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Total Proximal Left Anterior Descending Artery Occlusion Presenting as Right Sided Chest Pain with a Misdiagnosis of Costochondritis: A Case Report

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Abstract

Background

Acute coronary syndrome refers to a group of clinical symptoms consistent with acute myocardial ischemia or infarction that are potentially life threating requiring immediate interventions. Certain proportion of patients can present with atypical symptoms leading to a missed diagnosis associated with devastating outcomes.

Case presentation

We present a 60 years' female of African descent with a medical history of hypertension and type 2 Diabetes mellitus who presented with a 2 months' history of right-sided anterior chest pain and was diagnosed with costochondritis. Further assessment revealed, normal cardiac markers and an electrocardiogram suggestive of anterior wall myocardial infarction. A coronary computed tomography and cardiac magnetic imaging scans revealed a total occlusion of the proximal left anterior descending artery and a viable myocardium respectively. She underwent successful percutaneous coronary interventions with stenting with complete alleviation of her chest pain.

Conclusions

This case report highlights the importance of having a high index of suspicion in high-risk groups such as older females with co-morbidities presenting with atypical symptoms suggestive of acute coronary syndrome to health care providers. This ensures early diagnosis and provision of appropriate treatment associated with good outcomes. Likewise, the case also advocates on the use of advanced cardiac imaging in patients with inconclusive electrocardiographic and biochemical tests.

Keywords: *Proximal left anterior descending artery occlusion, Acute coronary syndrome, Unstable angina, Costochondritis, Coronary computed tomography.*

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Background

Acute coronary syndrome (ACS) refers to a group of clinical symptoms consistent with acute myocardial ischemia or infarction that entails a spectrum of disorders ranging from unstable angina (UA), non-ST segment elevation myocardial infarction (NSTEMI) and ST-segment elevation myocardial infarction (STEMI) (1). These are medical emergencies that require immediate interventions with global reports indicating 1.8 million deaths per year mainly attributed to ACS (2). In sub Saharan Africa (SSA), ACS was initially thought to be scarce, however is now increasingly being diagnosed. Reports in East Africa indicate a proportion range of 5% to 10% of admitted patients through the emergency department were diagnosed to have ACS (3,4).

Classical presentation includes typical angina chest pain described as: retrosternal chest pressure, burning or heaviness radiating to the neck, jaw, left shoulder and arm associated with nausea, vomiting, diaphoresis and unexplained fatigue (1,5). However, ACS can present with atypical or no symptoms most common in elderly females with co morbidities such as Diabetes mellitus (DM) (6,7). This can lead to a missed and/or delayed diagnosis with consequent suboptimal treatment associated with devastating outcomes especially in the elderly population. We report a case of 60 years' female with a complete proximal left anterior descending (LAD) artery occlusion presenting with atypical symptoms.

Case presentation

A 60-year-old female of African lineage was referred to our center from an up country hospital with a diagnosis of costochondritis for further evaluation. She was hypertensive for 4 years on regular metoprolol succinate extended release and amlodipine and was recently diagnosed with type 2 diabetes mellitus (DM) on regular metformin and glimepiride. She presented with a 2 months' history of right-sided anterior chest pain. It was dull ache in nature lasting for approximately 15 minutes, radiating to the right shoulder and arm. The pain worsened 4 days later from Canadian Cardiovascular Society class II to IV with no other accompanying symptoms. She had no prior history of chest trauma or dyspeptic symptoms. She never smoked or consumed alcohol, with no history of illicit drug use.

On examination she was an obese lady (body mass index of 30kg/m^2), conscious with a hyperemic region on the right side of the anterior chest wall, which was tender to palpation. She had a blood pressure 147/88 mmHg, pulse rate 102 beats per minute regular with good volume. Her respiratory rate was 23 cycles/minute and had a waist circumference of 107

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centimeters. Her fundoscopy examination revealed grade I hypertensive retinopathy. Other aspects of the cardiovascular system, musculoskeletal system and central nervous system examination were unremarkable.

Her initial resting electrocardiogram (ECG) revealed a sinus rhythm with poor R wave progression on the anterior wall V3 (see figure 1) and a series of normal cardiac makers (creatinine kinase-MB and troponin). Her echocardiogram showed mild left ventricular hypertrophy, good systolic function (ejection fraction of 60%) with no evidence of regional wall motion abnormalities. Other laboratory results revealed hypercholesteremia and hypertriglyceremia of 6.23mmol/L and 2.56mmol/L respectively and her glycated hemoglobin was at 9.92%.

