



# 3<sup>rd</sup> Annual Women's Cardiovascular Symposium

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## Abstract Submission Form

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### Disclosures:

No financial disclosures.

## Abstract Topic (must be gender- or sex-specific)

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|--|---|---|
| <input type="checkbox"/> Preventative cardiology       | <input type="checkbox"/> General cardiology     | <input type="checkbox"/> Interventional cardiology            |
| <input type="checkbox"/> Heart failure                 | <input type="checkbox"/> Cardio-oncology        | <input type="checkbox"/> Cardio-obstetrics                    |
| <input type="checkbox"/> Electrophysiology             | <input type="checkbox"/> Cardiovascular Imaging | <input checked="" type="checkbox"/> Coronary Microvasculature |
| <input type="checkbox"/> Social Determinants of Health | <input type="checkbox"/> Mental Health          | <input type="checkbox"/> Precision Medicine                   |

**Title:** Assessment of Clinical Presentation for Patients with Angina and Non-Obstructive Coronary Artery Disease and a History of Adverse Pregnancy Outcomes.

## Background:

Angina with non-obstructive coronary artery disease (ANOCA) affects nearly 4 million individuals in the US alone, nearly 70% of which are women. Adverse pregnancy outcomes (APO) complicate roughly 30% of all pregnancies and include hypertensive disorders of pregnancy (HDP, including gestational hypertension, pre-eclampsia and HELLP), gestational diabetes mellitus (GDM), preterm delivery, and low birth weight. History of APO is associated with two-fold higher odds of cardiovascular disease and adverse cardiac remodeling up to 10 years following pregnancy. However, the relationship between APO history and angina symptoms in an ANOCA population remains unknown. The purpose is to compare clinical characteristics, angina symptoms, and coronary microvascular dysfunction (CMD) prevalence between patients with ANOCA/INOCA and a history of APO.

**Methods:** Utilizing the WHC prospective registry, we compared female ANOCA patients with a history of one or more pregnancy with APO to those with normotensive pregnancy history (NTP) that underwent coronary functional angiography (CFA) for diagnosis of CMD. We assessed differences in clinical characteristics, symptoms utilizing validated questionnaires (DASI, UCSD SOB, SAQ7, PSS) and CFA findings (endothelial dependent, endothelial independent, spasm).

**Results:** 199 patients had ANOCA with a history of APO (ANOCA+hxAPO) and 482 patients had ANOCA with a history of NTP (ANOCA+ hxNTP). Patients with ANOCA+hxAPO were younger (Median age =53,  $P<0.001$ ), had higher BMI (mean=31.6, SD,  $P=0.001$ ) and had a higher prevalence of diabetes (23%,  $P=0.013$ ) compared to ANOCA+hxNTP. Patients with ANOCA+hxAPO had lower SAQ-7 scores (Median= 40.8) compared to ANOCA+hxNTP (Median=45.8, consistent with worse function compared and more severe angina ( $P= 0.045$ , Table 1). Additionally, ANOCA+hxAPO had higher perceived stress score using the PSS questionnaire (Median= 13) compared to NTP (Median=12,  $P=0.011$ , Table 1). There were no significant differences between the groups CFA outcomes.

## Conclusions:

History of APO is associated with worse anginal symptoms and perceived stress at a younger age compared to ANOCA counterparts with a NTP history. There were no differences in CFA findings in this population. This supports APO as an important sex specific risk factor for angina presentation in women with ANOCA.

**Tables/Figures/Graphics:** Include images that are part of your submission here. Images should be high resolution and have a file type of “gif”, “jpg”, or “jpeg”.

Demographics	ANOCA+hx NTP (N=482)	ANOCA+hx APO (N=199)	p-value
Age (median)	63	53	<0.001
Race/Ethnicity (%)			
White	411 (85)	172 (86)	0.694
Black	45 (9)	23 (12)	0.379
Hispanic/Latino	9 (2)	4 (2)	1.00
<b>Pregnancy Characteristics</b>			
Parity (%)			0.162
1	98 (20)	52 (26)	
2	198 (41)	69 (35)	
3+	186 (39)	78 (39)	
APO (%)			
Gestational DM		67 (34)	
Preterm Birth		37 (19)	
Gestational HTN		76 (38)	
Preeclampsia		88 (44)	
Eclampsia		5 (3)	
HELLP		4 (2)	
<b>Clinical Characteristics</b>			
BMI (mean ± SD)	28.8 (24.5, 34.0)	31.6 (26.0, 37.4)	0.001
Hypertension (%)	311 (65)	139 (70)	0.182
Hyperlipidemia (%)	445 (92)	176 (88)	0.104
Prediabetes (%)	19 (4)	9 (5)	0.729
Diabetes (%)	73 (15)	46 (23)	0.013
<b>Cardiovascular Characteristics</b>			
Non-obstructive CAD (%)	351 (73)	132 (66)	0.090
Hx obstructive CAD (%)	98 (20)	39 (20)	0.828
ANOCA (%)	218 (45)	108 (54)	0.032
INOCA (%)	166 (34)	52 (26)	0.035
MINOCA (%)	31 (6)	11 (6)	0.656
HFpEF (%)	56 (12)	24 (12)	0.871
HFrEF (%)	22 (5)	9 (5)	0.981
<b>Validated Questionnaires</b>			
DASI <sup>1</sup> (0-58.2) (median, IQR)	35.3 (24, 45.3)	34.8 (23.1, 46.5)	0.814
UCSD SOB <sup>2</sup> (0-120) (median, IQR)	26 (9, 47)	27.5 (11.5, 53.5)	0.182
SAQ7 <sup>1</sup> (0-100) (median, IQR)	45.8 (29.2, 60.0)	40.8 (23.9, 55.8)	0.045
PSS <sup>2</sup> (median, IQR)	12 (8.5, 17)	13 (10, 18)	0.011
Vasospastic Angina (%)	361 (75)	151 (76)	0.787
Microvascular Angina (%)	371 (77)	156 (78)	0.687
<b>CRT Outcomes</b>			
Endothelial Dependent CMD (%)	72 (58)	29 (46)	0.119
Endothelial Independent CMD (%)	84 (65)	39 (64)	0.927
CFR (median, IQR)	2.0 (1.8, 2.6)	2.3 (2.0, 2.7)	0.093
Epicardial spasm (%)	48 (34)	22 (31)	0.608

HFpEF: Heart Failure with Preserved Ejection Fraction; HFrEF: Heart failure with Reserved Ejection Fraction; CRT: Coronary Reactivity Testing; BMI: Body Mass Index; MINOCA: Myocardial Ischemia with non-Obstructive Coronary Arteries; ANOCA: Angina with non-Obstructive Coronary Arteries; INOCA: Ischemia with non-Obstructive Coronary Arteries; IQR: Interquartile Range; CSS: Canadian Cardiovascular Society Angina Grade, DASI: Duke Activity Status Index; UCSD SOB: University of San Diego Shortness of Breath; SAQ7: Seattle Angina Questionnaire; PSS: Perceived Stress Score; CFR: Coronary Flow Reserve; CMD: Coronary Microvascular Disease

1. Greater scores= better quality of life and functionality
2. Greater scores= poor quality of life and functionality