

the role of reproductive history and ovarian hormones with regard to SCAD.

The suggestion that patients with P-SCAD may be too young to have fibromuscular dysplasia (FMD) is thought provoking. Current data suggest that FMD is for the most part a stable disease entity (1), and among patients with SCAD, imaging evaluation for FMD is recommended for all patients regardless of age or symptoms (2). However, much remains to be learned about the natural history of SCAD, FMD, and the extent of their overlapping mechanisms.

*Marysia S. Tweet, MD
Sharonne N. Hayes, MD
Elisabeth Codsí, MD
Rajiv Gulati, MD, PhD
Carl H. Rose, MD
Patricia J.M. Best, MD

*Department of Cardiovascular Diseases

Mayo Clinic College of Medicine

200 First Street Southwest

Rochester, Minnesota 55905

E-mail: tweet.marysia@mayo.edu

<https://doi.org/10.1016/j.jacc.2017.10.057>

© 2018 by the American College of Cardiology Foundation. Published by Elsevier.

Please note: Dr. Best has received speakers bureau fees from Abbott Vascular. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

REFERENCES

1. Kadian-Dodov D, Goldfinger J, Hairston J, Olin J. Natural history of cervical artery fibromuscular dysplasia and associated neurovascular events (abstr). *J Am Coll Cardiol* 2016;67 Suppl:A2268.
2. Tweet MS, Gulati R, Hayes SN. What clinicians should know about spontaneous coronary artery dissection. *Mayo Clin Proc* 2015;90:1125-30.

Should We Recommend Cardiac Rehabilitation in Patients With Spontaneous Coronary Artery Dissection?



Saw et al. (1) have reported a high frequency of recurrent events following spontaneous coronary artery dissection (SCAD), including recurrent SCAD. As in prior experiences, SCAD occurred predominantly in women, and many of these women were pre-menopausal. To date, however, optimal means for preventing recurrent events in patients with SCAD remains unclear. Thus, it is notable that Saw et al. (1) also found that hypertension independently

predicted recurrent SCAD and that β -blocker treatment reduced the incidence of recurrent SCAD in a multivariate model (1). β -Blockers are presumably beneficial in reducing coronary arterial wall stress in patients with SCAD.

In addition, participation in cardiac rehabilitation (CR) represents another potential means that should be strongly explored to reduce risk in patients with SCAD. CR is associated with a reduction in blood pressure, improvement in sympathovagal balance, and decreased risk of recurrent atherosclerotic myocardial infarction (MI) (2). Several studies, as well as animal models, have also suggested that exercise training during CR may augment the effects of β -blockers in both MI patients and healthy volunteers (2-4). Moreover, Malfatto et al. (2) have shown that post-MI patients who used β -blockers and who underwent CR had a better autonomic profile both in the short term and the long term compared with patients who underwent CR without β -blockers. Thus, a combination therapy of β -blockers and CR could potentially regulate sympathetic activation in a more efficient manner than can β -blockers alone.

Saw et al. (1) also noted that precipitating emotional and physical stressors were common among their SCAD cohort. To this end, we have recently reported that CR can also improve the physical, psychological, and emotional status of patients with SCAD (5).

Interestingly, according to the Mayo Clinic registry, several health care providers hesitate to recommend CR because of limited data (5). However, CR has been shown to be safe in patients with SCAD and may attenuate the risk of recurrent SCAD through several potential mechanisms. Thus, until clinical trials can produce meaningful data, CR should be routinely considered in combination with β -blockers in patients with SCAD to prevent recurrent SCAD.

*Chayakrit Krittanawong, MD
Alan Rozanski, MD
Angela Palazzo, MD

*Division of Cardiology

Department of Internal Medicine

Icahn School of Medicine at Mount Sinai

1000 10th Avenue, Suite 3A-09

New York, New York 10019

E-mail: chayakrit.krittanawong@mountsinai.org

<https://doi.org/10.1016/j.jacc.2017.09.1153>

© 2018 by the American College of Cardiology Foundation. Published by Elsevier.

Please note: The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

REFERENCES

1. Saw J, Humphries K, Aymong E, et al. Spontaneous coronary artery dissection: clinical outcomes and risk of recurrence. *J Am Coll Cardiol* 2017;70:1148-58.
2. Malfatto G, Facchini M, Sala L, Branzi G, Bragato R, Leonetti G. Effects of cardiac rehabilitation and beta-blocker therapy on heart rate variability after first acute myocardial infarction. *Am J Cardiol* 1998;81:834-40.
3. Head A, Kendall MJ, Ferner R, Eagles C. Acute effects of beta blockade and exercise on mood and anxiety. *Br J Sports Med* 1996;30:238-42.
4. Minami N, Yoshikawa T, Kataoka H, et al. Effects of exercise and β -blocker on blood pressure and baroreflexes in spontaneously hypertensive rats. *Am J Hypertens* 2003;16:966-72.
5. Krittanawong C, Tweet MS, Hayes SE, et al. Usefulness of cardiac rehabilitation after spontaneous coronary artery dissection. *Am J Cardiol* 2016;117:1604-9.

