An Unusual Presentation of a Left Anterior Descending Artery Obstruction, A Deadly Disease

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This case report highlights the potential of continuous ST segment monitoring (C-STM) in the emergency department (ED) for identifying transient ischemic changes in patients with acute coronary syndrome (ACS). We present a case of a 62-year-old male with type 2 diabetes and hypertension who presented with chest pain, that resolved prior to arrival. Despite an initially non-diagnostic ECG, C-STM detected transient hyperacute T waves and mild ST elevations, prompting further investigation, and ultimately leading to successful percutaneous coronary intervention (PCI) for a critical left anterior descending (LAD) coronary artery lesion. Our case emphasizes the importance of high clinical suspicion, continuous monitoring, and timely intervention in patients with ACS, even when initial presentations are atypical. It also raises the question of which ACS patients benefit from C-STM.

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Key words: Acute Coronary Syndrome (ACS), Left Anterior Descending (LAD) artery obstruction, Continuous ST segment monitoring (C-STM), Transient ischemic changes, Chest pain

Chest pain is the second most common complaint that presents to the Emergency Department (ED) in the United States accounting for 7.6 million annual visits (1). It is of paramount importance to stratify all patients with respect to the risk of myocardial infarction (MI) due to the high mortality it carries. LAD obstruction represents 15.5% mortality in 5 years in the US, with the highest rates of strokes, heart failure and reinfarction. It also carries the worst prognosis of all MI's (2). The ischemic changes present in ECG's suggestive of myocardial ischemia have been well documented. For example, we have ST depression, T wave flattening and hyperacute T waves to name a few as well as the classic ST elevation along with Wellens syndrome and De Winters T wave (3-5). Ischemic changes are not always present in initial ECG, there are other tools we use in high-risk patients such as Continuous ST segment monitoring (C-STM) and serial ECG that are available to us to aid in identifying these changes. Since there are limited resources in Emergency Department, including cardiac monitors, there is the question of which ACS patients are safe to remove from continuous cardiac monitoring, attempts have been made to use the HEART score as a stratification tool, but evidence is still limited (6). We present a case in which these dynamic changes were transient (seconds) and not easily picked up in ECGs alone.

Case report

A 62-year-old male patient with past medical history of type 2 diabetes mellitus and hypertension that presented to the ED with chest pain that started 1 hour prior to arrival. Upon history the patient stated he was mowing his lawn when the pain suddenly started beneath his sternum. Upon arrival at the ED the pain had subsided. Vital signs on arrival were BP:120/80 HR:67 RR:18 T:36.9 C. Physical exam showed no murmurs nor rubs, lungs had equal breath sounds bilaterally. He was promptly connected to a cardiac monitor; initial ECG showed no acute changes compatible with ischemia or MI (See Figure 1). Upon reevaluation hyper acute T waves and mild ST elevation were noticed on the cardiac monitor prompting the team to repeat the ECG. New ECG showed hyperacute T waves in anterolateral leads with mild ST elevations (See Figure 1). Interestingly these changes lasted approximately 1 minute and disappeared thereafter with three subsequent ECGs identical to the first one. Serum low sensitivity troponin was negative. ECGs were discussed with Cardiology service and the patient was transferred to a Percutaneous Coronary Intervention (PCI) unit for catheterization. Patient had a defect in the left anterior descending (LAD) coronary artery (see Figure 2) and was subsequently stented (see Figure 2). Follow up image revealed resolution of defect after stenting. The patient was recontacted to inquire about current status, and he refers there was a need for reintervention due to stent thrombosis and he had a coronary artery bypass grafting (CABG) surgery in 2023. No further interventions were required after CABG was performed.

Discussion

This case illustrates the possibility of using C-STM in patients with ACS and being vigilant to any changes of their baseline as

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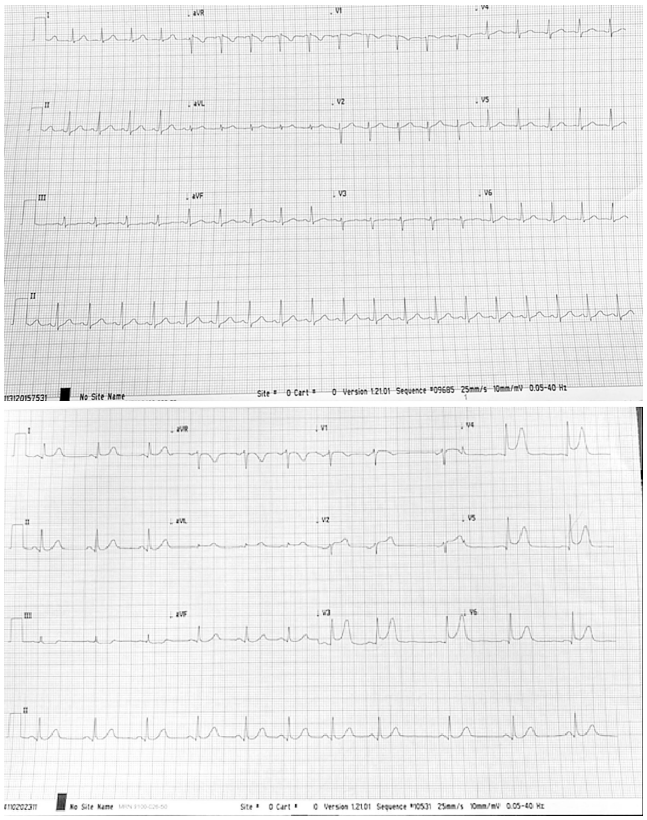
Figure 1. Initial ECG (top) and repeat ECG after changes noted in cardiac monitor (bottom)

