Background: Spontaneous Coronary Artery Dissection (SCAD) is a recognized cause of Acute Coronary Syndrome (ACS), particularly in young women. Despite increasing awareness, underdiagnosis of SCAD remains common. Given the distinct differences in management and potential outcomes, a prompt and accurate diagnosis of SCAD is crucial for appropriate treatment and follow-up.

Purpose: To assess the prevalence and implications of SCAD underdiagnosis in young women with ACS and to identify potential indicators of SCAD.

Methods: We included consecutive women aged \( \leq 55 \) years with an ACS referred for coronary angiography (CAG) to a tertiary center from 2012 to 2021. All index CAGs and when available intracoronary imaging recordings were retrospectively reviewed to identify angiographic signs of SCAD according to the Yip-Saw criteria. Known cardiovascular risk factors, predisposing conditions for SCAD, and major adverse cardiovascular events (hospital visits, recurrent ACS, target vessel revascularization, stroke) were collected during hospitalization and follow-up. SCAD patients were compared to ACS patients without SCAD (atherosclerotic coronary artery disease, coronary spasm, no abnormalities). Subsequently, the initially recognized SCAD patients were compared to the reclassified SCAD patients.

Results: 293 patients (mean age \( 48 \pm 5 \) years) were included, 217 (74%) presenting as STEMI and 64 (22%) as NSTEMI. Based on retrospective analysis of the (intra)coronary images SCAD was the underlying cause of the ACS in 17% of all patients (\( n = 50/293 \)) while only recognized at initial diagnosis in 26% (\( n = 13/50 \)) of these cases. SCAD type 2a was most frequently missed (30%). Compared to ACS patients without SCAD, SCAD patients were younger (\( 47 \pm 6 \) vs. \( 49 \pm 5 \) years, \( p < 0.05 \)), had lower rates of smoking (28% vs. 60%, \( p < 0.05 \)) and less often a history of dyslipidemia (10% vs. 24%, \( p < 0.05 \)) and diabetes (2% vs. 16%, \( p < 0.05 \)). Furthermore, the coronary tortuosity score was higher (4.7 \( \pm 2.0 \) vs. 3.0 \( \pm 1.5 \), \( p < 0.05 \)). Invasively treated SCAD patients often received \( \geq 3 \) coronary stents when compared to ACS patients without SCAD (28% vs. 15%, \( p = 0.02 \)) mostly due to hematoma extension. Follow-up showed ACS based on atherosclerosis occurred less often in SCAD patients compared to non-SCAD patients (resp. 9% vs. 14%, \( p < 0.05 \)) and recurrent SCAD was only recorded in reclassified SCAD patients (5% vs. 0%, \( p < 0.05 \)). On multi-variate analysis, the coronary tortuosity score (1.58 [1.3-1.88]) was associated with SCAD.

Conclusion: This study reveals that underdiagnosis of SCAD is common in young women with ACS leading to incorrect treatment with specific medication and excessive coronary stenting. Healthcare providers should be cautious for SCAD in young ACS patients with few cardiovascular risk factors and high coronary tortuosity scores. This study emphasizes the need for greater awareness and improved diagnostic methods for SCAD in young women with ACS.
Figure 1: Underdiagnosis of spontaneous coronary artery dissection in young female patients with acute coronary syndromes.
Abbreviations: ACS: acute coronary syndrome, SCAD: spontaneous coronary artery dissection