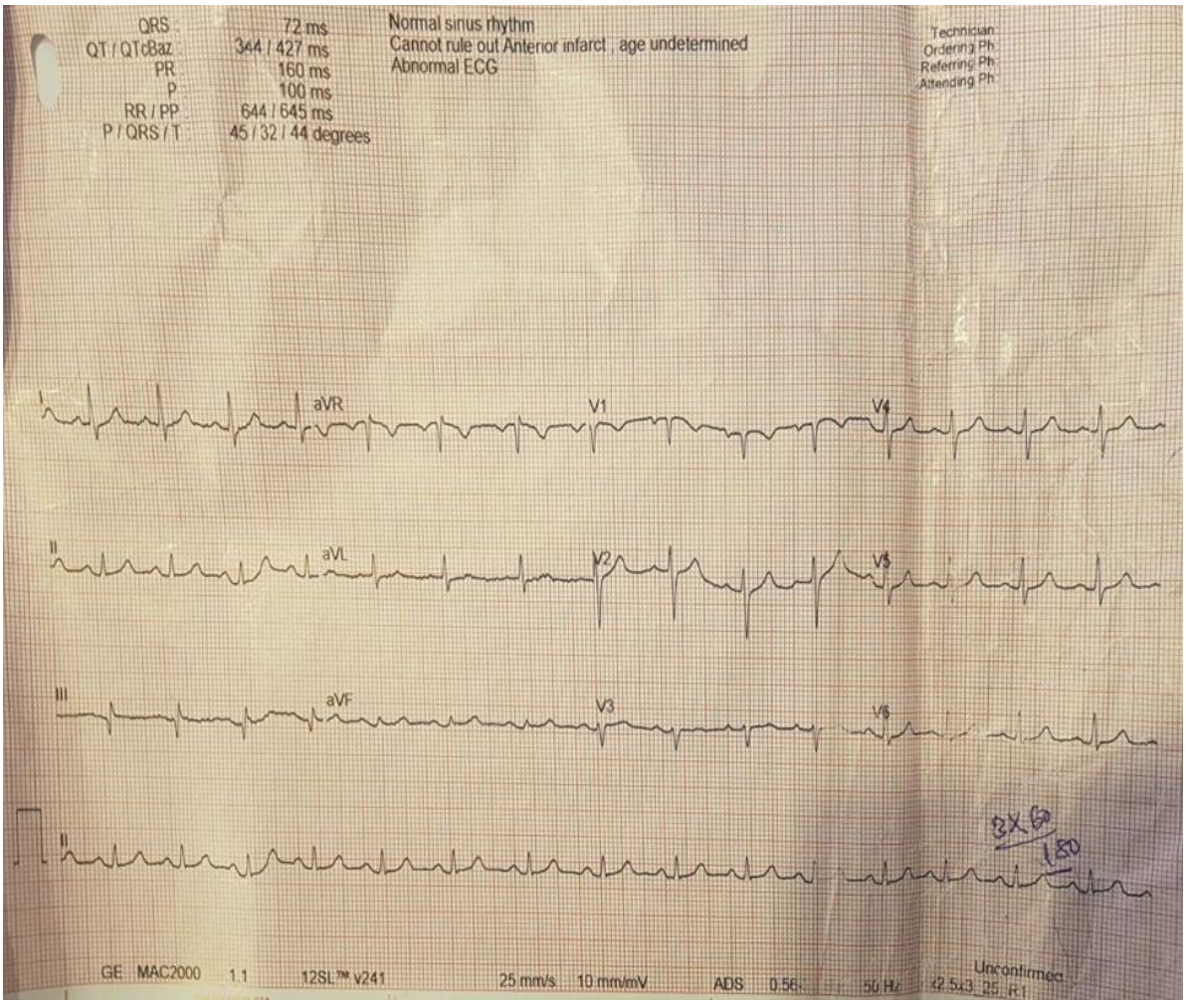

Figure 1: Initial ECG showing a sinus rhythm with poor R wave progression at V3

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A coronary computed tomography angiography scan revealed a total occlusion of the proximal left anterior descending artery (first diagonal and second septal branch) with normal systolic left ventricular function see Figure 2 and Figure 3. Her cardiac magnetic resonance image with gadolinium enhancement showed normal viable myocardium. The patient underwent coronary angiography and percutaneous coronary interventions (PCI) of the proximal LAD with stenting. The procedure was 100% successful with complete flow achievement (Figure 4). There was drastic improvement following PCI, the patient's chest pain completely resolved and she continued with long-term medical management, lifestyle modifications and monthly clinics at our center. Her ECG taken 6 months' post stenting revealed a sinus rhythm with presence of R waves on the anterior wall (figure 5).