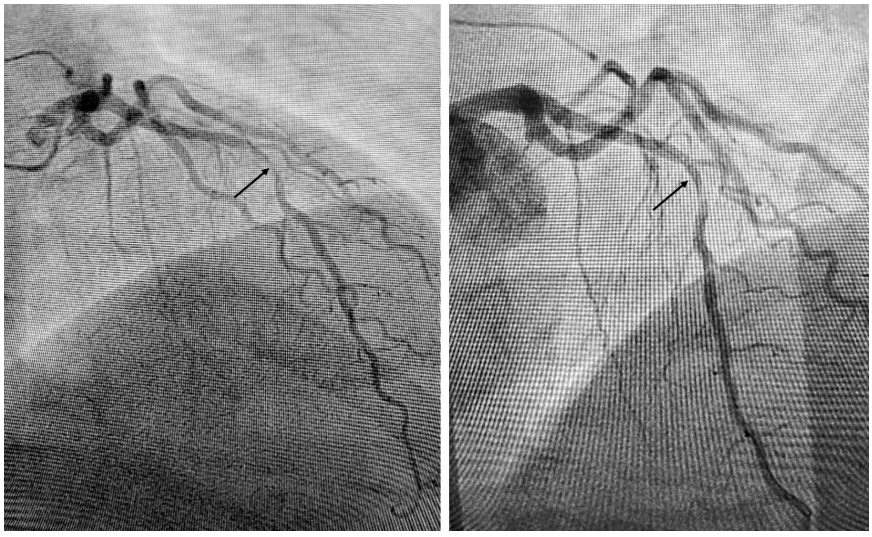


these can be transient and not caught on ECGs with ease. This is especially useful for patients without ventricular pacemaker or branch blocks, since they have baseline morphology that makes C-STM with cardiac monitor challenging. Hence the American College of Cardiology/American Heart Association (ACC/AHA) guidelines do not recommend use of cardiac monitor for ST segment monitoring in these patients, with changes to baseline morphology, due to low sensitivity. (Class III recommendation, by ACC/AHA guidelines) The ACC/AHA guidelines recommend C-STM in patients with ACS whose initial ECG is nondiagnostic as an alternative to serial ECG monitoring, in patients without changes to baseline morphology stated above (Class I recommendation by ACC/AHA guidelines), along with serum biomarker testing. Current guidelines recommend use of serial ECG, which is the gold standard, if there is high suspicion for ACS (7). There are several issues with using cardiac monitor continuous ST segment monitoring in the ED. These include but are not limited to need for personnel to be trained in ST segment monitoring, availability of nurses, physicians, and cardiac monitors with ST segment continuous monitoring. In our patient, who is intermediate risk by HEART score of 4, we found ischemic changes due to continuous cardiac monitoring, which prompted serial ECG evaluation. Current evidence shows limited value in use of serial ECG or C-STM in intermediate risk (HEART Score 4-6) or low risk (HEART Score 0-3) patients, without ST segment elevation on initial ECG. Overall Serial ECG is shown to be more sensitive (68%) compared to C-STM (41.7%) (5). It is important to note, the number of studies with use of cardiac monitor and ST segment monitoring in ACS patients in the ED, are extremely limited in number, more studies are required to better define which patients benefit from C-STM, especially in patients of indeterminate group (6).

Conclusions

In this case report, we describe a 62-year-old male with a significant medical history of type 2 diabetes mellitus and hypertension who presented with transient chest pain of sudden onset while performing a routine activity. Despite initial non-diagnostic EKG findings, continuous monitoring in the ED identified EKG changes suggestive of an evolving myocardial ischemia. The transitory nature of these EKG changes highlights the importance of continuous cardiac monitoring in high-risk patients. The patient's prompt transfer for cardiac catheterization revealed a critical lesion in the left anterior descending coronary artery, which was successfully managed with stenting. This case emphasizes the importance of high clinical suspicion, constant monitoring, and timely intervention in achieving favorable outcomes for patients with acute coronary syndromes. We also state the importance of further research regarding which patients presenting with chest pain benefit from C-STM in the emergency department.

Figure 2. Shows coronary angiography during PCI. LAD is shown prior to stenting showing partial occlusion. (Left) and LAD is visualized after stenting (right)



Resumen

Este reporte de caso resalta el potencial del monitoreo continuo del segmento ST (MC-ST) en el servicio de emergencias para identificar cambios isquémicos transitorios en pacientes con síndrome coronario agudo (SCA). Presentamos el caso de un varón de 62 años con diabetes tipo 2 e hipertensión que se presentó con dolor de pecho que resolvió antes de su llegada al hospital. A pesar de un ECG inicial no diagnóstico, el MC-ST detectó ondas T hiperagudas transitorias y elevaciones leves del segmento ST, lo que motivó una investigación adicional y finalmente condujo a una intervención coronaria percutánea exitosa para una lesión crítica de la arteria coronaria descendente anterior izquierda. Nuestro caso enfatiza la importancia de una alta sospecha clínica, el monitoreo continuo y la intervención oportuna en pacientes con SCA, incluso cuando las presentaciones iniciales son atípicas. También plantea la cuestión de qué pacientes con SCA se benefician del MC-ST.

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