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# Spontaneous Coronary Artery Dissection: A Rare but Deadly Cause of ACS in Younger Patients

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**Introduction:** Spontaneous coronary artery dissection, “SCAD”, is a rare cause of acute coronary syndrome and has an indistinguishable presentation from ACS due to plaque rupture.<sup>1</sup> The majority of cases occur in young women during the peripartum period or in association with oral contraceptive use.<sup>1</sup> SCAD is unpredictable, and sudden death is the usual mode of clinical presentation. Spontaneous coronary dissection should be considered in any young patient, especially any young woman without a previous cardiac history or risk factors, who presents with an acute coronary syndrome.

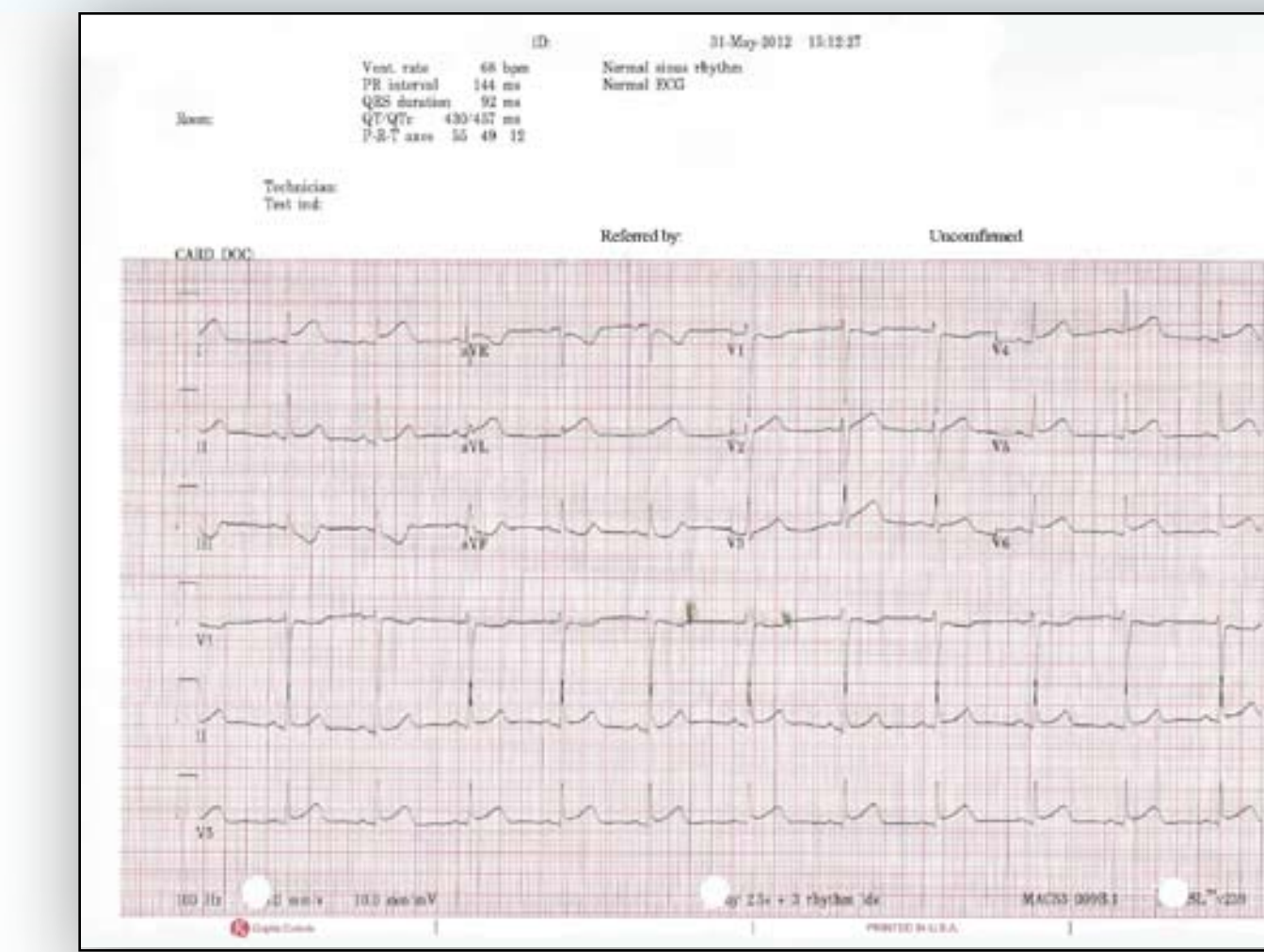
**Case:** A 32 year old woman was running when she developed severe chest discomfort. Her past medical history is significant for three uncomplicated pregnancies with her only medication being an oral contraceptive pill. Her initial EKG showed ST and T wave abnormalities in the lateral leads. She was rushed to the cardiac catheterization lab where catheterization showed 60% stenosis of the Ostial LAD, 70% stenosis of the Proximal LAD, 85% stenosis of the 1st Diagonal, and 90% stenosis of the Proximal Circumflex. At age 32, there was doubt that these findings were secondary to atherosclerosis. Rather, it appeared that these findings were consistent with spontaneous coronary artery dissection of the 1st diagonal vessel with subsequent retrograde dissection into the LAD and circumflex vessels. Upon collaborative review with CT surgery, it was determined that the patient’s condition was not amendable to catheter-based intervention. She was taken to the operating room where three-vessel coronary artery bypass surgery was performed. Surgical evaluation showed significant dissection of the 1st Diagonal vessel. The patient had a saphenous vein graft placed to the Obtuse Marginal, a saphenous vein graft to the dissected 1st Diagonal, and a left internal mammary artery to the mid LAD. The patient tolerated the procedure well and was discharged from the hospital in stable condition several days later.

