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Review Article

Spontaneous Coronary Artery Dissection in Postpartum Women: A Review of Published Cases

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Abstract

Background: Spontaneous coronary artery dissection separates the coronary wall without atherosclerosis, and the pregnancy-associated form affects young women presenting when attention is directed at obstetric rather than coronary diagnoses.

Objective: To summarise what the published record shows about its timing, phenotype and management, and whether treating it as atherosclerotic infarction is justified.

Methods: Narrative review of published cohort studies, registries, systematic reviews and individual case reports.

Findings: Across 316 pooled published cases, 249 (79.6%) occurred after delivery. Pregnancy-associated cases presented with ST elevation more often than non-pregnancy cases, 57% versus 36%. In unselected cohorts not restricted to pregnancy, percutaneous intervention failed in 53% of 95 revascularisation patients, whereas 85 of 94 managed conservatively had an uneventful course.

Conclusions: The published record supports conservative management wherever flow and haemodynamics allow, with revascularisation reserved for instability; it does not support routine intervention, and no randomised comparison exists.

Keywords: Spontaneous coronary artery dissection; Pregnancy; Postpartum period; Myocardial infarction; Conservative management

Introduction

Spontaneous coronary artery dissection is separation of the layers of the coronary arterial wall that is not caused by atherosclerosis, trauma or iatrogenic instrumentation. Blood accumulates within the wall as an intramural haematoma and compresses the true lumen from outside, so ischaemia arises without plaque rupture and without primary thrombus. The distinction matters because almost every reflex of contemporary infarct care, from potent antiplatelet loading to immediate stenting of the culprit lesion, was designed for a disease with a different mechanism [1,2].

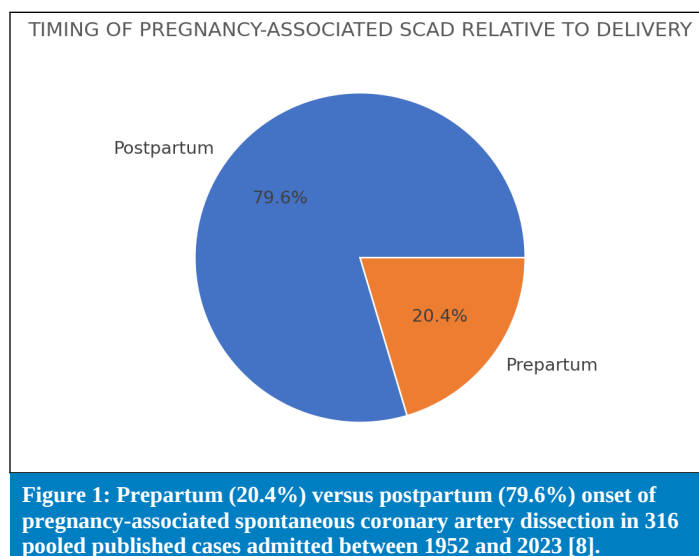
Pregnancy-associated spontaneous coronary artery dissection, abbreviated P-SCAD, is the subset occurring during pregnancy or in the months after delivery. It is repeatedly described as a leading mechanism of myocardial infarction in pregnant and recently delivered women, unlike the atherosclerotic mechanism that dominates infarction in older populations [3]. The women affected are young, usually without conventional coronary risk factors, and present when clinical attention is directed at obstetric rather than coronary diagnoses [4].

This article reviews the published record of cohort studies, registries, systematic reviews and individual case reports; it reports no patient of the authors. Its argument is that P-SCAD is not a variant of atherosclerotic myocardial infarction and must not be managed as one, and that the strongest evidence for that position is the observed behaviour of the coronary artery when it is instrumented.

Epidemiology and Timing Relative to Delivery

How large a share of all spontaneous coronary artery dissection is pregnancy-associated depends on how patients reach the reporting centre. In a single-centre referral cohort, 54 of 323 patients were pregnant, post-miscarriage or postpartum at the time of the event (16.7%) [5]. In a multicentre registry restricted to women with one or more prior pregnancies, 98 of 907 had

pregnancy-associated disease (10.8%) [6]. In a prospective national cohort, peripartum status accounted for 4.5% of predisposing conditions [7]. The spread across these denominators is wide and almost certainly reflects referral bias in specialty-clinic series, so the defensible statement is a range rather than a single figure.



Age separates this group sharply from the rest. Median age at the pregnancy-associated event was 36.7 years, interquartile range 33.7 to 39.1, against a median of 49.2 years at first dissection for the whole registry cohort of 907 women [6]. Pooled individual patient data from 253 published studies covering 316 patients admitted between 1952 and 2023 give a median age of 34 years [8].