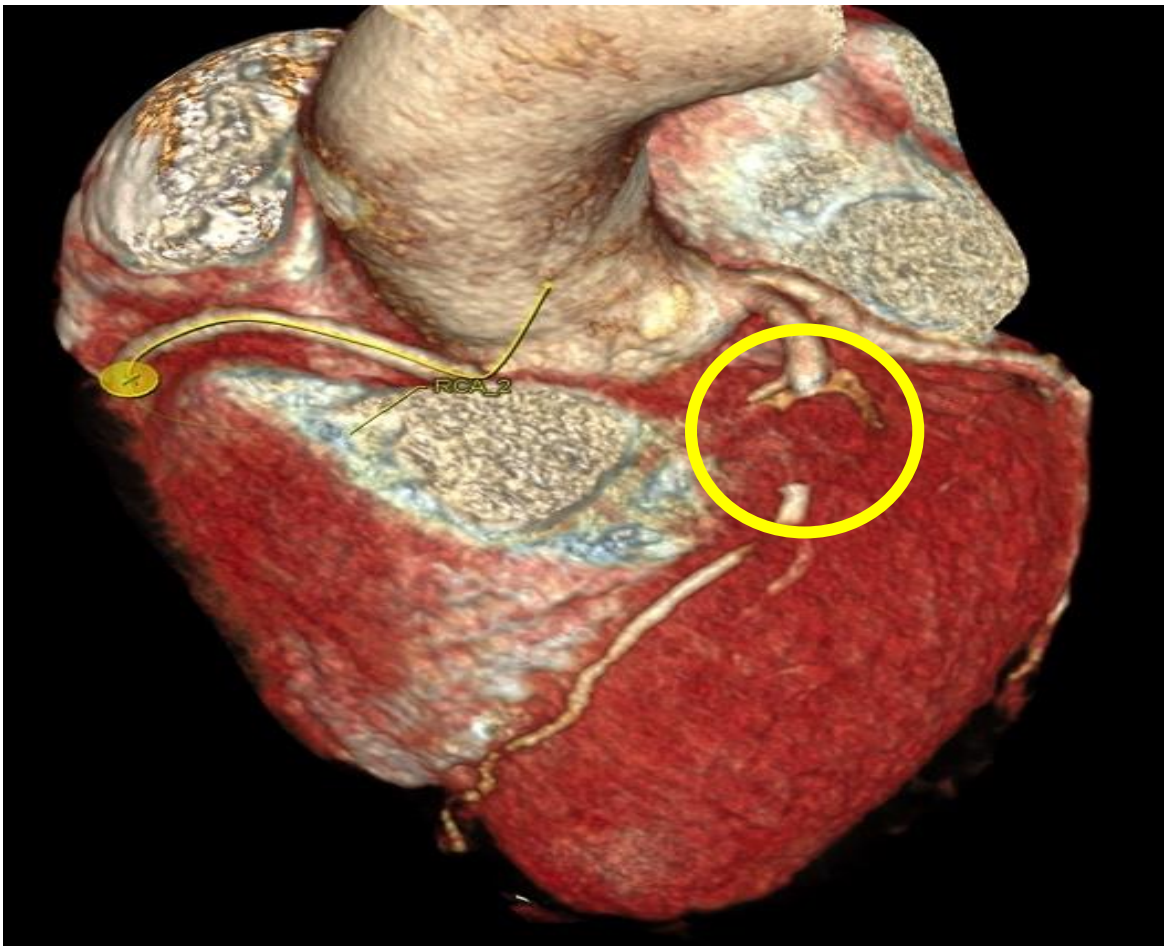

Figure 2: A 3D reconstruction cardiac CT angiogram showing a total proximal left anterior descending artery occlusion

