

Case Presentation

Essential Thrombocytosis Mimicking Acute Coronary Syndrome: A Diagnostic Dilemma

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Abstract

Coronary thrombosis can be a prominent feature of Essential Thrombocytosis and is mainly caused by platelet dysfunction. Essential Thrombocytosis (ET) is a non-reactive, chronic myeloproliferative neoplasm in which sustained megakaryocytic proliferation in the bone marrow leads to an increase in the number of circulating platelets. However, coronary atherosclerosis without thrombosis leading to acute coronary syndrome (ACS) and heart failure (HF) has not been described in ET.

We reported a case of a young patient with long standing chest pain, electrocardiographic (EKG) changes, mildly elevated troponins and HF as the initial presenting symptoms. In the absence of specific guidelines, we successfully utilized cardiac computed tomography angiogram (CCTA) and characterized coronary atherosclerosis without thrombosis in ET.

Learning Objective: Coronary atherosclerosis can be the presenting symptom of Essential Thrombocytosis in young patients with minimal cardiovascular risk factors and atypical and resolving symptoms. In the setting of Thrombocytosis, diagnosis can be established with the use of Cardiac Computed Tomography Angiogram, providing opportunities for early intervention and successful outcomes in these patients.

Keywords: CCTA; Coronary; Atherosclerosis; Essential Thrombocytosis

Introduction

Essential Thrombocytosis (ET) is a non-reactive, chronic myeloproliferative neoplasm in which sustained megakaryocytic proliferation in the bone marrow leads to an increase in the number of circulating platelets. Vascular thrombosis is a prominent feature of the disease, and is understood mainly as caused by platelet dysfunction. However, coronary atherosclerosis without thrombosis leading to acute coronary syndrome (ACS) and heart failure (HF) has not been described in ET.

Herein, we report a case of a young patient with long standing chest pain, electrocardiographic (EKG) changes, mildly elevated troponins and HF as initial presenting symptoms. In the absence of specific guidelines, we successfully utilized cardiac computed tomography angiogram (CCTA) and characterized coronary atherosclerosis without thrombosis as the cause of ACS in ET.

Case Presentation

A 30 year old African American man presented to our hospital after experiencing 5 days of progressively worsening chest discomfort. He had been experiencing antecedent chest discomfort for eight months at a correctional facility, which was characterized as burning and sharp, sub-sternal, post-prandial and radiating to the left shoulder. Chest discomfort would be alleviated with activity, though occasionally, exacerbated by it as well. Patient also endorsed exertional dyspnea, diaphoresis and cough with blood-tinged sputum. Past medical history was remarkable only for 15 pack-years history of nicotine dependence whereas family history was unremarkable

for premature acute coronary syndrome (ACS). After evaluation by his unit physician, he was transferred to a local emergency room at an outside hospital (OSH) for further management. Upon initial evaluation, vital signs were found to be stable and urine toxicology screen was positive only for tetra hydro cannabiniol. EKG showed antero-septal Q-waves, antero-septo-lateral ST segment elevation and T-wave inversion in lateral leads while Troponin - T peaked at 0.4ng/ml. Cardiology service was consulted and a 2D-echocardiogram was performed, which revealed depressed left ventricular ejection fraction at 20-25%. Given the high index of suspicion for viral cardiomyopathy, conservative management was preferred. Dual Anti

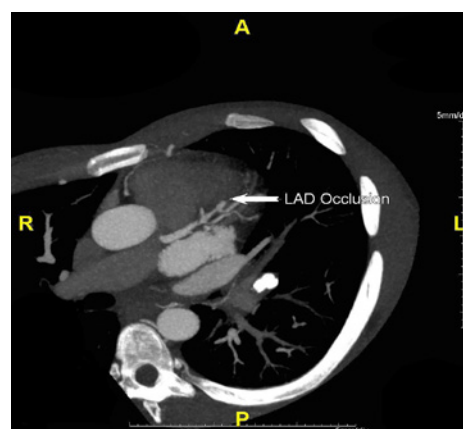


Figure 1: Coronary Computed Tomography Angiogram: Mid-left anterior descending (LAD) artery occlusion.

