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Case Report

Post Percutaneous Coronary Intervention Pericarditis and Positive Effect of Colchicine on Patient Condition

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Abstract

The global prevalence of MI in individuals < 60 years was found to be 3.8%. Also, following the assessment of 20 eligible investigations with a sample size of 5,071,185 individuals (> 60 years), this value was detected at 9.5% [1]. Cardiac catheterization is an invasive procedure used for both diagnostic as well as therapeutic purpose in patients having myocardial infarction either STEMI OR NSTEMI. It is important to understand that, the chances of having any major complication post coronary angiography occur in less than 2% of the population, with mortality of less than 0.08% [2]. Rupture of large vessels during visualization and stenting needs to be consider, although it is highly unlikely. As a result of any perforation of large vessel leads to pericardial effusion and inflammation of pericardium. Our case study is about a 43- year- old male, who was diagnosed with pericarditis. His presenting symptoms and ECG changes were mimicking inferior wall non-ST elevation myocardial infarction (NSTEMI) or old infarction changes along with small Q wave, there were no typical findings on ECG indicative of pericarditis. Laboratory findings showed raised cardiac markers (troponin 1, CKMB).Patient underwent for coronary angiography and no acute pathology was seen. Follow up echocardiography revealed mild pericardial fluid accumulation that triggered his recurrent chest pain. On the bases of his recurrent symptoms, a course of anti-inflammatory drug that is colchicine 0.5mg was initiated, which is highly recommended to prevent recurrent pericarditis. Chest pain was relieved and ST segment depression almost returned to normal base line after 3 weeks though it was old infarction it takes usually 4 to 6 weeks return to normal. Despite the lack of specific clinical manifestation, post-traumatic pericarditis should be considered in patients with symptoms and signs of pericarditis and a prior history of iatrogenic injury or thoracic trauma.

Key Words: Cardiac catheterization, myocardial infarction, post traumatic pericarditis,

Introduction

Acute coronary syndrome (ACS) is the most common cardiovascular disease and one of the major causes of mortality and morbidity worldwide. The term acute myocardial infarction (AMI) is used when there is evidence of myocardial necrosis consequent to an ischemic injury.

It occurs when an unstable plaque ruptures, leading to occlusion of a coronary artery or when there is a mismatch between oxygen supply and demand (due to systemic hypotension, vasospasm).AMI can be divided into three categories i.e. Non ST-Elevation (NSTEMI) myocardial infarction, ST Elevation (STEMI) myocardial infarction and unstable angina are the traditional type of ACS [3]. Diagnosis is based on typical features, chest pain, ECG changes and elevation of cardiac markers. Definitive diagnosis requires cardiac catheterization, which serves both diagnostic and therapeutic purposes. High risk factors are diabetes, obesity, smoking, hypertension, stress, family history, and dyslipidaemia.

According to 2023 ESC guidelines, a comprehensive overview of the management of patients presenting with ACS, from the point of diagnosis and risk stratification at initial presentation, to long term management after the initial hospitalization period, particular focus is given to the importance of anti- thrombotic therapy, invasive assessment and revascularization [4].

Coronary angiography, also called cardiac catheterization, is a minimally invasive study that is considered the gold standard for diagnosing coronary artery disease. This test is performed under local anaesthesia and involves injecting contrast medium into the coronary arteries via catheter. Cardiac catheterization is one of the most widely performed cardiac procedures. In the United States, more than 1,000,000 cardiac catheterization procedures are performed annually [5] It can be either therapeutic or diagnostic procedure. The procedure is done in the evaluation and the treatment of the following conditions.

- Coronary artery disease
- Measuring the hemodynamic in the right and left side of the heart
- Evaluate the left ventricular function
- Evaluation and treatment of cardiac arrhythmias
- Evaluation and treatment of valvar heart disease
- Assessment pericardial and myocardial diseases
- Assessment of the congenital heart diseases
- Evaluation of heart failure

In any invasive procedure, there are some patients related or procedure related complications but the chances are rare due to advancement of new technique. The risk of major complications during diagnostic cardiac catheterization procedure is usually less than 1%, and the risk of mortality of 0.05% for diagnostic procedures [5].