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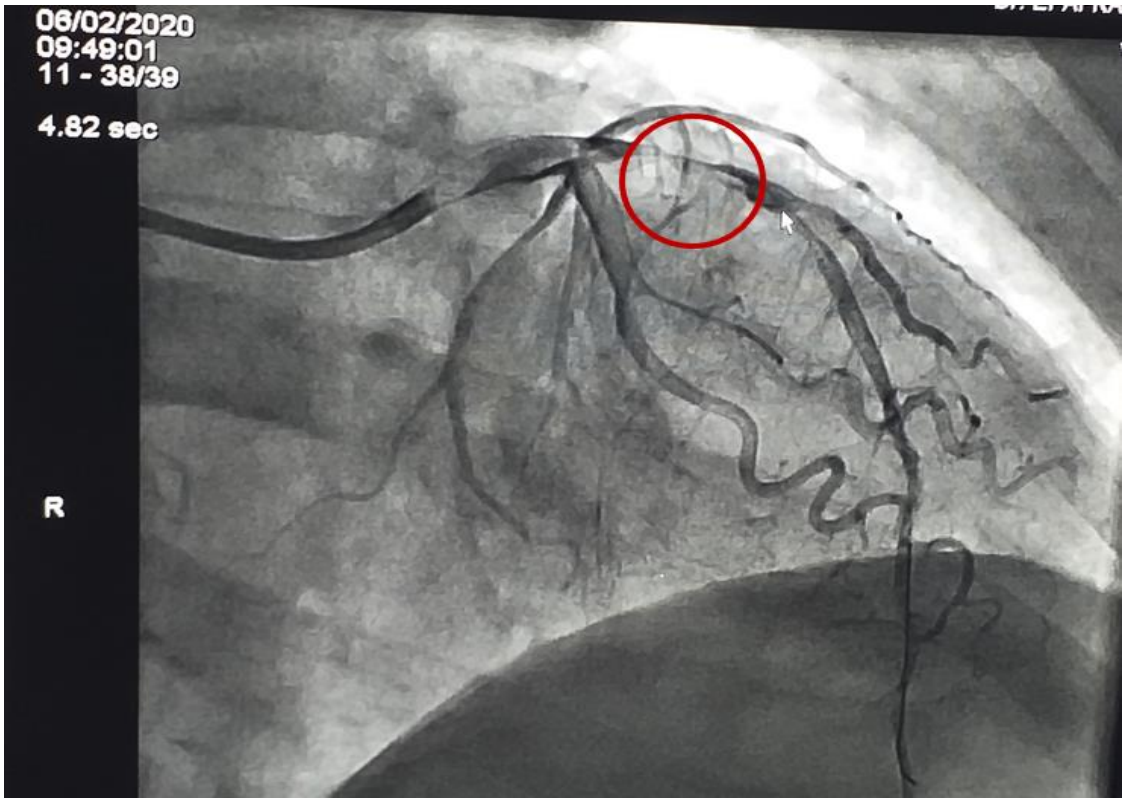

Figure 3: Coronary angiogram during percutaneous intervention showing proximal left anterior descending artery occlusion prior to stent implantation and deployment

