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CASE REPORT

Successful Reperfusion Using Mechanical Aspiration Thrombectomy in ST-Segment Elevation Myocardial Infarction with an Ectatic Right Coronary Artery: A Case Report

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Abstract:

A Coronary artery ectasia predisposes to thrombus formation through disturbed flow and blood stasis, fulfilling a key component of Virchow's triad, and may result in acute myocardial infarction with a high thrombus burden. The aim of primary percutaneous coronary intervention (PPCI) is restoration of both epicardial coronary flow and myocardial reperfusion. Although routine thrombus aspiration is not recommended, selective use may be beneficial in patients with extensive intracoronary thrombus. We report a 60-year-old diabetic and hypertensive man presenting with acute inferior wall myocardial infarction, in whom coronary angiography demonstrated diffuse ectasia of the right coronary artery and its branches with a massive thrombus in the posterior left ventricular branch. Following administration of unfractionated heparin and eptifibatide, multiple passes of manual aspiration thrombectomy using a Medtronic Export Advance catheter resulted in successful thrombus removal, restoration of coronary flow, and complete ST-segment resolution, highlighting the potential role of selective aspiration thrombectomy during PPCI in ectatic coronary arteries with high thrombus burden.

Key words: Acute myocardial infarction; Coronary artery ectasia;Manual aspiration thrombectomy; Primary PCI

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Introduction:

Intracoronary thrombosis is a major determinant of adverse outcomes in ST-segment elevation myocardial infarction (STEMI), contributing to distal embolization, slow-flow or no-reflow phenomena, stent thrombosis, and increased mortality despite primary percutaneous coronary intervention (PCI)[1]. Although large randomized trials have failed to demonstrate routine clinical benefit from manual aspiration thrombectomy (MAT) during primary PCI[2], selective use of MAT in patients with a high thrombus burden may reduce thrombotic complications, including stent thrombosis and reinfarction[1]. Consequently, MAT continues to be employed in carefully selected cases to improve coronary flow and microvascular reperfusion. When aspiration alone is inadequate, adjunctive strategies such as intracoronary thrombolysis, modified balloon techniques, or deferred stenting may be required. Coronary artery ectasia further increases thrombotic risk by promoting blood stasis and disturbed flow, creating a substrate for extensive thrombus formation.

Case presentation:

A 60-year-old male smoker, hypertensive and diabetic presented to the emergency department with sudden, severe central chest pain radiating to the jaw, neck, and left arm for 30 minutes. He was anxious and diaphoretic, with a pulse of 90 beats/min and a blood pressure of 90/60 mmHg. Electrocardiography showed ST-segment elevation in leads II, III, and aVF, with reciprocal ST-segment depression in leads I, aVL, and aVR (Figure 1A).

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He received loading doses of aspirin (300 mg), ticagrelor (180 mg), and atorvastatin (40 mg) and was referred for emergency cardiac catheterization.

Transfemoral coronary angiography revealed ectasia of the right coronary artery (RCA) and posterior left ventricular (PLV) branch, with critical ostial stenosis of the PLV partially occluded by a large organized thrombus, resulting in TIMI 2 flow (Figure 2A). The left coronary system wasnormal. Due to ongoing chest pain and hemodynamic instability, primary percutaneous coronary intervention (PPCI) was undertaken.

Intravenous unfractionated heparin (8,000 IU) and intracoronary eptifibatide were administered. Manual aspiration thrombectomy was performed using a Medtronic Export Advance catheter, with two passes, retrieving a substantial red thrombus and restoring TIMI 3 flow, allowing clear visualization of the distal vessel. A 4.0 × 18 mm drug-eluting stent was deployed from the distal RCA to the PLV branchachieving excellent angiographic result with TIMI 3 flow and good myocardial blush (Figure 2B).Post-procedure, the patient's chest pain resolved completely. He had an uncomplicated recovery in the coronary care unit. ECG demonstrated complete ST-segment resolution (Figure 3), and transthoracic echocardiography revealed preserved left ventricular function without regional wall motion abnormalities.