Minor complications include thrombosis and embolism, hematoma/retroperitoneal bleeding, incomplete palmer arch. Other major complications are myocardial infarction, stroke, and aeroembolism, perforation of large vessels, infection and arrhythmias.

In this case, patient had developed pericarditis when his first coronary angiography was done, during the procedure the distal end of major artery was perforated, as a result of that he developed pericarditis due to accumulation of blood in the posterior-lateral wall of pericardium.

The incidence of acute pericarditis is nearly 27.7 percent per 100,000 individuals yearly. The re- occurrence of pericarditis is seen in almost 30% of patients after first episode. Notably, among patients with a first recurrence, a second is observed in 25–50%, and a further (third) in 20–40% [6]. Mortality rate is approximately 1% in developed countries. Patient with all age groups may get acute pericarditis. The common age groups are 20 to 50 years.

Pericardium serves many important but subtle function. It limits distension and facilitate interaction of the cardiac chamber, influences ventricular filling, prevents excessive torsion and displacement of the heart, minimize friction with surrounding structures, and prevent the spread of infection.

Acute pericarditis is a syndrome of pericardial inflammation characterized by typical chest pain (sharp, retrosternal pain that radiates to the trapezius ridge, often aggravated by lying down and relieved by sitting up). Specific ECG changes includes diffuse ST changes with characteristic evolutionary changes and PR depression.

The diagnosis of pericarditis requires two of the following four features:

- chest pain
- Rub
- typical ECG changes
- pericardial effusion

Acute pericarditis usually responds to oral NSAIDs, such as aspirin (650mg every 3 to 4 hours) or Ibuprofen (300-800 mg every 6 hours) Colchicine (1 mg/day) may be used to supplement the NSAIDs as it may reduce the symptoms and decrease the rate of recurrences [7].

Our aim is to highlight the importance of colchicine in the treatment of pericarditis is that, this agent may be useful in

recurrent pericarditis, which is immune-mediated, owing to its ability to disrupt the inflammatory cycle involved in pathogenesis.

Our patient recurrent symptoms were improved, when we put him 0.5 mg colchicine, along with antiplatelet therapy, anti-hypertensive and antihyperlipidemic medication respectively.

Case Presentation

A 43-year-old male patient of Pakistani origin, with a medical history of ST-Elevation Myocardial Infarction (STEMI) specifically Inferior Wall MI, reported to the emergency department complaining of chest pain. The pain, which had a gradual onset, originated in the centre of the chest and radiated to the left arm, upper back, and right side of the jaw, with a pain score of 6/10. Notably, the patient did not exhibit any associated symptoms such as diaphoresis, nausea, or breathlessness. He had experienced a similar episode of pain a week after his first coronary angiography at Fakeeh Hospital, where he was treated for Inferior Wall MI. The patient, a smoker and non-alcoholic, had been adhering to the medication regimen prescribed by the attending physician at Fakeeh Hospital. His family history was unremarkable.

Upon physical examination, the patient's tympanic temperature was recorded at 36.8 degrees Celsius, heart rate at 67 beats per minute, respiratory rate at 14 breaths per minute, and blood pressure at 136/80 mmHg. His oxygen saturation (SpO2) was 100%. Auscultation revealed normal heart sounds and bilateral vesicular breathing with no added sounds.

The 12-lead electrocardiogram (ECG) showed a regular sinus rhythm with a heart rate of 61 beats per minute. Noteworthy findings included T wave inversion in leads II, III, and aVF, and a small Q wave, indicative of old ischemic changes in the inferior wall as shown in (Figure 1). Management of Acute Coronary Syndrome (ACS) as per the Advanced Cardiac Life Support (ACLS) guidelines was initiated. Laboratory investigations revealed Creatine Kinase-MB (CK-MB) levels at 19.01 ng/ml and highly sensitive Troponin T levels at 294.3 ng/ml as shown in (Figures 2 and 3) respectively. The patient's high- density lipoprotein (LDL) was elevated at 171.1 mg/dl, and haemoglobin was 13.7 g/dl.

