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Case Report

Suspected colchicine-induced late myocardial rupture occurring after the late presentation of acute inferior ST-elevation myocardial infarction

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Abstract: Colchicine is one of the established drugs of choice for post-myocardial infarction (MI) induced pericarditis, given its anti-inflammatory properties. Recently, colchicine received FDA approval for secondary prevention of atherosclerotic cardiovascular disease, which leads to concerns regarding its anti-healing effects on myocardial tissue post-infarction. We present a case of a suspected colchicine-induced myocardial rupture in an elderly male, who presented with a syncopal episode while on colchicine three weeks after the late presentation of infero-posterior ST-elevation myocardial infarction.

Keywords: Colchicine, myocardial rupture, free wall rupture, STEMI, myocardial infarction

Introduction

Colchicine, an anti-inflammatory agent widely used for the management of gout and autoimmune diseases, has emerged as a prevalent treatment modality for cardiovascular disease, given the wide implications of inflammation on atherosclerotic plaque formation [1]. Colchicine is currently the first drug of choice for pericarditis by inhibiting inflammatory response and preventing recurrent pericarditis [2-4]. Furthermore, myocardial infarction (MI) causes a severe inflammatory response that is important for cardiac repair by inducing scar formation and healing. Leukocytes and macrophages remove damaged and dead cells setting the process of scar formation. This inflammatory response is important for healing, which can lead to fibroblast activation and secretion of matrix metalloprotease and numerous inflammatory factors that contribute to scar formation and remodeling. Remodeling can lead to reduced contractility and ultimately to heart failure. Colchicine is a potent agent that exhibits anti-inflammatory properties by inhibiting chemotaxis, and pro-inflammatory cytokines. Colchicine binds to the active sites of Matrix Metalloproteinases-9 (MMP-9), nicotinamide adenine dinucleotide phosphate (NADPH), and TGF-beta 1 (transforming growth factor-beta 1) exerting a strong anti-inflammatory effect [5-8]. This is the main reason colchicine has been studied in patients with atherosclerosis and post-myocardial infarction. It is thought that its anti-inflammatory properties can reduce remodeling thus reducing heart failure post myocardial infarction. Furthermore, it may prevent plaque rupture by preventing severe inflammation in a vulnerable plaque. This is the main mechanism that was thought to be the reason for the positive effect of colchicine in patients with atherosclerotic heart disease leading to the U.S. Food and Drug Administration (FDA) approval. The FDA approved the use of colchicine in June 2023 in addition to statins for secondary prevention of stroke, myocardial infarction, and cardiovascular death in patients with atherosclerotic cardiovascular disease. Two large, randomized control trials, COLCOT and LoDoCo2, confirmed that long-term daily administration of 0.5 mg of colchicine consistently lowered the risk of ischemic cardiovascular events compared to placebo [9-11]. The latest indication for colchicine now

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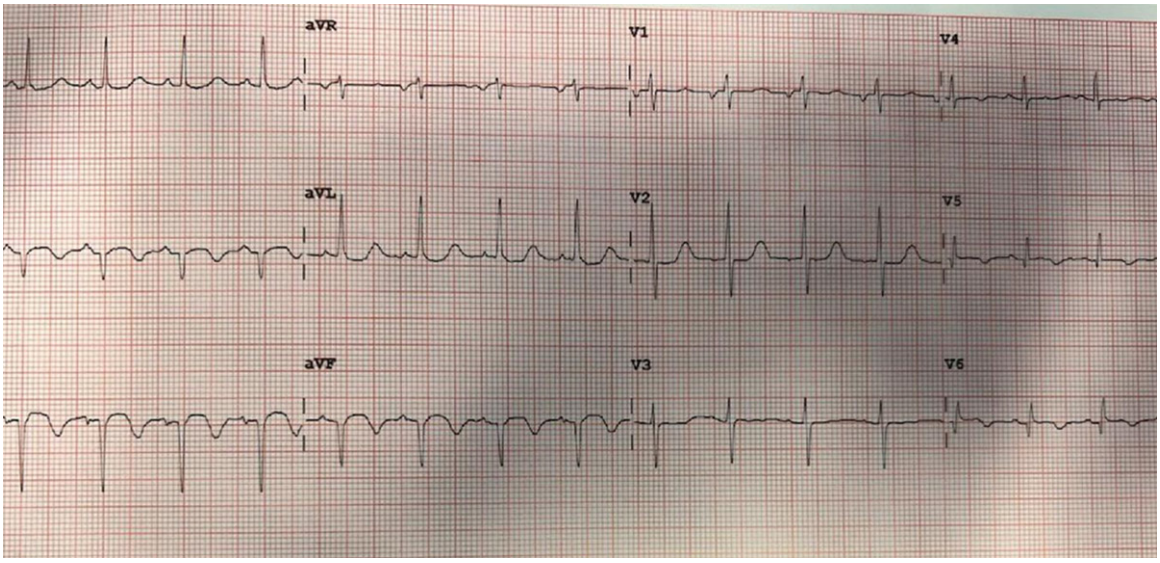

Figure 1. Electrocardiogram on presentation showing completed inferior myocardial infarction.

exposes a new cohort of patients to an anti-inflammatory drug that inherently decreases tissue healing in a mechanism similar to steroids. We aim to bring to light the potentially harmful implications of decreased cardiac tissue regeneration by using the following case of a patient on colchicine for post-MI pericarditis who later presented with ventricular free wall rupture, likely explained by disrupted healing of infarcted tissue.