REPLY: Should We Recommend Cardiac Rehabilitation in Patients With Spontaneous Coronary Artery Dissection?



We thank Dr. Krittanawong and colleagues for their insightful comments on the potential synergistic effects of beta-blockers and cardiac rehabilitation (CR). Although the benefits of beta-blockers and CR were well established for patients who had atherosclerotic myocardial infarction, the value of both therapies after myocardial infarction caused by spontaneous coronary artery dissection (SCAD) was only recently explored. For patients with SCAD, our study showed the benefit of beta-blockers, which were associated with a substantial reduction of recurrent SCAD events (1). Limited studies had explored the safety and efficacy of CR post-SCAD (2-4).

Retrospective series of patients with SCAD who underwent standard CR programs suggested improvements in emotional and physical wellbeing (3,4). At our institution, a centralized and concentrated SCAD patient cohort enabled us to establish a dedicated SCAD-CR program, which was tailored to the unique exercise and psychosocial demands of survivors of SCAD (2). Our modified exercise therapy consisted of aerobic activities with initial low-level targets for heart rate and blood pressure (titrated to perceived exertion of moderate to somewhat difficult) and light resistance training with 2- to 12-lb weight repetitions. Mindful living sessions and psychosocial support and counseling with SCAD peers, case managers, a social worker, and a psychiatrist were available. We reported our SCAD-CR program to be safe and beneficial in the first prospective cohort of 70 patients, with improvements in exercise capacity and psychosocial measures and reduction in chest pain post-SCAD. Furthermore, the long-term cardiovascular event rate was lower compared with patients

who did not participate in SCAD-CR (4.3% vs. 26.2%; $p < 0.001$). Interestingly, ~85% of our SCAD-CR patients were taking a beta-blocker, which may have played a role in the reduction of cardiovascular events. In addition, we routinely advise patients with SCAD to avoid intense isometric activities (avoiding weights >30 lbs) and competitive sports and to minimize emotional stress. We presume that the mechanisms of long-term benefits were additive from beta-blocker use, exercise rehabilitation, and avoidance of triggers.

Although the current available supportive data are limited, we agree with Dr. Krittanawong and colleagues that beta-blockers and CR should be routinely administered and recommended, respectively, after a SCAD event. Even though a SCAD-specific CR program is unavailable outside Vancouver, we believe that standard CR programs are still beneficial to patients with SCAD, with recommended modifications to exercise training and psychosocial support as outlined in our protocol.

*Jacqueline Saw, MD
Karin Humphries, DSc
G.B. John Mancini, MD

*Division of Cardiology
Vancouver General Hospital
2775 Laurel Street, 9th floor
Vancouver, British Columbia V5Z 1M9
Canada
E-mail: jsaw@mail.ubc.ca

<https://doi.org/10.1016/j.jacc.2017.10.058>

© 2018 by the American College of Cardiology Foundation. Published by Elsevier.

Please note: Dr. Saw has received unrestricted research grant support from the Canadian Institutes of Health Research, Heart & Stroke Foundation of Canada, University of British Columbia Division of Cardiology, AstraZeneca, Abbott Vascular, St. Jude Medical, Boston Scientific, and Servier; has received speaker honoraria from AstraZeneca, St. Jude Medical, Boston Scientific, and Sunovion; has received consultancy and advisory board honoraria from AstraZeneca, St. Jude Medical, and Abbott Vascular; and has received proctorship honoraria from St. Jude Medical and Boston Scientific. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

REFERENCES

1. Saw J, Starovoytov A, Zhao Y, Peng D, Humphries K. Clinical predictors of recurrent spontaneous coronary artery dissection. *J Am Coll Cardiol* 2017;69:273.
2. Chou AY, Prakash R, Rajala J, et al. The first dedicated cardiac rehabilitation program for patients with spontaneous coronary artery dissection: description and initial results. *Can J Cardiol* 2016;32:554-60.
3. Silber TC, Tweet MS, Bowman MJ, Hayes SN, Squires RW. Cardiac rehabilitation after spontaneous coronary artery dissection. *J Cardiopulm Rehabil Prev* 2015;35:328-33.
4. Krittanawong C, Tweet MS, Hayes SE, et al. Usefulness of cardiac rehabilitation after spontaneous coronary artery dissection. *Am J Cardiol* 2016;117:1604-9.