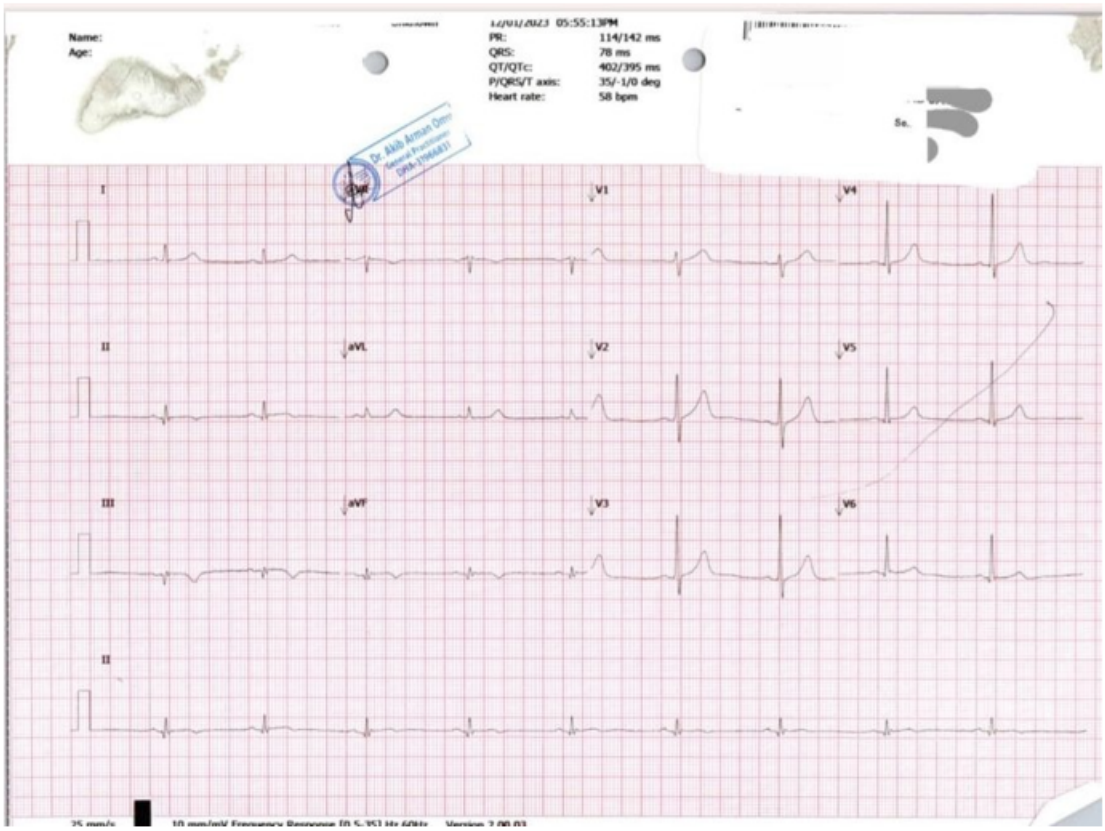

Figure 1: ECG readings for T wave inversion in lead II, III and avf and small Q wave