Case presentation

A 61-year-old Hispanic male presented to the emergency department (ED) with complaints of syncope while standing. He had no chest pain or shortness of breath. He has a relevant history of recent late presentation of inferior ST-elevation myocardial infarction (MI) three weeks prior, which was treated with percutaneous coronary intervention (PCI). After the procedure, he was found to have a large pericardial effusion which was drained. Colchicine 0.5 mg BID was initiated for suspected post-MI pericarditis. One week later, the patient was found to have a recurrent moderate-sized pericardial effusion on the echocardiogram with no evidence of tamponade on his post-discharge office visit. He was sent home to be returned for a repeat echocardiogram a few weeks later. However, the patient presented to the emergency department (ED) a few days later for evaluation after a syncopal episode.

On arrival at the ED, his systolic blood pressure was in the 90s and improved to 120 after receiving intravenous fluids. He had sinus tachycardia with a rate of 112. On physical examination, he was awake, alert, and in no acute distress. He had jugular venous distention up to his ears. His lung sounds were clear. He had no murmurs or peripheral edema. He was on aspirin 81 mg daily, Plavix 75 mg daily, atorvastatin 40 mg daily, and losartan 25 mg daily in addition to colchicine. He had stopped taking all these medications the night before his ED visit due to feeling ill. In the ED, he received his missed doses of Plavix 150 mg and aspirin 81 mg. Labs were notable for normal creatinine, potassium 3.4, normal white blood cell count, mild anemia, and high sensitivity troponin of 1500. The electrocardiogram demonstrated inferior q waves and T wave inversions in inferior and lateral leads, consistent with recent inferior STEMI (**Figure 1**). The echocardiogram showed a loculated pericardial effusion near the inferior wall with no color flow detection from the left ventricle (**Figure 2**). An MRI was performed, which showed perforation of the free left ventricular inferno-posterior wall (**Figure 3**). The patient underwent urgent surgery for 8 hours to repair of the ruptured myocardium (**Figure 4**). He was intubated for a total of 48 hours and fully recovered after the surgery. On follow-up up to six months, he has remained asymptomatic.

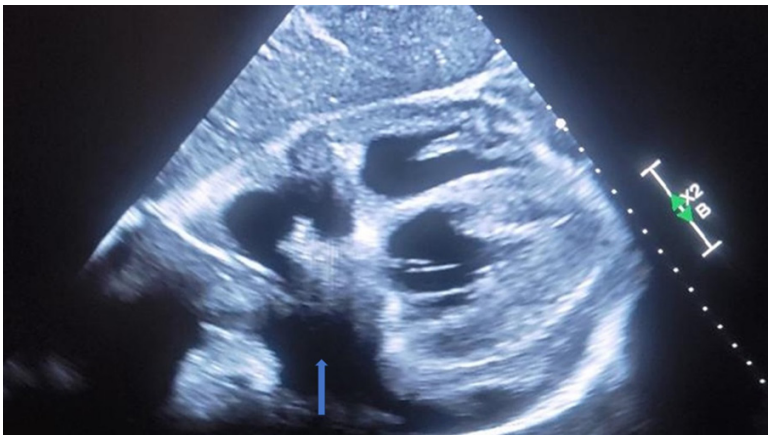

Figure 2. Echocardiogram showing loculated effusion near inferior wall with no color flow detection from left ventricle.

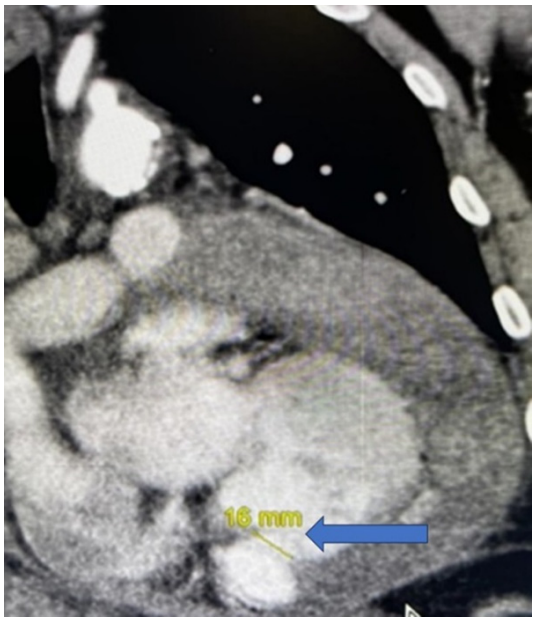

Figure 3. MRI demonstrating free wall perforation (arrow).

