

MAYO CLINIC SPONTANEOUS CORONARY ARTERY DISSECTION (SCAD) RESEARCH PROGRAM

INTRODUCTION

Thank you for participating in the Mayo Clinic SCAD Research Program. Our research, including the "Virtual" Multicenter Spontaneous Coronary Artery Dissection Registry (NCT01429727) and the Genetic Investigations in SCAD (NCT01427179), would not be possible without your participation.

We still need you! Please notify our team about any medical or contact information updates. Your responses to follow-up surveys are invaluable for answering new and persistent SCAD research questions. We know that your time is valuable and we are incredibly grateful for the effort you take to respond to our research team. We also appreciate receiving updates from you about your health at <u>MayoSCAD@mayo.edu</u>. Let us know how you are doing, including if all is well. THANK YOU!

This newsletter focuses on recent progress, reflecting the significant impact of your participation. For more information about Mayo's current SCAD research, please visit <u>mayo.edu/research/SCAD</u>. For additional questions about Mayo Clinic or SCAD, go <u>here</u>. We



also have a Mayo Clinic SCAD <u>Facebook page</u> (please Share and Like us)!

Definition of SCAD and Initiation of a Research Program

SCAD is a cause of heart attack or sudden cardiac death due to a tear and/or blood pocket formation within the wall of the coronary arteries. When the SCAD occurs, blood flow to the heart is impaired, which can cause heart muscle injury. The severity of presentation and heart injury may vary among patients. Prior to 2009, SCAD was reported as case reports and autopsy series. The largest series included 42 patients. It was poorly defined and described as very rare and often fata!!

In 2009 Dr. Sharonne Hayes was approached by two patients with history of SCAD who inquired whether Mayo Clinic was and/or could conduct research on SCAD using a social networking platform. Dr. Hayes was intrigued by this idea. She engaged Drs. Marysia Tweet, Rajiv Gulati and Timothy Olson, and they worked together to create the "Virtual" Multicenter SCAD Registry (NCT01429727) and Genetics Investigation in SCAD (NCT01427179). They found that it was possible to confirm and study SCAD without having patients physically come to Rochester, MN. This work started with a pilot study of 12 patients and since then has evolved into an international Registry of over 1200 patients.

First Mayo Clinic Registry Paper. ncbi.nlm.nih.gov/pubmed/21878595



WHAT HAS CHANGED SINCE 2009?

Since 2009, the knowledge and research of SCAD has increased exponentially with patient-initiated research and advocacy; scientific and clinical collaborations; and reported series now including hundreds of SCAD patients. There have been important insights, enhanced awareness, changes in clinical approaches, and new hypotheses. There are growing efforts toward studying evidence and addressing unanswered questions. SCAD has been highlighted by WebMD, *Women's Health Magazine, Time Magazine*, NBC news, and others. Importantly, in 2018 two scientific consensus documents on SCAD have been published:

- American Heart Association
 <u>Scientific Statement</u> on SCAD
 ahajournals.org/doi/pdf/10.1161/CIR.00000000000564
- European Society of Cardiology
 <u>Position Paper</u> on SCAD
 academic.oup.com/eurheartj/article/39/36/3353/4885368

ONGOING MAYO CLINIC PROJECTS

- Why does SCAD recur and who is at risk?
- · Is there a way to prevent SCAD?
- · Stress, mental health and quality of life after SCAD
- Pregnancy after SCAD
- Cardiac arrest
- Qualitative study of narratives written by SCAD patients
- · Autoimmune diseases and SCAD
- Atrial fibrillation and SCAD
- Physical activity after SCAD
- Novel SCAD Imaging
- Genetic Studies and Novel Gene Discovery

FREQUENTLY ASKED QUESTIONS

Frequently asked questions can be found at mayo.edu/research/centers-programs/ spontaneous-coronary-artery-dissection-scad/ about/questions-answers







Current Status of the Mayo Clinic SCAD Research Program

To date, we have enrolled **over 1200 participants** with confirmed SCAD (about 100 "in process"). Enrollment has included imaging and medical record review, collection of questionnaires, personal narrative, biospecimen collection, and echocardiography. We have collected **over 1607 bio-specimens** for DNA extraction and genetic research including more than **1053** from those with history of SCAD and **554** from family members. Analysis of these samples is underway including whole genome sequencing (WES) aimed at discovery of novel genome candidates and genome wide association studies (GWAS) to discover SCAD-associated genetic variants.

Since 2011, our Mayo Clinic SCAD Research team has <u>published</u> more than 40 peer-reviewed manuscripts and presented over 30 abstracts/presentations/ posters at scientific meetings. Dr. Hayes was the chair of the writing group for the <u>AHA Scientific Statement</u> on SCAD, with Drs. Tweet and Gulati as co-authors.

Our team has a growing Mayo Clinic SCAD Clinic in which we care for local SCAD patients and those seeking referral. In addition to the research based on the Mayo Clinic SCAD Registry, ongoing research projects include the <u>Rochester Epidemiology Project</u> and prospective novel studies.

We have incorporated SCAD practice and research updates into numerous internal and external continuing medical education sessions so as to teach other medical professionals about the best practices to diagnose, treat, and advise SCAD patients.

For more information about Mayo's current SCAD research, please visit our <u>website</u>. For additional questions about Mayo Clinic or SCAD, go <u>here</u>. Visit



our Mayo Clinic SCAD <u>Facebook page</u> (please Share and Like us)!