**Discussion:** Spontaneous coronary artery dissection is a rare but serious form of acute coronary syndrome that typically affects a young, predominantly female population and presents as a life-threatening condition in more than half of cases.<sup>2</sup> In a recent, retrospective study of 87 patients with angiographically confirmed SCAD, Tweet et al. reported a majority of these patients were female (82%), with a mean age of only 42.6 years old. The cause of SCAD is unknown; however recent literature describes a number of potential associations (Figure 5). The most common association in women was postpartum status (18%), while extreme physical activity (44%) was the principal factor associated in males.<sup>2</sup> The clinical presentation of spontaneous coronary artery dissection includes the entire spectrum of coronary syndromes, and is primarily related to the extent of the dissection and the vessel involved,<sup>3</sup>(Figure 6). The dissection occurring in SCAD usually occurs in the outer media and causes luminal occlusion by pushing the inner media against the opposing wall.<sup>3</sup> Coronary angiography remains the gold standard for diagnosis (Figures 2 & 3), however given the challenge of diagnosing SCAD, intracoronary imaging should be considered in cases with high suspicion of SCAD. Currently, the management of acute spontaneous coronary artery dissection is not clearly defined. Being a rare clinical disease with limited published evidence makes management of SCAD difficult. Treatment options currently consist of conservative therapy, percutaneous coronary intervention, and coronary artery bypass grafting, each showing varying short versus long term clinical risks and benefits. Concerning data coming from Tweet et al’s recent study is the alarming rate of SCAD reoccurrence (17%, all of which were female) in patients diagnosed with SCAD. This clearly indicates the need for close clinical monitoring and patient follow-up, regardless of the chosen treatment modality. Going forward, there is a strong need for multi-center studies to better understand this rare but deadly cause of acute coronary syndrome.