Discussion

Colchicine has been known to have anti-inflammatory effects. While traditionally used for the prevention of gout as well as the treatment of acute or recurrent pericarditis, colchicine has recently been approved by the U.S. Food and Drug Administration for use in secondary prevention of cardiovascular disease [1]. Two large, randomized control trials, COLCOT and LoDoCo2, confirmed that long-term daily administration of 0.5 mg of colchicine consistently lowered the risk of ischemic cardiovascular events compared to placebo [9-11].

Previously steroids and other anti-inflammatory agents have been suggested to be a risk factor for myocardial rupture [12]. This may be explained by the anti-inflammatory effects which can inhibit healing, as balanced inflammatory changes promote damage resolution and tissue healing [13]. Colchicine acts similarly to steroids as seen in this case. We can never be 100% certain that myocardial rupture in our patient was related to colchicine treatment. However, because colchicine is a potent anti-inflammatory drug that slows down healing and scar formation, late rupture without any scar tissue seen during surgery, strongly suggests colchicine-induced inhibition of healing contributed to the myocardial rupture. This is the first case describing this phenomenon to our knowledge. Providers must be cautious in prescribing long-term colchicine post-MI, particularly in the case of a late presenting large MI with a pericardial effusion. Colchicine needs to be restudied in patients with recent myocardial infarction regarding increasing risk of myocardial rupture.

Moreover, late survival after myocardial rupture is rare. This patient had a rupture three weeks post-MI. Because he had a chronic pericardial effusion, he likely had adhesions which produced a tamponade effect and improved his outcome. This case demonstrated that patients with acute myocardial infarction can have late myocardial rupture and survive if the rupture is contained.

Furthermore, in the presence of a loculated effusion post-MI, especially recurrent effusions, it is important to consider the possibility of myocardial rupture prior to performing pericardiocentesis or pericardial window. It is advisable to perform a CT or MRI of the chest before proceeding with any drainage. In this case, we were unable to visualize flow into the pericardium due to tamponade. In the case of myocardial perforation or rupture, surgical repair is indicated and carries the risk of death from

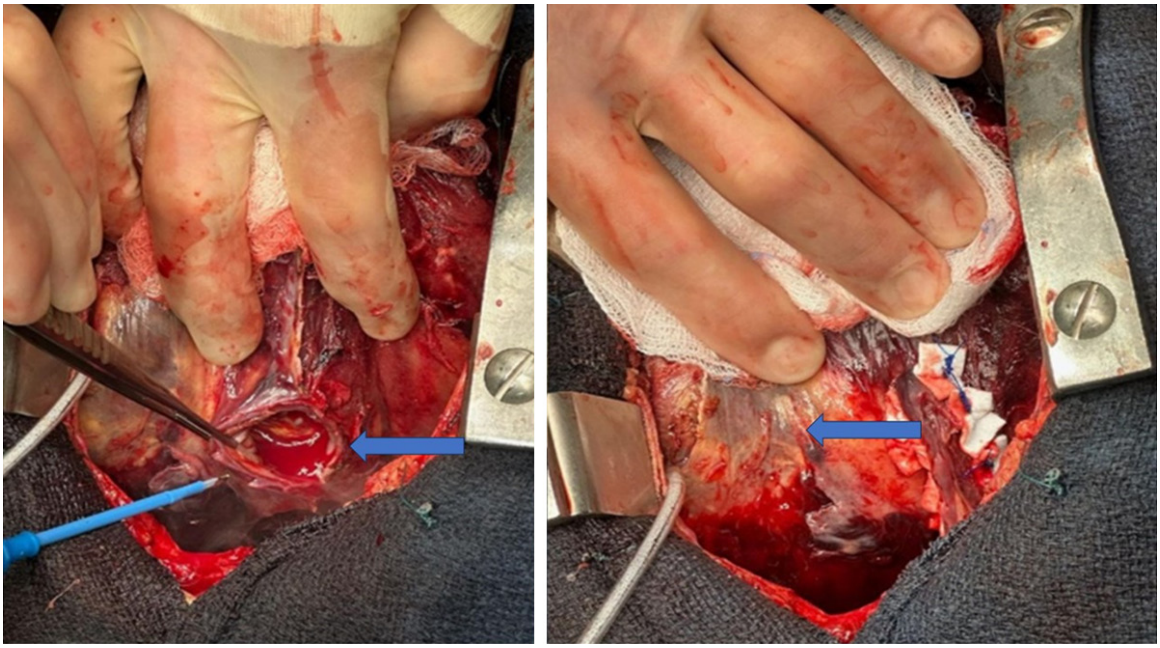

Figure 4. Surgical repair of ruptured myocardium (arrow).

bleeding or infection. If there is no myocardial perforation, one can proceed with drainage.

Conclusion

Colchicine is an anti-inflammatory agent that has been shown to improve cardiac outcomes in patients with cardiovascular disease. However, colchicine can simultaneously impair healing and tissue regeneration. We report a case of an elderly male with suspected colchicine-induced delayed ventricular free wall rupture post-MI, raising concerns regarding prolonged use of colchicine after myocardial infarction.

Disclosure of conflict of interest

None.

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