Published in final edited form as:

JACC Adv. 2023 December ; 2(10): . doi:10.1016/j.jacadv.2023.100714.

Pregnancy After Spontaneous Coronary Artery Dissection: Counseling Patients Who Intend Future Pregnancy

Marysia S. Tweet, MD, MS[a], **Sharonne N. Hayes, MD**[a], **Anna Beatrice G. Grimaldo, BS**[b], **Carl H. Rose, MD**[c]

[a]Department of Cardiovascular Medicine, Mayo Clinic College of Medicine, Rochester, Minnesota, USA;

[b]Mayo Clinic Alix School of Medicine, Mayo Clinic College of Medicine, Rochester, Minnesota, USA;

[c]Division of Maternal Fetal Medicine, Department of Obstetrics and Gynecology, Mayo Clinic College of Medicine, Rochester, Minnesota, USA.

Keywords

acute coronary syndrome; fibromuscular dysplasia; myocardial infarction; pregnancy; spontaneous coronary artery dissection; women

BACKGROUND

Spontaneous coronary artery dissection (SCAD) is an uncommon but increasingly recognized etiology of acute coronary syndrome and cardiac death in the premenopausal female population.

Female sex hormones likely influence SCAD, although the exact pathophysiologic mechanisms are not presently understood.[1,2] Specifically, most SCAD patients are women, SCAD events are associated with both the pregnant and postpartum states, and a subgroup of SCAD patients experience angina that correlates with menses.[1,2] Consequently, after a diagnosis of SCAD, women of childbearing age are routinely counseled to avoid future pregnancy, recognizing that this can be a devastating recommendation for younger women who intend to have children or conceive unintentionally.

RATIONALE FOR RECOMMENDATION TO AVOID PREGNANCY

Based on historical epidemiological data, our clinical practice has generally been to discourage subsequent pregnancy, consistent with the 2018 American Heart Association

ADDRESS FOR CORRESPONDENCE: Dr Marysia S. Tweet, Department of Cardiovascular Diseases, Mayo Clinic College of Medicine, 200 First Street SW, Rochester, Minnesota 55905, USA. tweet.marysia@mayo.edu.

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SCAD Scientific Statement consensus,[1] and there are several valid reasons for this. First, SCAD recurrence rates range from the recent report of 2.1% at 36 months[3] to prior studies describing as high as 22% at 34 months.[4] Second, there is no effective manner to predict SCAD recurrence or severity for individual patients, and thus preventative strategies remain inherently limited. Furthermore, multiple studies have shown that SCAD in a patient who is either pregnant or postpartum is more severe as compared to other SCAD patients[5]; this includes a higher prevalence of multivessel disease, left main involvement, and cardiac failure.[5–7] Concurrent fibromuscular dysplasia, common among SCAD patients, may confer additional obstetrical risks of gestational hypertension (25%), pre-eclampsia (7.5%), and preterm delivery (20%).[8]

However, the data supporting the recommendation to avoid pregnancy—which is based on level III evidence—remain limited. Three studies in the published literature describe a total of 78 pregnancies in 59 patients after SCAD (Table 1)[6,7,9]; many of these mothers were older (median age 38 years), with normal or near-normal left ventricular function, and 36% had a prior pregnancy-associated SCAD. From a cardiovascular perspective, most subsequent pregnancies were uncomplicated; however, 5 of the 59 women (8%; 6% of 78 pregnancies) experienced recurrent SCAD myocardial infarction within a year postpartum. Collectively, these findings suggest that while the majority of women may tolerate pregnancy after SCAD, it is not without a degree of risk. Furthermore, generalizability of the existing published series to the entire spectrum of SCAD patients who are of reproductive age is uncertain.

OUR APPROACH TO WOMEN WHO BECOME PREGNANT AFTER SCAD

Some women who have recovered from SCAD express a desire for continued childbearing. In these situations, we have suggested the option of adoption to obviate potential maternal and fetal risks. However, not all patients find this an acceptable alternative. For patients referred to our practice expressing an interest in pregnancy or already pregnant, we engage a multidisciplinary Pregnancy Heart Team to comprehensively evaluate their current status to determine candidacy for pregnancy and counsel accordingly; ideally, this occurs prior to conception.

During these visits, details of the patient's cardiac and obstetric history, imaging assessment of arteriopathy elsewhere in the circulatory system, and contemporary echocardiographic cardiac function are carefully assessed. Patients are advised to wait at least 1 year after myocardial infarction prior to proceeding with a pregnancy and ideally have recovered ventricular systolic function without residual cardiopulmonary symptoms. Exercise stress studies with concurrent cardiac and/or coronary imaging are administered to patients with reduced ventricular function or persistent cardiopulmonary symptoms to refine individual risk profiles. Results are collectively interpreted in the context of anticipated physiologic circulatory demands a pregnancy would impose, at times objectively adding further reason to avoid future pregnancy. The medication list is also reviewed with a preference to continue beta-blockers and medication modification if necessary if the patient is hypertensive. Medications are adjusted as necessary to avoid teratogenic exposures. Minimal data exist

regarding the safety of assisted reproductive techniques (such as ovarian stimulation for a gestational carrier), and the relative risk is unknown in comparison to a term pregnancy.