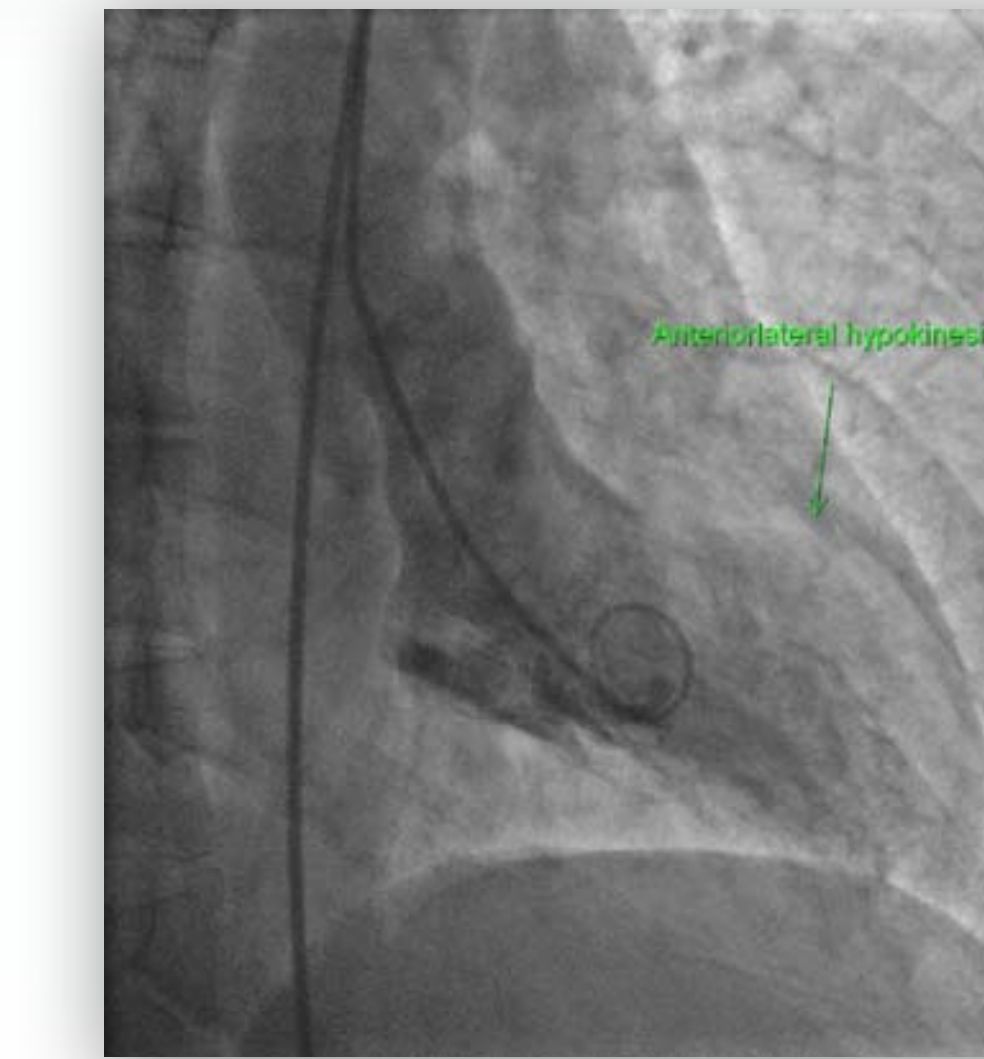
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## Figures



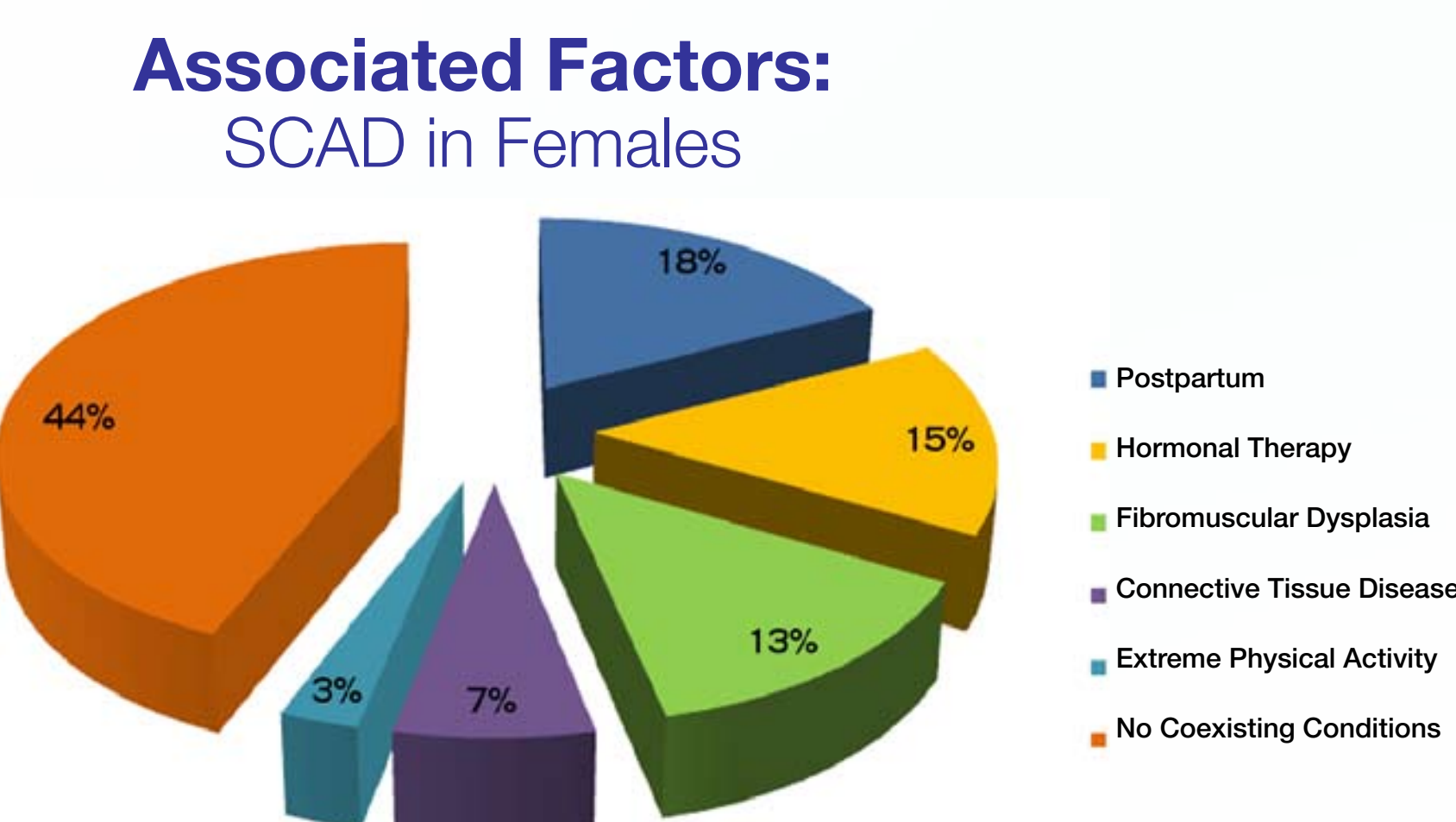
**Figure 1.** Initial EKG of the 32 year old woman presenting with sudden onset of chest pain while jogging. The EKG shows ST elevations in the lateral leads, which prompted emergent cardiac catheterization and ultimately lead to a diagnosis of spontaneous coronary artery dissection.