Most events follow delivery rather than precede it. In those same 316 pooled published cases, 64 (20.4%) occurred before delivery and 249 (79.6%) after it [8]. The risk is front-loaded: 35 of 50 events with recorded timing in the referral cohort fell within the first month after delivery [5]. A multicentre series of 13 found 12 in the puerperium at a median of 10 days after delivery, the single antepartum case being the only death [9]. The tail is nevertheless long: in a registry series of 11 pregnancy-associated cases among 83 women with prior pregnancy, events occurred between 2 and 32 weeks after

delivery [10]. Chest pain months after delivery does not exclude the diagnosis.

A Distinct Clinical and Angiographic Phenotype

The pregnancy-associated form is more severe than dissection outside pregnancy. Comparing 54 pregnancy-associated with 269 non-pregnancy cases in one cohort, ST-elevation infarction occurred in 57% versus 36% (p=0.009), left ventricular ejection fraction of 35% or less in 26% versus 10% (p=0.0071), left main or multivessel dissection in 24% versus 5% (p<0.0001) and multivessel disease in 33% versus 14% (p=0.0027) [5]. A meta-analysis of 14 studies including 2145 women of generative age found pooled odds of ST-elevation presentation for pregnancy-associated versus non-pregnancy disease of 3.16 (95% CI 2.30-4.34) and of left main involvement of 14.34 (95% CI 7.71-26.67), with pooled left main involvement of 5.9% (95% CI 3.1-8.8) [11]. In the 316 pooled published cases the left anterior descending artery was affected in 74.4%, dissection was multivessel in 45.2% and 72.6% presented with ST elevation [8].

The acute course is correspondingly unstable. Cardiac arrest was recorded in 18.4% and cardiogenic shock in 16.1% of the 316 pooled cases [8]; one-third of a 13-patient series presented in cardiogenic shock [9]. In the prospective national cohort, in-hospital major adverse events occurred in 20.6% of peripartum patients versus 8.2% of the remainder (p=0.023), and peripartum status independently predicted 30-day major adverse cardiac events [7].

Table 1: Pregnancy-associated (P-SCAD) versus non-pregnancy (NP-SCAD) spontaneous coronary artery dissection, 54 versus 269 patients in a referral cohort [5], 98 versus 809 in a multicentre registry [6] and pooled odds ratios across 2145 women of generative age [11].				
Variable	P-SCAD	NP-SCAD	Comparison	Source
STEMI at presentation	57%	36%	p=0.009	tweet2017
Left main or multivessel	24%	5%	p<0.0001	tweet2017

Variable	P-SCAD	NP-SCAD	Comparison	Source
LVEF 35% or less	26%	10%	p=0.0071	tweet2017
Fibromuscular dysplasia	31%	45%	p=0.01	koczo2026
Pre-eclampsia	25%	13%	p=0.001	koczo2026
Left main involvement	-	-	OR 14.34 (7.71-26.67)	apostolovic2024
Bypass grafting	-	-	OR 6.29 (4.08-9.70)	apostolovic2024

Predisposing features also differ. Fibromuscular dysplasia, the commonest arteriopathy in unselected dissection cohorts, is less frequent in the pregnancy-associated group: 42% versus 64% (p=0.047) in the cohort of 54 versus 269 [5] and 31% versus 45% (p=0.01) in the registry of 907 [6]. A single-registry series of 11 cases reported the opposite direction without significance, its authors calling the finding hypothesis-generating [10]. The obstetric associations are more consistent: assisted reproductive technology in 26% versus 12% and pre-eclampsia in 25% versus 13% (p=0.001) in the registry [6], and pre-eclampsia in 27.3% versus 1.4% (p<0.01) in the smaller series [10].

Why the Angiogram Misleads

The commonest angiographic appearance is not a visible dissection flap. In an unselected cohort of 168 patients with spontaneous coronary artery dissection, type 2 disease, a long smooth narrowing produced by intramural haematoma with no dual lumen, accounted for 67.0%; the classic type 1 appearance of contrast staining and a visible false lumen accounted for 29.1%, and focal type 3 lesions that mimic atherosclerosis for 3.9% [12]. No comparable type-by-type breakdown specific to pregnancy-associated disease has been published, so these proportions describe the unselected population and should be cited as such. What they establish is that most dissections do not look like dissections, and that an angiogram read with atherosclerotic expectations yields either a tight stenosis apparently warranting a stent or an unremarkable study.

Both errors appear in the published cases. In one report a woman with lateral ST elevation on the first postpartum

day had complete occlusion of the proximal left anterior descending and circumflex arteries, and intravascular ultrasound showed intramural haematoma compressing the true lumen with no dissection flap, that is type 2 disease [13]. In another, a woman six weeks after her third delivery had an initial invasive coronary angiogram reported as normal; cardiac magnetic resonance showed extensive scar, and repeat angiography with intravascular imaging then visualised the dissection [14].