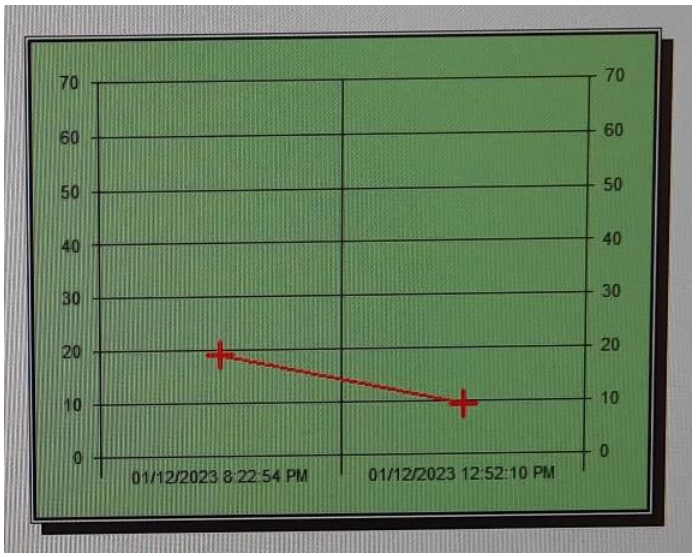

Figure 2: Change in CKMB level

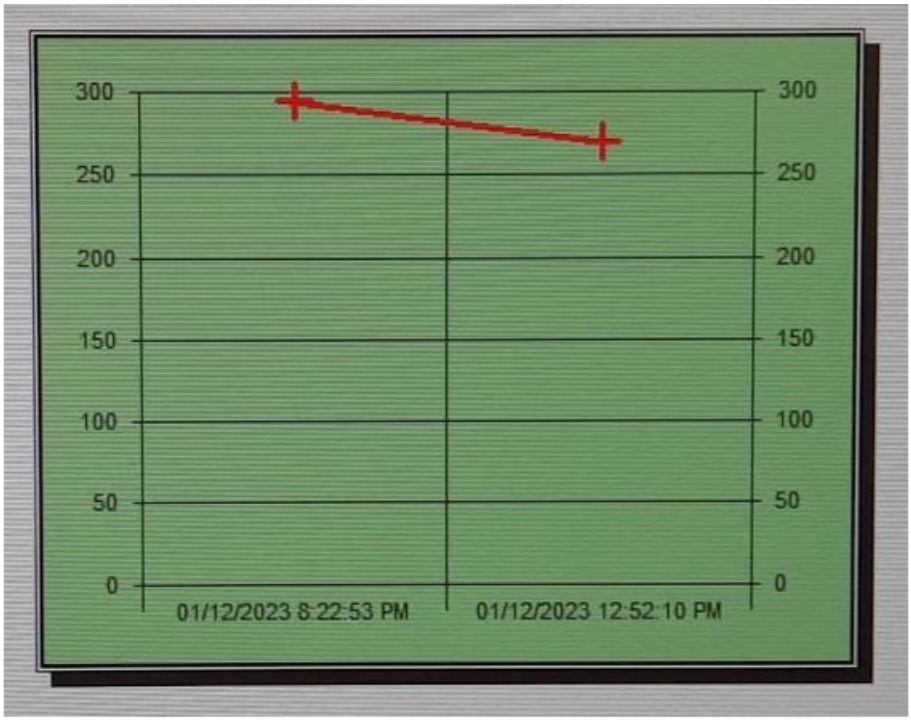

Figure 3: Change in Troponin level

Cardiac catheterization revealed 40% stenosis in the mid-segment of the Left Anterior Descending (LAD) artery with TIMI III flow, 70% stenosis in the mid-segment of the first diagonal branch, and 70% stenosis in the proximal segments of the Left Circumflex artery. The Right Coronary Artery (RCA) was Ectatic, (Figure 4), with TIMI II flow, occlusion of the Posterior Left Ventricular (PLV) branch, and faint retrograde filling from the left system. A perforation in the vessel was also observed as shown in (Figure 5). Given the failed attempt at Percutaneous Coronary Intervention (PCI) to the distal RCA and PLV a month prior, no further attempts were made.

