women without atherosclerosis and fears that physical exercise will trigger recurrent SCAD [14,15]. Consensus documents emphasize that referral to cardiac rehabilitation programs is paramount in SCAD [1,2].

The goals of these follow-up clinical visits are to reassure and provide counselling to patients, supervise screening for associated conditions, assess treatment and adherence, and, ultimately, improve quality of life, alleviate symptoms, and improve long-term prognosis.

2. Present study

In this Issue of the Journal Christenson et al [16] from the University of Pittsburgh sought to assess whether specialized SCAD clinics would improve guidance-based care in SCAD. With this aim, they reviewed the electronic medical records of 40 hospitals in Pennsylvania since 2018 (year of publication of societal international consensus on SCAD) to identify patients with SCAD. All corresponding angiograms were subsequently reviewed to confirm the diagnosis. Care of patients visited in a SCAD clinic during follow-up was retrospectively compared with that received by patients seen in non-SCAD clinics. Baseline characteristics were similar in the two groups. Significant differences were observed in pregnancy and contraception discussions (88 % vs 0 %, $p < 0.001$) in SCAD clinics compared to non-SCAD clinics. Safety of hormone replacement therapy was also more frequently addressed (85 % vs 7 %, $p < 0.001$) in SCAD clinics. In addition, screening for FMD was systematically performed in SCAD clinics (100 % vs 30 %, $p < 0.001$). Finally, a more comprehensive discussion on potential triggering medications (triptans) and the use of statins, was also more frequently provided in SCAD clinics [16].

The optimal management of patients with SCAD represents a major unmet clinical need. The present study by Christenson et al [16] suggests that specialized SCAD clinics provide a more nuanced treatment and improve guidance-based care. In this regard, the results of this small study are of value, and addressing some issues would be of interest.

First, electronic medical records have limitations for clinical purposes, especially in SCAD which lacks a specific ICD-10 code. Dissections related to ruptured atherosclerotic plaques and iatrogenic dissections during diagnostic angiograms or coronary interventions may cause misdiagnosis although, reassuringly, all the angiograms in this study were carefully reviewed by experts. Alternatively, some cases may have been overlooked as diagnosis of SCAD may be elusive. Data on counselling was manually extracted from the available clinic notes with the potential risk of underreporting.

Second, only a small number of patients were included (21 in SCAD clinics and 24 in non-SCAD clinics). A higher number of cases would have been expected coming from 40 hospitals during the study period. Discussions on statins (63 vs 17 %) and DAPT (83 vs 44 %) discontinuation were only numerically more frequent in SCAD clinics. Of note, the potential role of statins in SCAD has not been established whereas the use of prolonged DAPT has been associated with worse outcomes in some studies [1,2,4,8]. Interestingly, in contrast with previous studies, virtually all patients received beta-blockers for recurrence prevention [1–6].

Third, although baseline characteristics were similar in both groups the possibility of selection bias cannot be excluded considering the retrospective nature of the study. Patients seen in the SCAD clinic had a higher rate of FMD screening before the index visit and final screening was achieved in all of them. The methodology and completeness of the screening were not detailed, yet this is relevant as an incomplete screening might explain the low rate of vascular anomalies detected.

Fourth, the study does not indicate whether patients benefited from rehabilitation programs or if rehabilitation was more frequently pursued in the dedicated clinics. Studies from referral SCAD centres [14,15] suggest the value of these programs that are recommended in the consensus documents of the disease [1,2].

Fifth, the dedicated SCAD clinic was located within a Womeńs Cardiac Clinic. This organization is very attractive, as 90 % of SCAD patients are female, and could have favourably influenced management, but also may limit the generalizability of the results to other settings.

Finally, it may be argued that demonstrating that the care provided by specialized physicians working in dedicated SCAD clinics is better aligned with current SCAD recommendations is simply a self-fulfilling prophecy. Although the prediction necessarily turned out to be true, this approach remains the standard for management quality assurance. This study confirms the value of specialized clinics to ensure guidance-directed care in SCAD. However, it is still unclear whether this specialized care improves the quality of life or the prognosis of SCAD patients. Further studies are warranted to elucidate the logistic, economic, and real clinical implications of this management strategy.

3. Conclusions

SCAD is completely different from atherosclerotic CAD [1,2]. Adequate education should be guaranteed across all SCAD health providers to ensure adequate management. Implementation of SCAD dedicated clinics may be challenging due to the relative rarity of the condition. However, the present study confirms that these clinics provide more systematic and comprehensive counselling and ensure a closer adherence to current recommendations for these challenging patients. At least SCAD patients should be concentrated in selected post-MI clinics run by cardiologists with SCAD expertise according to local protocols [3,4,9,17]. Networks, with readily accessible, well-organized, multispecialty referral SCAD clinics, appear to be the ideal solution to ensure optimal management of these patients.

CRediT authorship contribution statement

Fernando Alfonso: Conceptualization, Investigation, Supervision, Validation, Writing – original draft, Writing – review & editing. **Marcos García Guimarães:** Conceptualization, Validation, Visualization, Writing – review & editing. **Teresa Bastante:** Conceptualization, Validation, Visualization, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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