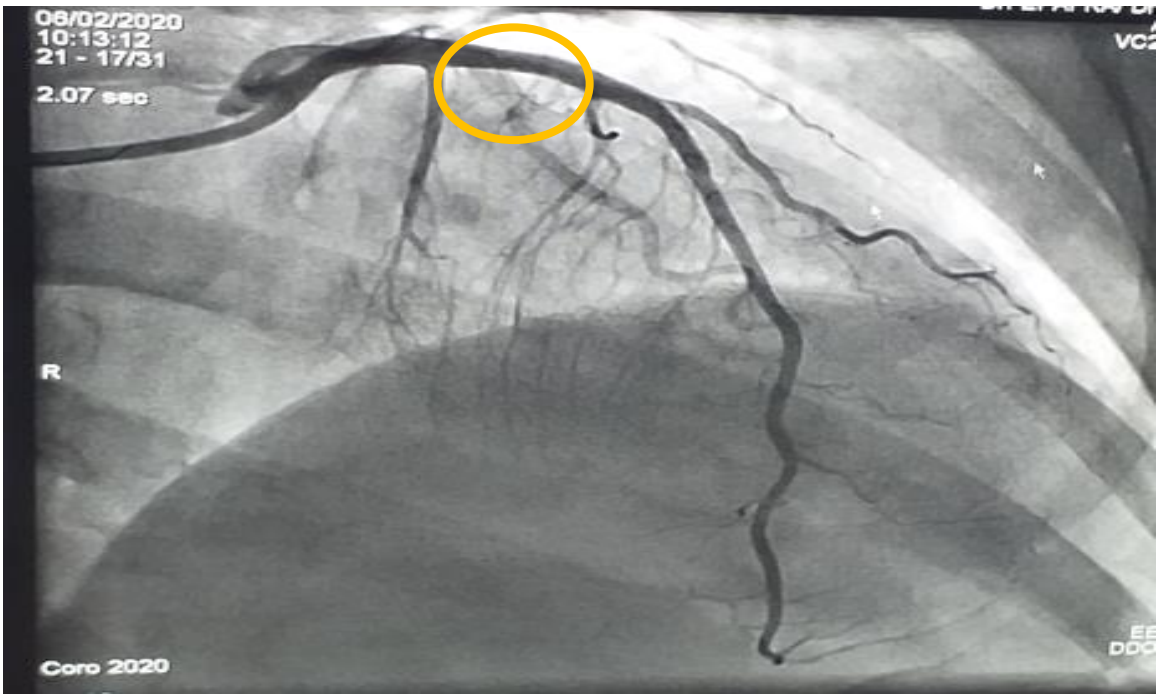

Figure 4: Coronary angiogram showing a completely open and stented proximal left anterior descending artery

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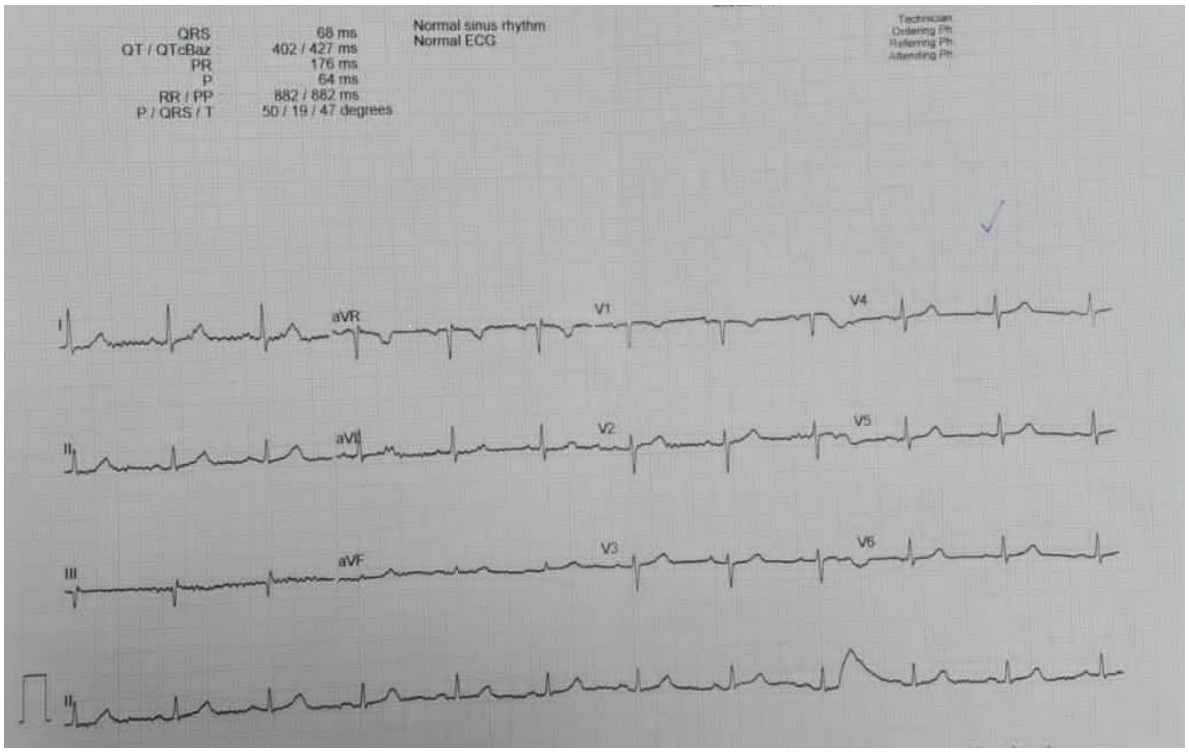

Figure 5: ECG taken 6 months' post stenting showing a sinus rhythm

Discussion

ACS is an acute onset of myocardial ischemia or necrosis caused by a critical imbalance between oxygen supply and demand to the myocardium as a result of plaque rupture or thrombus formation in a coronary vessel (1,8). It is a potentially life-threatening condition commonly encountered at the emergency medicine department that requires urgent interventions. Clinical presentation is an essential component in the evaluation of these patients and diagnosis is mainly dependent on classical symptoms, elevation of cardiac biomarkers and electrocardiographic features. It is notable that as many as 33% of cases present with atypical presentation leading to a missed or delayed diagnosis (9). Such atypical symptoms in order of frequency include: dyspnea (49.3%), diaphoresis (26.2%), nausea/vomiting (24.3%) and syncope (19.1%), which are prevalent in older females with comorbidities (DM, hypertension and prior history of heart failure) (10). A recent report by Lee et al revealed that, patients presenting with atypical symptoms were more likely to delay hospital admission leading to delays in initiating treatment and had a higher in-hospital and long term mortality (6).