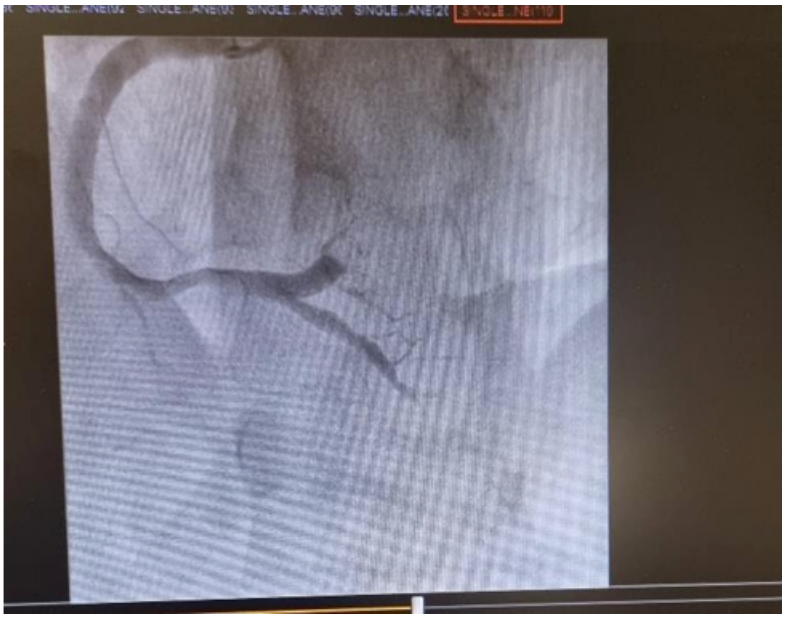

Figure 4: Ectatic vessel

Figure 5: Perforated vessel

Post-angiography, the patient underwent further evaluation to assess cardiac function and structural abnormalities. Echocardiography revealed mild hypo kinesis of the basal inferio-posterior and inferior- lateral wall. Trace mitral regurgitation was noted with a normal left atrium size and no aortic stenosis. The pericardium in the posterior-lateral wall appeared brightened. The Left Ventricular Ejection Fraction (LVEF) was 50%. Mitral inflow velocity indicated grade I Left Ventricular (LV) diastolic dysfunction with a normal Left Ventricular End Diastolic Pressure (LVEDP) of 0.9. A mild pericardial effusion was observed during the first echocardiography conducted a month prior. There was no evidence of pulmonary hypertension or clot formation.

The patient remained hemodynamically stable and was discharged on the second day of hospitalization. His discharge medications included Lipitor 40 mg daily, Plavix 75 mg daily, Aspirin 100 mg daily, Atacand 4 mg daily, and Euthyrox 100 mcg once daily, given his known history of hypothyroidism.

During the patient's follow-up visit a week later, he reported persistent chest pain and discomfort. It was hypothesized that he was likely suffering from pericarditis, potentially due to the accumulation of blood in the posterior wall of the left ventricle during his initial angiography. Given the persistence of his symptoms, he was prescribed a 14-day course of Colchicine, administered at a dosage of 0.5 mg twice daily. This medication regimen proved to be effective in alleviating his symptoms.

Discussion

Pericardium is a thin membrane which surrounds the heart and the roots of the major blood vessels that extend from the heart. One of the pathological conditions that affect the pericardium is called Pericarditis. Pericarditis is the inflammation of the fluid filled sac. As the pericardium gets inflamed the typical heart function is disrupted leading to symptoms from chest pain. The types of infection that contribute to pericarditis are as follows. (i) Viral infection: Influenza, Enterovirus (usually cold meningitis or viral), Adenovirus (Bronchitis and pneumonia) and others. (ii) Bacterial infection: Streptococcus pneumonia, Mycobacterium tuberculosis, Staphylococcus aureus. (iii) Fungal infection: It can occur in patients with compromised immune system. (iv) Autoimmune conditions: Lupus or Rheumatoid arthritis. (v) Medications: Cancer Treatment drugs or any drug that suppress the immune system have side effects. (vi) trauma: cardiac instrumentation, cardiac surgery (vii) myocardial infarction.