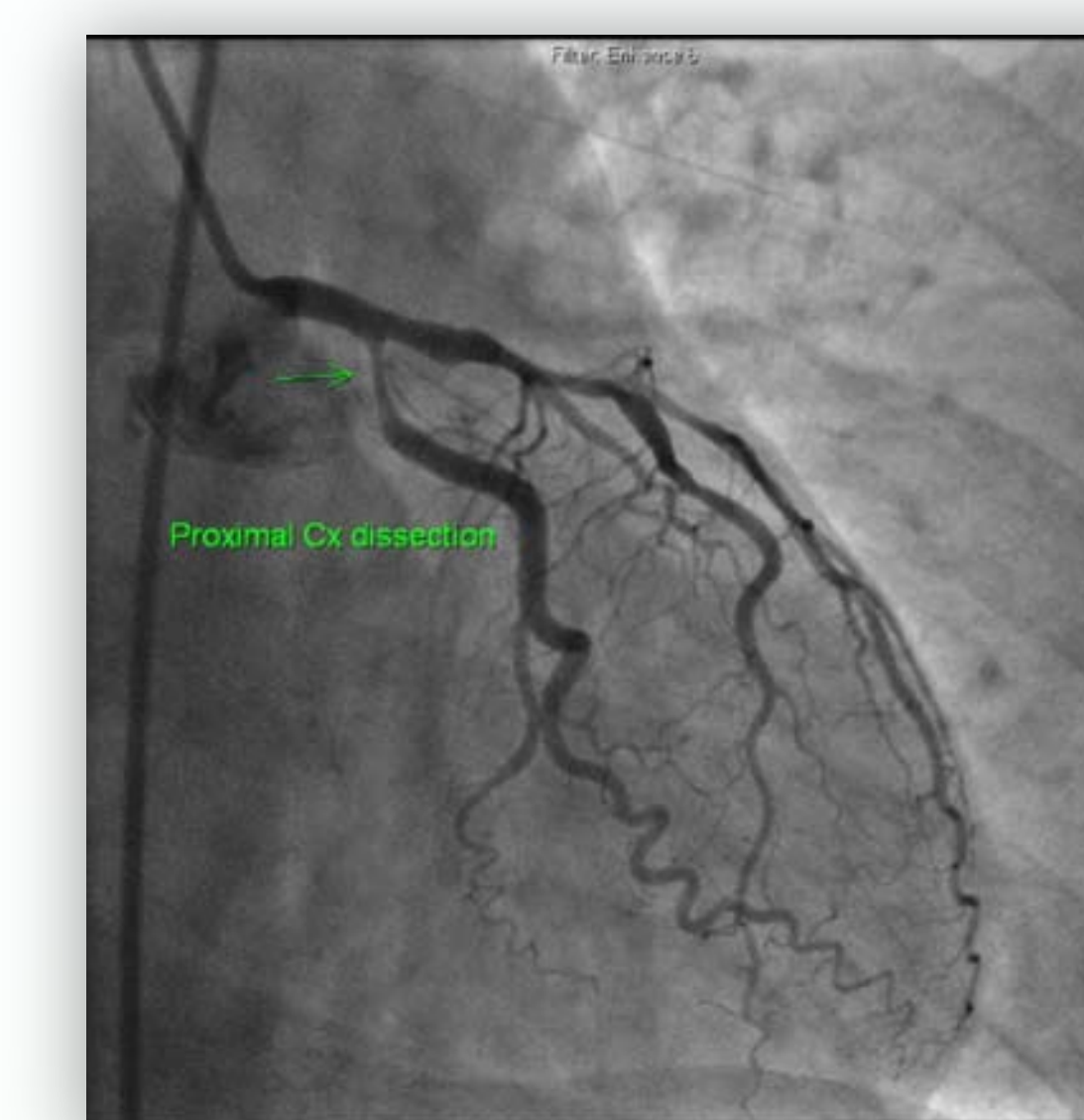
**Figure 4.** Cardiac ventriculography demonstrating anterolateral wall hypokinesis resulting from spontaneous coronary artery dissection involving the Proximal and Ostial LAD, 1st Diagonal, and Proximal Circumflex vessels.