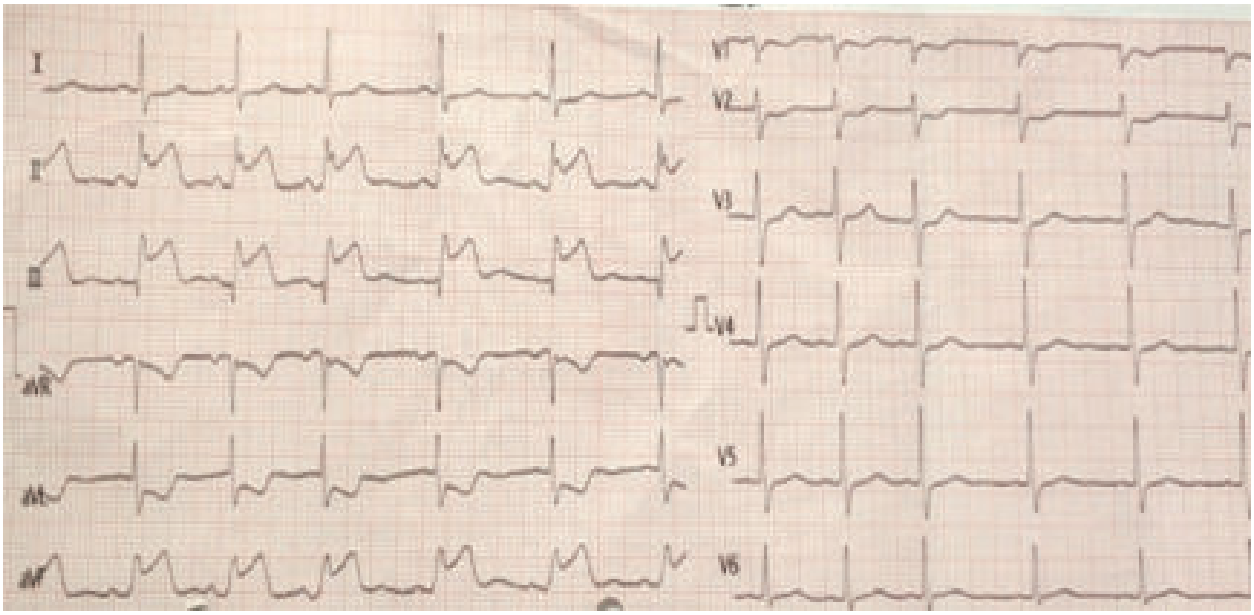

Figure 1: *ST-Elevation in lead II, III aVF and ST depression in lead aVL, V1, V2.*

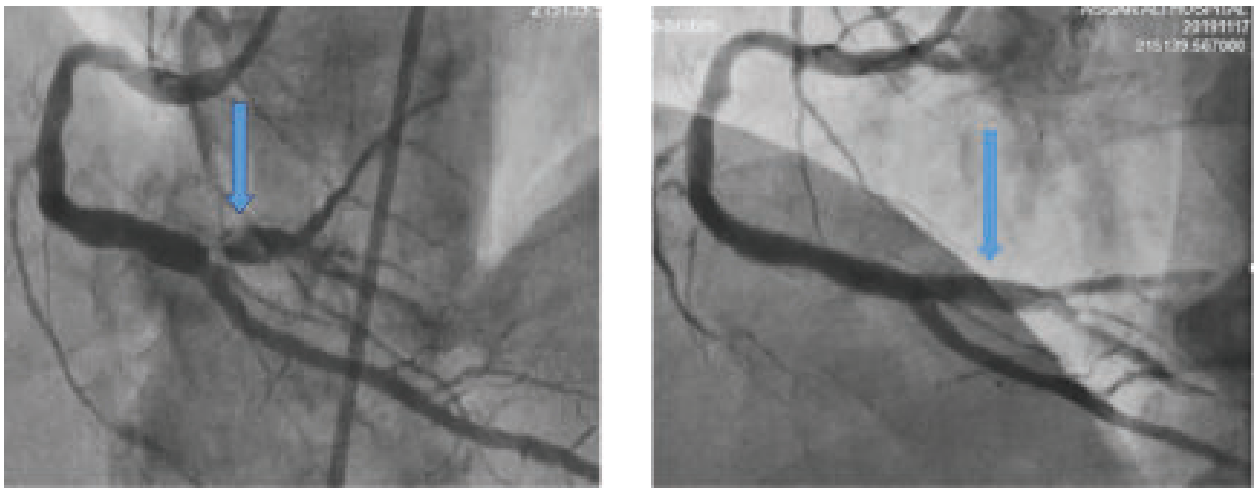

Figure 2 A: *A large thrombus in the "Ostio-proximal"* ***2B:*** *After stent deployment into the lesion part of the posterior left ventricular branch.*