If a woman elects to conceive, routine prenatal care is initiated during the first trimester including monitoring blood pressure, with early ultrasound to determine fetal viability, number, and establish gestational age. Baseline maternal echocardiography is performed at 8 to 12 weeks gestation. Fetal anatomic survey ultrasound is performed at 18 to 20 weeks, with empiric imaging every 4 weeks thereafter to monitor fetal growth. Repeat maternal echocardiography with cardiology and anesthesiology consultations are obtained at 30 to 32 weeks, followed by multidisciplinary review by the Pregnancy Heart Team (cardiology, anesthesiology, obstetrics) at 32 to 34 weeks to review timing and method of delivery, in conjunction with ancillary resource contingencies. Depending on maternal status, delivery is usually recommended at 39 to 40 weeks, ideally at a level III/IV maternal care center[10] with immediate access to a catheterization laboratory. The method of delivery is typically dictated by standard obstetrical indications, with preference for planned vaginal delivery.

During labor, we have recommended early administration of neuraxial anesthesia to reduce the catecholamine-mediated tachycardia in response to pain, with permissive descent (delayed Valsalva) in the second stage of labor. Obstetrical management is otherwise straightforward, with avoidance of terbutaline and methylergonovine to reduce provoking tachycardia and coronary arterial vasospasm, respectively. Presuming uncomplicated antepartum and intrapartum courses, patients are transferred to the routine postpartum floor, with prompt evaluation should any cardiopulmonary symptoms occur. Lactation appears to be permissible, except in the subset of patients in whom this precipitates anginal symptomatology. Following discharge, return evaluations are scheduled with both obstetrics and cardiology to review clinical status, exam, and monitor blood pressure, with medication adjustment as needed.

CONCLUSIONS

Emerging experiential data regarding a subgroup of women with a history of SCAD who have tolerated subsequent pregnancy without recurrence is cautiously encouraging; however, we do not yet have reliable factors to predict SCAD recurrence. Our current practice remains to counsel all women with a history of SCAD who are of childbearing age to avoid future pregnancies, cognizant this advice is based on observations of severe pregnancy-associated SCAD and SCAD recurrence.

ACKNOWLEDGMENTS

The authors acknowledge Drs Sahar Naderi and David Adlam for sharing additional details regarding the Chen et al[6] and Chan et al[7] cohorts, respectively, for the Table 1.

FUNDING SUPPORT AND AUTHOR DISCLOSURES

Dr Tweet is supported by the NIH NHLBI K23HL155506 Award. The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

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TABLE 1

Summary of Published Series of Women With Pregnancy After SCAD

	Chen et al, 2021	Tweet et al, 2020	Chan et al, 2022	Cumulative
Total women with pregnancy after SCAD	8	23	28	59
Total pregnancies	9	32	37	78
Maternal age, y	37 (35–42)	38 (34–40)	NR[a]	38 (35–41)
History of P-SCAD	2/8 (25)	7/23 (30)	12/28 (43)	21/59 (36)
FMD	2/8 (25)	6/23 (26)	4/28 (14)[b]	12/59 (20)
LVEF	Not reduced	≥54%	NR[c]	
Time in months to conception	24 (30)	18 (11)	30 (25.5)	
Median gestational age at delivery, wk	37.7[d]	NR[d]	39	
Miscarriage	0/9 (0)	11/32 (34)	7/37 (19)	18/78 (23)
Termination	2/9 (22)	1/32 (3)	3/37 (8)	6/78 (8)
Vaginal delivery	6/7 (86)	12/20 (60)	16/27 (59)	34/54 (63)
C-section	1/7 (14)	8/20 (40)	11/27 (41)	20/54 (37)
Breast feeding	6/7 (86)	15/20 (75)	16/27 (59)[e]	37/54 (69)
Recurrent SCAD ACS within 12 mo of pregnancy	1/9 (11)	1/32 (3)	3/37 (8)	5/78 (6)
Time to follow-up after pregnancy, y	6 (1.9–8.13)[f]	4.3 (2.4–8.9)	NR	
MACE	2/8 (25)	2/23 (9)	3/28 (11)	7/59 (12)
Death	0	0	0	0

Values are n, median (IQR), or n/N (%).

[a] Median (IQR) age at SCAD diagnosis in this cohort was 36 (6) years.

[b] Prevalence of extracoronary arteriopathy; data are missing for 1 patient.

[c] Among 24 patients (31/37 pregnancies), the left ventricular ejection fraction for 2 patients was below 50% at the time of conception (43% and 46%).

[d] All but 1 patient in each cohort was to term at the time of delivery.

[e] Data missing for 2 patients.

[f] Follow-up not reported for 2 patients.

ACS = acute coronary syndrome; FMD = fibromuscular dysplasia; LVEF = left ventricular ejection fraction; MACE = major adverse cardiovascular events; NR = not reported; P-SCAD = pregnancy-associated SCAD; SCAD = spontaneous coronary artery dissection.