Our patient was a 60 years' female with a medical history of hypertension and type 2 DM. She presented with atypical symptoms of right-sided anterior chest pain with no

accompanying symptoms or signs classical for ACS, which led to a misdiagnosis of costochondritis. Her atypical presentation could be explained by her age and underlying comorbidities. Aging is associated with progressive atherosclerotic changes leading to endothelial injury, formation of fatty streaks, inflammation and subsequent thrombus formation (11). Likewise, DM is associated with cardiovascular autonomic neuropathy which leads to abnormal perception to myocardial ischemia (7). All these factors contributed in delays in reaching the appropriate diagnosis.

Our patient's initial ECG showed evidence of poor R wave progression on the anterior wall and literature describes this finding as suggestive but not diagnostic of anterior myocardial infarction (12). Likewise, it could also signify left or right ventricular hypertrophy. Her series of cardiac makers was essentially normal from date of admission. Biomarkers for myocardial injury (CK-MB and troponin) are often elevated acutely within 6-12 hours for CK-MB and return to baseline within 36-48 hours, likewise troponin levels usually persists for a long as 10-14days (13,14). Our patient had symptoms for 2 months therefore it is expected to find normal biochemical results. This however, warrants the need for further evaluation using advanced imaging to exclude coronary artery disease in line with international guidelines which have incorporated the use of a coronary CT angiography as the modality of choice to exclude CAD in patients with inconclusive ECG and biochemical tests (15,16). Our patient completed a coronary computed tomography angiography scan which revealed a total occlusion of the proximal LAD artery with viable myocardium seen on cardiac magnetic resonance image without formation of collaterals. Collaterals vessels are usually observed in patients who have chronic total coronary occlusions (CTO), defined as 100% coronary artery blockage for more than 3 months based on angiography or symptoms (17). On the contrary, our patient had symptoms for only 2 months and fits the classic definition of unstable angina. Unstable angina is defined as the presence of ischemic symptoms suggestive of ACS with no biochemical and ECG findings indicative of ischemia (18).

Generally, based on the different risk stratification scores commonly used in clinical practice for patients with ACS the Thrombolysis in Myocardial Infarction (TIMI) score and Global Registry of Acute Coronary Events (GRACE) score, our patient had a 13% risk at 14 days of all-cause mortality and new or recurrent myocardial infarction requiring urgent revascularization and a 2% risk of mortality at 6 months respectively. This prompted the need for urgent PCI with stenting, which led to complete resolution of her symptoms.

Nonetheless, our patient is on medical treatment and lifestyle modification attending our out-patient cardiac clinic to monitor for any major adverse cardiac events especially within the first year.

Conclusion

This case report highlights the importance of having a high index of suspicion in high risk groups such as older females with co morbidities presenting with atypical symptoms suggestive of ACS to health care providers. This ensures early diagnosis and provision of appropriate treatment associated with good outcomes. The case also advocates on the use of advanced cardiac imaging in patients with inconclusive ECG and biochemical tests.

Declarations

Ethical approval and consent to participate

Ethical approval was sought from Jakaya Kikwete Cardiac Institute. Written informed consent was obtained from the patient for publication of this case report.

Consent to publication

The patient gave consent for publication for any clinical information or investigations including images collected, that was requested for during the written informed consent process.

Availability of data and materials

Data sharing is not applicable to this report as no datasets were generated or analysed during the current study.

Competing interests

The authors declare that they have no competing interests.

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No funding was received for this work.

Authors' contributions

All authors read and approved the final manuscript.

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List of abbreviations

ACS	Acute Coronary Syndrome
CAD	Coronary Artery Disease
DM	Diabetes Mellitus
LAD	Left Anterior Descending
NSTEMI	Non-ST Segment Elevation Myocardial Infarction
SSA	Sub Saharan Africa
PCI	Percutaneous Coronary Intervention
UA	Unstable Angina

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