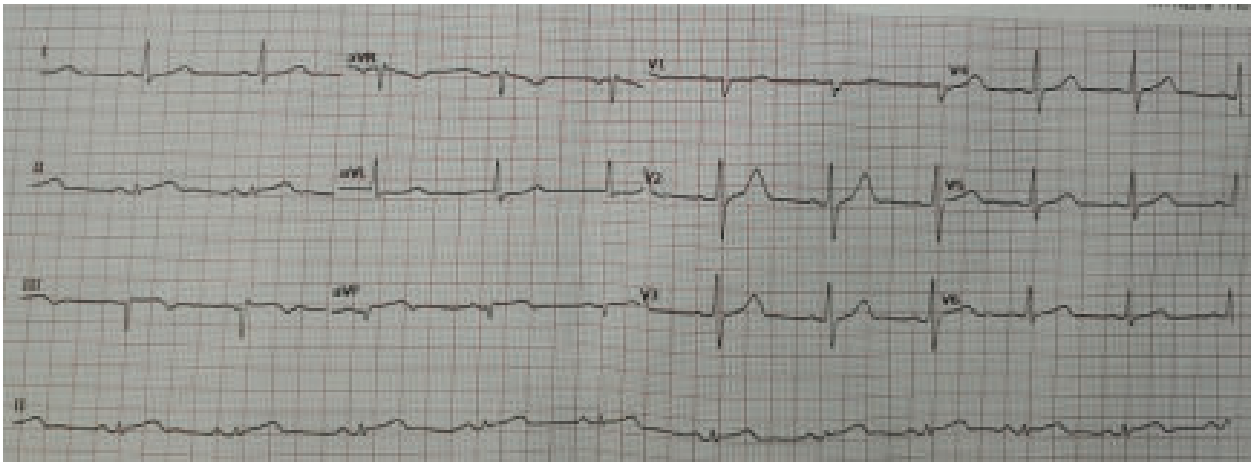

Figure 3: *Complete resolution of the ST segment after the procedure.*

Discussion:

Massive intracoronary thrombi are associated with unsuccessful angiographic reperfusion and unfavorable clinical outcomes[3,4].Although there have been improvements in antiplatelet and anticoagulant regimens and technical advances in PCIs, intracoronary thrombus remains one of the most dreaded enemies of interventional cardiologists. MAT is one of the most frequently used thrombectomy methods in primary PCIs, because the procedure is simple and the risk of vascular injury and distal embolism is low. Clinical guidelines also suggest that MAT is a reasonable approach when intracoronary thrombi are encountered8. However, studies have yielded inconsistent results in terms of its benefits in primary PCI[2,5].More recently, Jolly et al[2]. also reported that MAT did not reduce cardiovascular events, whereas it increased stroke rate. This result may partly be related to insufficient thrombus removal and inadequate coronary blood flow recovery in cases with massive intracoronary thrombosis. Safe and feasible alternative strategies are needed when MAT fails during primary PCI.

Intracoronary thrombolysis, once widely used for coronary artery disease, declined with the rise of primary PCI and stent implantation. Recently, it has regained use as an adjunct therapy. Studies have shown that agents like tenecteplase and alteplase, combined with improved antiplatelet regimens, are safe and effective in enhancing coronary flow, particularly in STEMI and cases of massive intracoronary thrombosis[6].

In our case first we had used the glycoprotein IIb/IIIa inhibitor followed by MAT which helped to clear up the thrombus and implantation of our stent become easy. After the stent implantation TIMI 3 flow as well as good myocardial blush was seen.

In this case, a large thrombotic occlusion occurred in the osteo-proximal part of ectatic PLV. Coronary ectasia is defined as a diffuse dilation of a coronary artery to a diameter at least 1.5 times larger than normal coronary artery diameter[7]. It is present in 1–5% of patients undergoing CAG.Various reperfusion strategies including MAT alone, simple balloon angioplasty, pulse-spray thrombolysis, intracoronary thrombolysis and mesh-covered stent implantation have been proposed in STEMI in ectatic coronary arteries[8]. Several randomized controlled trials have reported that rheolytic thrombectomy was more effective than MAT in thrombus removal and myocardial reperfusion in patients with STEMI, although there were no differences in infarct sizes and adverse cardiac events following PCI between rheolytic thrombolysis and MAT[9].Simple balloon angioplasty might increase the risk of distal embolization after intracoronary thrombus is incompletely removed. Prolonged intravenous heparin infusion is a viable option for the remaining thrombus after MAT in ectatic coronary arteries[10]. However, for ectatic coronary arteries, because the sheer amount of thrombus is massive and blood flow is slow, no single strategy would be sufficient. In fact, we employed multiple strategies namely glycoprotein IIb/IIIa inhibitor, MAT & balloon angioplasty during the PCI to achieve a good immediate result and ultimately an excellent outcome was seen.

Conclusion:

Intracoronary thrombus (ICT) during STEMI is common and can lead to worse clinical outcomes. While there is no gold-standard therapy to deal with ICT, there are a combination of both pharmacological and mechanical therapies that can be utilized. Importantly, aspiration

thrombectomy should not be used routinely in STEMI cases but may be helpful in selected cases at the discretion of the operator.

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