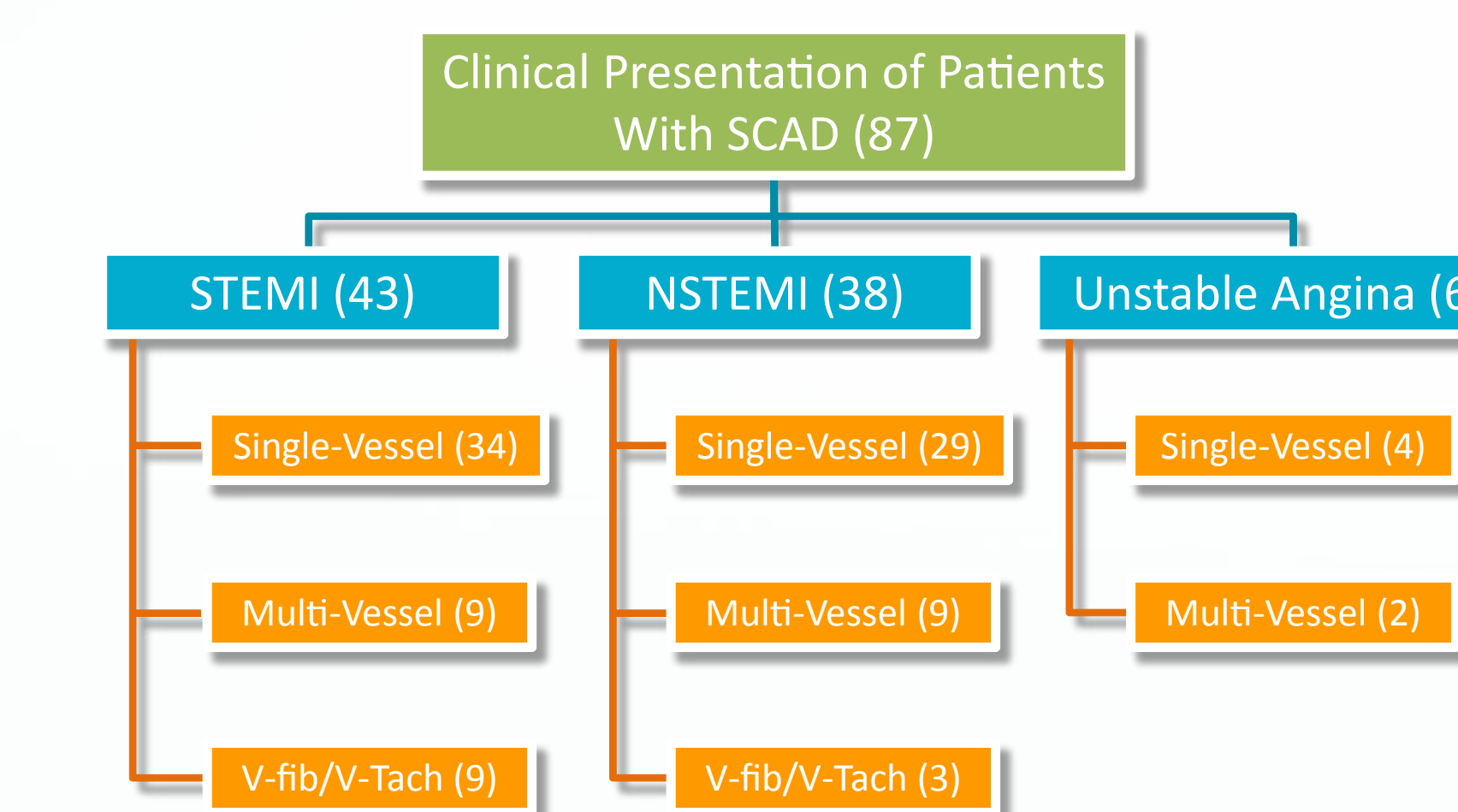
**Figure 2.** Coronary angiography demonstrating 70% stenosis of the Ostial LAD, 60% stenosis of the Proximal LAD, and 85% stenosis of the 1st Diagonal. These findings were consistent with a spontaneous coronary dissection originating at the 1st Diagonal vessel with retrograde dissection into the LAD.



**Figure 5.** Associated factors identified in female patients with angiographically confirmed SCAD as identified in a retrospective single-center cohort study of 71 female patients performed by the Mayo Clinic, 2012.<sup>2</sup>



**Figure 3.** Coronary angiography demonstrating 90% stenosis of the Proximal Circumflex artery. This stenosis is secondary to retrograde dissection of the proximal circumflex artery from spontaneous coronary artery dissection of the 1st Diagonal artery.



**Figure 6.** Clinical presentation of spontaneous coronary artery dissection (SCAD) as reported by the Mayo Clinic in a retrospective single-center cohort study of 87 patients with angiographically confirmed SCAD.<sup>2</sup>