The practical implications are consistent across published recommendations: a low threshold for angiography in a young postpartum woman with chest pain and biomarker rise, careful low-pressure engagement, a defined angiographic classification applied deliberately rather than by pattern recognition, and intracoronary imaging or repeat angiography when the study does not explain the infarct [15,1,4].

Revascularisation Fails More Often Than It Helps

Percutaneous intervention in a dissected coronary artery behaves unlike intervention in a plaque. Guidewires enter false lumens, balloon inflation propagates the haematoma, and stents deployed into an already separated wall extend the dissection at either edge. In a retrospective series of 189 first dissection episodes comprising 95 revascularisation and 94 conservatively managed patients, procedural failure occurred in 53% of those taken for percutaneous intervention. Failure occurred in 50% even in the subgroup whose vessel had preserved flow at presentation, and 6 of those patients (13%) required emergency coronary artery bypass grafting [16]. In a prospective national cohort in which 84.3% were managed conservatively, 14.1% underwent percutaneous intervention and 0.7% surgery, 30.1% of percutaneous procedures were unsuccessful [7].

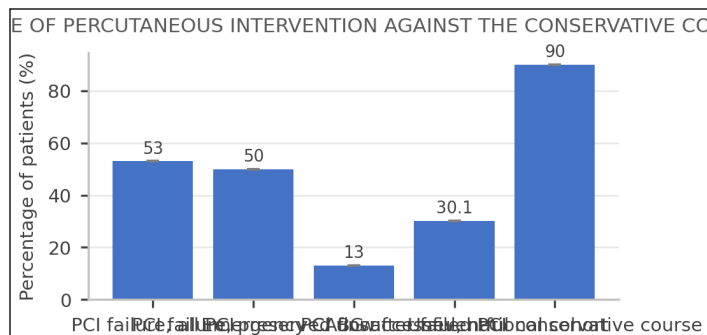


Figure 2: Procedural failure of percutaneous coronary intervention in spontaneous coronary artery dissection, 53% overall and 50% with preserved flow with emergency bypass grafting in 13%, in 189 first episodes [16], 30.1% unsuccessful percutaneous procedures in a prospective national cohort [7], and an uneventful in-hospital course in 85 of 94 conservatively managed patients (90%) [16].

The comparator is the untouched artery. Of the 94 conservatively managed patients in that series, 85 (90%) had an uneventful in-hospital course and 9 (10%) had early progression requiring revascularisation [16]. In the 168-patient angiographic cohort, all 79 conservatively managed patients who underwent repeat angiography 26 days or more after presentation showed spontaneous healing, and only 3 of 134 conservatively managed patients required revascularisation for extension of the dissection [12]. Spontaneous angiographic healing is the expected natural history rather than a fortunate exception [17].

Longer follow-up does not rescue the interventional strategy: five-year target vessel revascularisation was 30% after revascularisation versus 19% after conservative management ($p=0.06$), and five-year recurrent dissection 23% versus 31% ($p=0.7$) [16]. No randomised comparison exists in this disease, and observational comparisons are confounded by indication, since occluded vessels were more common in the revascularised arm. The defensible reading is not that intervention causes harm but that it fails frequently and has not been shown to protect against repeat revascularisation or recurrence.

Practice in pregnancy-associated disease has nevertheless remained more interventional. Initial management in the 316 pooled published cases was medical in 54.8% and

upfront revascularisation in 45.2% [8]. The meta-analysis of 2145 women found non-pregnancy cases more often managed conservatively than pregnancy-associated cases, odds ratio 0.61 (95% CI 0.37-0.98), and surgery far more frequent in the pregnancy-associated group, odds ratio 6.29 (95% CI 4.08-9.70) [11]; a registry series reported bypass grafting in 18.2% versus 1.6% ($p<0.05$) [10]. Part of that excess reflects anatomical necessity, since left main and multivessel involvement are far more common here.

Evidence from Published Cases

Individual reports supply detail that pooled proportions cannot. In a series of six previously healthy women aged 27 to 39 presenting 1 to 75 days after delivery, the left main was involved in five of six; two received stents, two underwent bypass grafting and two were managed medically, and the single death was diagnosed at autopsy [18]. A multicentre series of 13 women with a mean age of 33.8 years, mostly multiparous and without conventional risk factors, described dissection of the left anterior descending or circumflex arteries in 12 [9].

Where instrumentation was attempted in an unstable left-sided lesion, the reports document rapid deterioration: one woman destabilised during percutaneous intervention and proceeded to bypass grafting, surviving with moderate to severe residual left ventricular impairment [13], and another with left main occlusion from extensive intramural haematoma and cardiogenic shock had flow restored only by decompressing the haematoma with cutting balloons as a bridge to emergency surgery [19]. Where the anatomy permitted waiting, outcomes were good: three postpartum women presenting between 12 days and 5 months after delivery, one after out-of-hospital cardiac arrest and one with multivessel disease that progressed and recurred, were all treated conservatively and in good condition at latest follow-up [20].

