

Coronary Artery Dissection: A Spontaneous Phenomena in Postpartum Period

Sanwal Sing Mehta¹, Muhammad Usman Asghar^{2,*}, Hira Cheema³, Krishna Kommineni¹

¹Internal Medicine, Maimonides Medical Center, New York, USA

²Surgery, New York University School of Medicine, New York, USA

³Internal Medicine, Shifa College of Medicine, Islamabad, Pakistan

*Corresponding author: usmanjutt898@gmail.com

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Abstract Spontaneous coronary artery dissection (SCAD) is a rare but life-threatening cause of acute coronary artery syndrome. Although, SCAD may be attributed to underlying medical illness such as connective tissue disease, vasculitis or atherosclerosis, its occurrence in young healthy females is an uncommon phenomenon. Pregnant females, particularly in their peripartum or post-partum periods are affected the most. The etiology remains unclear but certain factors such as hemodynamic and hormonal changes during pregnancy have thought to play a significant role. Spontaneous coronary artery dissection has a very high mortality rate and physicians should be vigilant when an otherwise young healthy female presents with symptoms of acute coronary syndrome.

Keywords: coronary artery dissection, pregnancy, postpartum

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1. Introduction

Spontaneous coronary artery dissection is rare phenomena causing acute coronary syndrome in apparently young healthy females, particularly in pregnancy or postpartum period. Approximately eighthly percent of these cases have occurred in women during pregnancy or postpartum period [1]. Almost all cases present with symptoms similar to acute myocardial infarction. The clinical spectrum depends on the severity of arterial dissection and ranges from unstable angina to sudden cardiac death. The most common location of coronary arterial dissection is the Left Anterior Descending Artery [2,3] which supplies the anterolateral myocardium, Interventricular Septum and majority of the Left Ventricle. LAD being an important blood supply to the heart, a dissection will greatly increase the mortality risk. In such circumstances, timely diagnosis and treatment can prevent sudden cardiac death. We aim to present a mini review of SCAD to highlight the etiology, pathophysiology, treatment plan and strategies to prevent this serious complication.

2. Epidemiology

Spontaneous coronary artery dissection (SCAD) is an infrequent but serious cause of Acute Coronary Syndrome leading to increased morbidity and mortality. Females with no prior cardiovascular disease and/or risk factors are affected the most, particularly in their peripartum and

postpartum periods. According to a study, one-third of cases arise in the third trimester of pregnancy or in the first three months of the postpartum period. There is a peak in incidence two weeks postpartum [4,5]. In a healthy female with no past medical history; advance age and multiple gestations are important risk factors to consider for SCAD. Seventy percent of these patients die with sudden cardiac arrest [6] and many deaths occur within 6 weeks after the first clinical presentation [7]. The first case of SCAD was reported in 1931, since then more than 150 cases in literature have been described. SCAD is associated with high mortality rate of about 50 % at the time of presentation and mortality rate increases in those patients who present with sign and symptoms of myocardial infarction.

3. Pathophysiology

Coronary artery dissections can occur secondary to chest trauma, surgical intervention, or continuous progression of aortic dissection. In rare circumstances, coronary artery dissection is a spontaneous occurrence especially in the postpartum period. Coronary artery dissections result from a tear in the inner layer (tunica intima) of the artery. This allows the blood to pool in the tunica media or in-between tunica media and external elastic lamina; creating a false lumen [8]. The hematoma within the tunica media compresses the true lumen of the coronary artery which leads to myocardial ischemia and sudden death in severe cases. The role of pregnancy in the development of SCAD is unclear. The tendency to develop SCAD in peripartum and post-partum period is

thought to be influenced by changes in sex hormones occurring during pregnancy. High level of estrogen is considered to alter the arterial wall architecture. This includes hypertrophy of smooth muscles, loss of ground substance, and decrease collagen production in the media [9,10]. Furthermore, hemodynamic changes during pregnancy have also been contributed to this phenomenon. In pregnancy, the total blood volume increases by fifty percent leading to increased cardiac output, stroke volume, heart rate and increase in myocardial oxygen demand. Physiological anemia during pregnancy along with decreases in diastolic pressure further reduces the myocardial oxygen delivery; predisposing to cardiac ischemia [11].

The physical stress of labor is a contributing factor for increased arterial wall stress and the development of arterial wall dissections. Both hormonal and hemodynamic changes along with physical stress of labor during pregnancy can increase the risk of intimal tear and development of SCAD. In another study, periadventitial eosinophilic infiltrates have thought to enhance the production of proteolytic enzymes which can lead to arterial wall fragility [12]. Some studies have also proposed that changes in the physiology of clotting factor may contribute to the development of SCAD. Apart from pregnancy, other conditions that increase the susceptibility to SCAD are connective tissue diseases such as Marfan's Syndrome, Fibromuscular Dysplasia and Ehlers-Danlos type IV. Autoimmune disease including Systemic Lupus Erythematosus and various vasculitis disorders have also been reported to be a cause of SCAD. In previously reported cases the patients were also screened for autoimmune and connective tissue diseases, but no apparent underlying cause of the coronary artery dissection was found.

4. Clinical Presentation and Diagnosis

Clinical presentations depend on extent and severity of dissection and ranges from unstable angina to acute myocardial infarction and cardiogenic shock. Patients can present with wide variety of symptoms, from acute coronary syndrome to cardiac arrest or even sudden cardiac death. When a young female with no previous risk factor or medical condition presents with sign and symptoms of acute coronary syndrome, clinician should suspect SCAD and emergency angiography should be performed. Coronary Angiography and Intravascular Ultrasound is done to establish a clinical diagnosis. Primary percutaneous coronary intervention has been a therapeutic choice for reperfusion.

5. Management

Pharmacological management of SCAD involves the use of nitrates, antiplatelet and beta-blockers; similar to Acute Coronary Syndrome. Treatment of SCAD with thrombolytic is controversial as it may play a role in

worsening the arterial dissection. Invasive management such as coronary artery angioplasty and stent placement has been promising in improving the morbidity and mortality of patients. Treatment with stent implantation is considered superior to angioplasty alone [13]. Surgical management with coronary artery bypass graft is an alternative when a patient presents with multi-vessel coronary artery disease.

6. Conclusion

Physicians should be aware of the possibility of Spontaneous Coronary Artery Dissection (SCAD) in pregnant patients presenting with acute chest pain in their peripartum or postpartum period. These patients' population can have SCAD regardless of cardiovascular risk factor or any underlying medical condition.

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