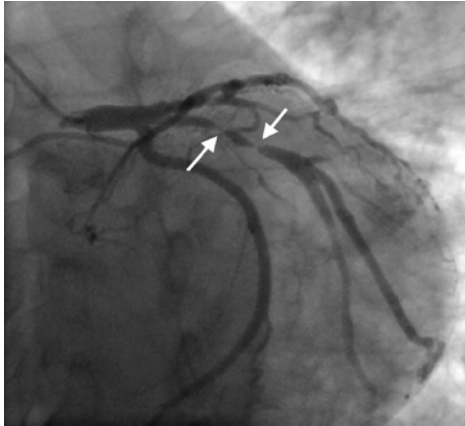


Figure 2: Coronary Angiogram: 30-40% proximal stenosis and 60% eccentric stenosis in mid-LAD between the first and second diagonal branch.



Figure 3: Coronary Angiogram: Successful Revascularization of Left Anterior Descending Artery lesions and establishing TIMI grade 3 flows.

Platelet therapy (DAPT) with Aspirin 325mg PO and Plavix 300mg PO was empirically administered. Interestingly, the platelet count was reported at more than 2million/mm³ and leukocytosis was noted. Hematology- oncology service at the OSH recommended against the use of intravenous (IV) thrombolytic therapy given high probability of a bleeding diathesis in the setting of excess number of abnormal platelets. Patient was administered a single dose of Hydroxyurea 500mg PO and was transferred to a tertiary care facility to undergo platelet-pheresis and further management of possible ACS.

At the tertiary care facility, DAPT and IV heparin were initiated for ACS. Given the rapid resolution of atypical chest pain symptoms, lack of significant CV risk factors, low TIMI score of 1 and suspicion for viral cardiomyopathy, it was decided to perform CCTA prior to considering cardiac catheterization. CCTA showed a lesion in the Left Anterior Descending (LAD) (Figure 1) and a tandem lesion in the ramus-intermedius artery. Consequent left heart catheterization and PCI confirmed proximal and mid-LAD stenoses (Figure 2), as well as proximal stenosis in the first diagonal branch and tandem, ramusintermedius stenosis. A Xience-Alpine 3.5 x 28-mm stent (Abbott Vascular-USA) was successfully placed across the latter lesions without any residual luminal narrowing and with TIMI grade III flow into the distal artery (Figure 3). In the interim,

Thrombocytosis peaked at 3,209,000/mm³, while leukocytosis peaked at 22000/mm³. Bone marrow biopsy reported minimally hypercellular marrow, megakaryocytic hyperplasia, atypia, and reticulin fibrosis (2+), eosinophilia with normal morphology and absent iron stores. However, Philadelphia chromosome, and JAK-2 V617F mutations were negative on special stains. Elevated calreticulin level was reported, which suggested a diagnosis of ET. Patient was initiated on Hydroxyurea 500mg oral, twice daily, maintained on DAPT (Aspirin 81mg and Plavix 75mg oral daily) and was eventually discharged on the same regimen after a remarkable improvement in his symptoms was noted. At a scheduled clinic follow up visit 2 weeks after discharge, patient was asymptomatic and with normal vital signs.

Discussion

Essential Thrombocytosis is a rare disease with a reported incidence of 7 per 1,000,000 [1] and mortality of up to 40% [2]. Thrombocytes are the principal cells required for hemostasis and endothelial repair. After adhering to the vascular endothelium, they can promote atherosclerosis [3]. In a single-center retrospective study, incidence of thrombotic ACS without atherosclerosis in patients with ET was 9.4% with no events noted in younger patients (<40 years) [4].

It is postulated that atherosclerosis in ET is initiated by pro-inflammatory cascade from activated clonal cells. Chemokines including Interleukins, CRP, fibrinogen, CD-40 and NF-kB lead to recruitment of T cells and B cells and eventually progressing to coronary atherosclerosis [5]. In a meta-analysis, CCTA had a sensitivity of 96% and specificity of 86% when compared to invasive coronary angiography [6]. Hydroxyurea administered with antiplatelet therapy in ACS and ET has led to prevention of recurrent coronary thrombosis [7] but has not yet been described in prevention of atherosclerosis.

Hence, we presented a novel case of coronary atherosclerosis and HF as presenting symptoms of ET in a young patient with only one CV risk factor. In the setting of atypical and rapidly resolving symptoms, CCTA was able to identify multiple coronary occlusive lesions, which were validated during PCI. To the best of our knowledge, neither has coronary atherosclerosis without thrombosis been described in ET, nor CCTA has been utilized to confirm coronary atherosclerosis in ET. We recommend further studies to identify inflammatory targets and establish guidelines for management of patients with coronary atherosclerosis secondary to ET.

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