NEW KNOWLEDGE SINCE 2009

Large series of SCAD patients, increased awareness, and your participation has contributed to some important research findings:

Most SCAD occur in middle-aged women without usual cardiac risk factors.

Men and women may have different risk factors for SCAD.

Abnormalities of arteries such as aneurysms, dissections, and fibromuscular dysplasia in other locations are observed in the majority, and all patients with SCAD should have at least a one-time head to pelvis imaging (computed tomography angiography [CTA] or magnetic resonance angiography).

Most SCAD (99%) is NOT familial, and the genetic underpinnings are complex. However, PHACTR1 and TLN1 have been observed as potential important targets for future SCAD genetic studies.

About 5–8% of patients have an inherited connective tissue disease (e.g., Marfan, Ehlers-Danlos, Loeys-Dietz) that is associated with SCAD. Since these diseases could impact future care, usually patients meet a geneticist to consider testing for these.

SCAD can occur again in approximately 10–20% of patients. The rate of recurrence, factors which contribute to risk of recurrence and how to prevent recurrence are research priorities.

SCAD can heal without treatment and therefore in some can be managed without a stent or surgery. However, for some patients, a stent or surgery may be necessary. For those managed without a stent or surgery, inpatient monitoring for early worsening of SCAD is important.

Symptoms such as chest discomfort are frequent after SCAD. While such symptoms warrant evaluation, some patients will have symptoms even if the SCAD has healed.

Some women experience symptoms associated with menstruation.

Cardiac rehabilitation after SCAD is beneficial.

Migraine headaches are frequent among those with history of SCAD.

Post-traumatic stress disorder, anxiety and depression are common among those with SCAD and should be addressed if present.



Locations where arterial abnormalities may be found. Citation: Tweet MS, Kok SN, Hayes SN: Spontaneous coronary artery dissection in women: what is known and what is yet to be understood. Clin Cardiol. 2018 Feb 4; 41 (2): 203-210. doi: 10.1002/clc.22909. Epub 2018 Mar 1, for which Mayo Foundation for Medical Education and Research holds copyright.

https://onlinelibrary.wiley.com/doi/full/10.1002/clc.22909

Genetic Locus Associated With Spontaneous Coronary Artery Dissection



Our genetics team, led by Dr. Timothy Olson, in collaboration with international researchers including Drs. David Adlam, Nabila Bouatia-Naji and others observed that the genetic variant rs9349379-A allele is associated with fibromuscular dysplasia and spontaneous coronary artery dissection, a discovery which reveals genetic underpinnings and potential mechanisms for SCAD. Republished with permission of Elsevier, Inc, from Adlam D, Olson T, Combaret N et al. Association of the PHACTR1/EDN1 genetic locus with spontaneous coronary artery dissection. JACC. 2019;73(1):58-66; permission conveyed through Copyright Clearance Center, Inc.

https://www.sciencedirect.com/science/article/pii/ S0735109718390326?via%3Dihub



Our genetics team found a genetic variant in the TLN1 gene, which encodes an important cytoskeletal protein in the coronary arteries that may contribute to SCAD.

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https://www.ahajournals.org/doi/10.1161/ CIRCGEN.118.002437



Acknowledgements

We would like to acknowledge the significant financial support by <u>SCAD Research, Inc</u>, with a cumulative funding support of \$969,300 since 2011. This has been imperative for sustaining the program and initiating novel projects with a focus on supporting the genetics research. Our research has also been financially supported by the Mayo Clinic Department of Cardiovascular Medicine, and the National Institutes of Health Office of Research of Women's Health (BIRCWH Scholar Program, HD65987 MTweet). The vast majority of work performed by the Mayo Clinic SCAD team physicians such as coronary angiogram review, data review/analysis, grant writing, development of educational materials, and review/writing of manuscripts is conducted during personal time.





Mayo Clinic SCAD Team

Cardiovascular Medicine

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Radiology

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Core Facilities

BAP I ab Medical Genome Facility Sequencing, Genotyping Bioinformatics Mayo Genome Consortium



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Mayo Clinic SCAD Clinic Appointment Information Appointment Coordinator: 507-538-6308

Mayo Clinic SCAD Research page Mayo.edu/Research/SCAD

Information about Mayo Clinic's current SCAD research for patients, research participants and health care providers, including links to Mayo Clinic SCAD publications.

Mayo Clinic SCAD Patient Information page

mayoclinic.org/spontaneous-coronary-arterydissection/

Patient care and health information page discussing SCAD symptoms and causes, diagnosis and treatment, doctors and departments, and care at Mayo Clinic.

Mayo Clinic SCAD Facebook page (Please share and "Like" us)

facebook.com/SCADMayoClinic

Closed Facebook support group for SCAD survivors (Hosted by survivors, not Mayo Clinic) facebook.com/groups/SCADsupport/

SCAD Research, Inc. scadresearch.org

SCAD Research, Inc. Facebook page facebook.com/SCADResearchInc/

SCAD Angels Facebook (For family members of someone who did not survive SCAD) https://m.facebook.com/groups/135852273695551

Online community of WomenHeart: The National **Coalition for Women with Heart Disease** WomenHeart.org

Information and support for women living with heart disease, including an online patient community hosted by Inspire with many SCAD survivor members. Annual education program at Mayo Clinic to train women with heart disease has included many with history of SCAD.