Antepartum reports show the same reasoning under

obstetric constraint. A woman at 37 weeks with type 2 dissection of the left anterior descending filling retrogradely from the right coronary artery underwent caesarean section first and deferred on-pump beating-heart bypass grafting to day 2 because of bleeding risk [21]; a woman at 36 weeks with three-vessel dissection was delivered by emergency caesarean and then managed conservatively to discharge [22]. A nulliparous woman at 11 weeks had a concurrent right vertebral artery dissection and required bypass grafting when her coronary dissection extended four days after presentation [23]. A further case reported from a limited-resource setting concerns a 41-year-old woman; the accessible record establishes age and peripartum timing but not vessel, management or outcome [24].

Table 2: Published cases and case series of pregnancy-associated spontaneous coronary artery dissection reviewed here [18,9,13,19,20,14,23,24]; N = 8 reports covering 27 women.				
Report	Age / parity	Timing	Vessel	Management and outcome
Rose 2017, n=6	27-39 / not stated	1-75 days postpartum	Left main in 5 of 6	2 stent, 2 CABG, 2 medical; 1 death (autopsy)
Cade 2017, n=13	mean 33.8 / mostly multiparous	12 of 13 puerperal, median 10 days	LAD or LCx in 12	Not stated per case; 1 death, the antepartum case
Igbokwe 2021	30 / second pregnancy	day 1 postpartum	Proximal LAD and LCx, type 2	Destabilised at PCI, rescue CABG; survived, LV impairment
Mailey 2022	30 / not stated	day 1 postpartum	Left main, occlusive haematoma	Cutting-balloon decompression as bridge to emergency CABG
Wurdinger 2024, n=3	not stated / not stated	12 days to 5 months postpartum	Multivessel in one	Conservative in all; all well at follow-up
Haney 2024	37 / third delivery	6 weeks postpartum	LAD, first angiogram normal	PCI with stenting; LV function normalised at 3 months
Price 2025	not stated / nulliparous	11 weeks gestation	Coronary plus right vertebral artery	CABG for dissection extension; delivered at 33+4 weeks

Report	Age / parity	Timing	Vessel	Management and outcome
Yao 2023	41 / not stated	peripartum, not further stated	not stated	not stated

Recurrence, Subsequent Pregnancy and Counselling

Recurrence appears to be a property of the arteriopathy rather than of the index treatment. Kaplan-Meier five-year recurrence was 14.8% among 636 women of childbearing potential [25], and pooled recurrence across studies of 2145 women of generative age was 15.2% (95% CI 9.1-21.3), with no significant excess in pregnancy-associated cases, odds ratio 2.54 (95% CI 0.97-6.61) [11].

Across three published series pooling 78 pregnancies in 59 women, 5 of 59 (8%), equivalent to 5 of 78 pregnancies (6%), had recurrent dissection with infarction within 12 months of pregnancy; major adverse cardiac events occurred in 7 of 59 (12%) and there were no deaths. Miscarriage occurred in 18 of 78 pregnancies (23%) and vaginal delivery in 34 of 54 (63%) [26]. In a matched analysis, exposure to a subsequent pregnancy did not differ between women with and without recurrence, 2 of 92 (2%) versus 13 of 158 (8%), p=0.06, with an adjusted hazard ratio of 0.38 (95% CI 0.09-1.6) [25]. The risk is real but the data do not support advising universally against future pregnancy.

Published outcomes have improved as management has shifted. Across five decades of reports, maternal mortality fell from 85% in the earliest to 4% in the most recent decade (p<0.0001) and fetal mortality from 50% to 0.0% (p=0.023), alongside more emergent angiography, less thrombolysis and less surgical management [27]. Contemporary pooled mortality is 4.1% in 316 published cases [8] and 3.3% (95% CI 1.4-5.1) in the meta-analysis of 2145 women [11].

Conclusion

The published record describes a disease of young, recently delivered women whose coronary arteries dissect without atherosclerosis, most often within a month of delivery, most often in the left anterior descending artery, and disproportionately in the left main or in several vessels at once. It presents more severely than dissection outside pregnancy and is treated more aggressively, yet the same record shows percutaneous intervention failing in roughly half of attempts while conservatively managed vessels heal almost uniformly on repeat angiography. Managing this disease as though it were atherosclerotic infarction imports a technique the anatomy defeats. The reasonable default is prompt angiography with the angiographic classification deliberately applied, intracoronary imaging or repeat angiography when the study does not explain the infarct, conservative management wherever flow and haemodynamics allow, and revascularisation reserved for ongoing ischaemia, left main involvement or haemodynamic instability.

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