Low Dose of Intracoronary Tenecteplase in High Thrombus Burden in Primary Percutaneous Coronary Intervention – A Case Report

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Abstract

Primary percutaneous coronary intervention (PPCI) has emerged as the current standard of care for ST elevation myocardial infarction (STEMI) in achieving reperfusion of injured artery. Most of the STEMI can achieve reperfusion by using stenting, however, condition may not be the same when there is presence of massive intracoronary thrombus in PPCI. It remains challenging and is a strong predictor of adverse outcome. Thus, there is a need for further appropriate strategy to ensure coronary reperfusion in order to reduce morbidity and mortality. We hereby report a case with high thrombus burden in PPCI, after failed manual aspiration thrombectomy, which is successfully treated with low dose of intracoronary thrombolysis. Re-look angiogram showed complete resolution of thrombus in dominant right coronary artery (RCA) compared to previous angiogram.

1. Introduction

PPCI is the standard reperfusion strategy and most effective treatment in ST elevation myocardial infarction nowadays. However, presence of massive intracoronary thrombus is a challenging condition during PPCI. The prevalence of massive intracoronary thrombus has been reported as high as 17%, and it carries adverse clinical and procedural outcomes (eg. failed thrombus aspiration and slow flow).1,2,3,4Nature of coronary artery, for example like ectatic and big size due to progressive remodeling may contribute to this condition.

In addition, even with manual thrombus aspiration strategy, the persistence of intracoronary thrombus still high and can up to 8%. In this scenario, intracoronary thrombolysis is an alternative method as low dose intracoronary thrombolysis is safe and leads to improvement in epicardial flow and tissue perfusion by dissolving thrombus.9Thereby, we report our experience in using low dose intracoronary thrombolytic agent through aspiration catheter in a patient with massive intracoronary thrombus with failed manual thrombus aspiration.
2. Case Report

A 73 years old gentleman, with underlying atrial fibrillation on Dabigatran 150mg BD, presented to our centre with typical chest pain at 7am. It occurred at resting, heaviness in nature and pain score of 8/10. It was associated with nausea and diaphoresis. He denied of failure symptoms. On physical examination, he appeared alert with full Glasgow Coma Scale. His blood pressure was 112/72mmHg, pulse rate 72 beats per minute with pulse oximetry reading of 98%. Lungs auscultation appeared to be clear. Electrocardiogram (ECG) on arrival showed ST segment elevation in lead II, III, avF with T inversion in lead I, aVL, V4 to V6 (Figure 1). Diagnosis of acute inferior STEMI Killip I was made. Aspirin 300mg and clopidogrel 300mg were served. Subsequently, patient was pushed to angiogram suite for PPCI.

![Figure 1: Electrocardiogram on arrival showed ST segment elevation in lead II, III, avF with T inversion in lead I, aVL, V4 to V6.](image)

Coronary angiogram revealed dominant and very big size right coronary artery (RCA). It also demonstrated acute occlusion of distal RCA with large thrombi (Figure 2a). Intracoronary Tirofiban was given over 3 minutes. Five attempts of aspiration thrombectomy had failed to achieve reperfusion. Despite multiple white and red thrombi aspirated, but still presence of large thrombus and unable to achieve optimal flow TIMI 3. Subsequently, we decided to administer low dose intracoronary thrombolysis via aspiration catheter.

![Figure 2a: RCA dominant, ectatic vessel; large distal thrombus obstructing distal flow](image)

Intracoronary tenecteplase (TNK) administered was1/5th of the systemic dose while remaining 4/5th was given through intravenous route. He was then maintained on heparin infusion as per protocol for the next 24 hours. He was monitored in coronary care unit for signs of reperfusion. Relook angiogram was performed 10 days later noted complete resolution of thrombus at crux PLA/PDA compared to previous angiogram (Figure 2b).

![Figure 2b: Complete resolution of thrombus at crux PLA/PDA compared to previous angiogram](image)
Patient developed 1 episode of ventricular fibrillation with cardiorespiratory arrest at 3 pm on the same day. CPR was performed for 1 minute and defibrillation of 150J was delivered, before ventricular fibrillation was terminated. He was given low molecular weight heparin enoxaparin, but it was interrupted by hematuria. Hematuria resolved after conservative treatment. No significant drop in haemoglobin level noted. He was discharged home well after 12 days of admission.

Discussion

Massive intracoronary thrombus is not uncommon and is associated with PCI failure. With its high association with distal embolization, it bears adverse prognostic implication. On the other hand, persistent intracoronary thrombus causing no-reflow phenomenon, and leads to reduction of myocardial perfusion with increment of infarct size. Manual thrombus aspiration can be considered in cases of high thrombus burden in PCI, even though studies showed inconsistent results in terms of its benefit versus risks. Nevertheless, TOTAL trial, TASTE trial and INFUSE-AMI trial consistently reflected that routine manual aspiration does not help in the mortality reduction and re-hospitalizations.

In the condition of failed aspiration in PCI, low dose intracoronary thrombolysis is another safe option. A study conducted by Sezer M et al revealed that intracoronary streptokinase administration in PCI not only improves microvascular perfusion, it also prevents left ventricular dilatation, preserve systolic function and also reduce long term left ventricular infarct size. Besides that, Kelly et al. reported that intracoronary TNK was safe and well-tolerated. In fact, another study conducted by Boscarelli et al. found that administration of intracoronary low dose TNK or alteplase in STEMI, had shown significant reperfusion and thrombus dissolution after manual thrombus aspiration. There are few case reports or case series showed similar outcome with successful reperfusion after intracoronary thrombolysis in massive intracoronary thrombus. The intracoronary TNK dosage that we used were 1/5th of the systemic dose while remaining 4/5th was given through intravenous route. He was then maintained on heparin infusion as per protocol for the next 24 hours.

On the other hand, the risk of bleeding is always a concern for clinician. A meta-analysis conducted by Wu et al demonstrated that no significant difference in bleeding risk events in between the intracoronary GPIs group and those in the control group. It is due to tirofiban is belongs to small molecule glycoprotein IIb/IIIa inhibitor, which is highly selective and has shorter half-life, with certain platelet inhibition and reversibility. This safety profile is also supported by Kelly et al. By looking at our patient, he developed few days of hematuria, resolved after conservative treatment and no major bleeding noted.

In a nutshell, low dose intracoronary thrombolysis with TNK is a safe and effective reperfusion strategy in selected cases, especially high thrombus burden in PCI.

Reference


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