Post cardiac injury syndrome (PCIS), also known as post pericardiectomy syndrome and Dressler's syndrome, commonly occurs after cardiac surgery or following myocardial infarction, but has also been reported following temporary/permanent pacemaker implantation and radiofrequency ablation, and, as reported here and by others, can be a rare complication following PCI [8]. The chances of developing pericarditis are approximately 0.2% post coronary angiography [9]. Sometimes invasive cardiac procedures may lead to epicardia myocardial and pericardial damage that may lead to accumulation of debris and blood in the pericardium. It's important to rule out either its ischemic attack or pericardial inflammation according to the clinical picture of the patient characterized by typical chest pain (sharp, retrosternal pain that radiates to trapezius ridge, often aggravated by lying down and relieved by sitting up pericardial friction rub, pericardial effusion, leucocytosis and elevated CRP level). Although the pathogenesis of PCIS following PCI remains unclear, immune-mediated mechanisms involving anti-heart autoantibodies as well as irritable blood accumulating in the pericardial space inciting pericardial injury. Specific electrocardiographic changes (ST-T wave changes with characteristic evolutionary changes and PR segment depression). Clinical presentations can vary from patient to patient as in our case, patient presented with the symptom of chest pain on and off with no acute ECG findings other that old infarction.

In this case, upon detailed history, we excluded all the main possible causes of pericarditis like viral fever, bacterial infection, auto immune disease and trauma history, we assumed that, patient developed pericarditis after first coronary angiography due to perforation of distal part of right coronary artery. The morphologic response to injury of the pericardium is limited. It reacts to injury by creating exudate consisting of a combination of fluid, fibrin and cells. The components of the exudate are determined by the underlying cause of pericardial disease.

Recurrence of pericarditis (with or without pericardial effusion) occur in up to one third of the patients, usually within 18 months of acute attack and may follow a course of many years [7]. As in this case, patient had recurrent attack after one month of acute attack.

Prolong symptoms of pericardial inflammation leads to various complications like (i) cardiac tamponade (that is accumulation of pericardial fluid under pressure and may be acute, subacute, low pressure or regional). (ii) Constrictive pericarditis (thickening, calcification and loss of elasticity of the pericardium). (iii) Elevation of the right atrial and pulmonary wedge pressures persists after drainage of the pericardial fluid.

Acute pericarditis usually respond to non -steroidal anti-inflammatory drugs (NSAIDS), like aspirin 650mg every 3 to 4 hours)or ibuprofen (300-800 mg every 6 hours) [7]. Corticosteroids should be avoided unless there is a specific indication (such as connective tissue disease or uremic pericarditis) because they enhance viral multiplication and may result in recurrences when the dosage is tapered.it has been observed that the systemic use of colchicine (for 3 months) as an adjunct to NSAIDS during the

first episode of pericarditis strikingly reduces the recurrence of pericarditis by 70% [10]. Colchicine therapy may be considered systematically and is given a class I indication according to ESC (EUROPEAN SOCIETY OF CARDIOLOGY) guidelines (1 mg BID the first day, followed by 0.5 mg BID, a lower dose of 0.5 mg BID the first day followed by 0.5 mg once daily is given for 3 months to patients weighing <70kg) [11]. Colchicine concentrates in white blood cells, particularly polymorph nuclear cells, inhibiting tubulin polymerization, thus interfering with migration and phagocytosis, and reducing the inflammatory cycle [12]. Two randomized placebo-controlled trials of colchicine for recurrent pericarditis reported marked and significant reduction in symptoms persistence at 72 hours and recurrence at 18 months when colchicine was added to conventional therapy [7].

Here we described a rare case of PCIS that manifest as acute pericarditis and localized pericardial effusion. Coronary perforation of vessels by guidewire during cardiac catheterization and accumulation of blood in the pericardium likely caused the injury to the pericardium. ECG findings showed old ischemic changes in the inferio-lateral leads that was contrary to the usual diffuse changes of ST elevation in pericarditis.

Conclusion

Post myocardial infarction pericarditis in a patient having a recent MI and coronary angiogram requires a high degree of diagnostic accuracy in order to prevent repeated cardiac catheterization and timely institution of NSAIDS and colchicine for the treatment of pericarditis would help in the resolution symptoms of chest pain and alleviation of patient's apprehension that he is suffering from recurrent MI.

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