MEDWIN PUBLISHERS
Committed to Create Value for Researchers

Open Access Journal of Cardiology
ISSN: 2578-4633

In-Situ Thrombosis Post Primary Percutaneous Coronary Intervention and Possible Management

Haytham Emara*

Department of Cardiology, University Hospital of Wales, UK

***Corresponding author:** Haytham Emara, Department of Cardiology, University Hospital of Wales, UK; Email: haythamemara147@hotmail.com

Mini Review

Volume 8 Issue 1

Received Date: March 03, 2024

Published Date: March 22, 2024

DOI: 10.23880/oajc-16000200

Abstract

Background: Several intracoronary agents have been used by interventional cardiologists, in context of PCI iatrogenic thrombosis. Recently the use of low-dose fibrinolysis at the time of the primary PCI has gained popularity as a new strategy to improve post-procedural coronary flow.

Conclusion: Using low-dose fibrinolytic therapy at the time of primary PCI might play a vital role in minimizing the risk of microvascular thrombus.

Keywords: Intracoronary Streptokinase; Thrombus Burden; S-T Elevation Myocardial Infarction; Primary PCI; Microvascular Perfusion; Distal Embolisation

Introduction

The restoration of coronary blood flow by PCI has significantly improved the prognosis of patients with acute STEMI during the past decades. However the occurrence of thrombosis may limit its success. This often leads to microvascular dysfunction due to distal embolization from mechanical reperfusion [1].

The presence of intracoronary heavy thrombus burden during PCI often presented a challenge for the interventionist, and usually played a crucial role in slow or no-reflow phenomenon, reduced post-PCI myocardial blush, as well as distal embolization, increasing the risk of MACE [2].

On angiography, heavy thrombus burden can look like a cut-off pattern of occlusion in the IRA, a floating thrombus, accumulated thrombus proximal to the occlusion, or persistent dye stasis distal to the occlusion. Accordingly, mechanical strategies as thrombus aspiration, embolic protection devices, rheolytic thrombectomy and ischaemic preconditioning, or pharmacotherapy as anticoagulants, glycoprotein IIb IIIa inhibitors, vasodilators and intracoronary thrombolytics could be used in dealing with such a problem [3].

Intracoronary administration of a thrombolytic leads to lysis of thrombus. As a consequence this mechanical deformation of the thrombus causes physical disruption of clot [4].

Sezer and his colleagues carried out a pilot study on 41 patients undergoing primary PCI. Patients were randomly assigned to receive intracoronary streptokinase in a dose of 250 kU. Fourty eight hours after PCI, all measures of microvascular function were significantly better in the streptokinase group than in the control group, including lower corrected TIMI frame count. Then in 2009 they added 54 eligible patients to those of the pilot study, in adherence with the same protocol, so the total sample volume became 95 patients who underwent primary PCI, were randomly distributed into 2 groups; a group who received ICSK 250 kU

(n=51) and a group who didn't receive any additional therapy (n=44). At 48 hours after the primary PCI procedure, the cTFC was lower and MBG 2 and MBG 3 were more frequent (86% vs. 36%; p = 0.001 adjusted) in the ICSK group, denoting better microvascular perfusion in the ICSK group compared to the control group. MBG and cTFC were significantly better in the ICSK group on the long term as well [5].

Bainey and his colleagues in 2015 through a meta-analysis, compared the benefits and risks of IC thrombolytic as an adjunctive agent during primary PCI in STEMI patients. Three randomised studies were included (131 patients; 71 IC thrombolytic and 60 IC placebo). TIMI flow 2 and TIMI flow 3 were more commonly seen with IC thrombolytic compared to placebo (P-value=0.004) [6].

Dissolution trial was conducted on STEMI patients with heavy thrombus burden, and in its conclusion that IC thrombolytic improves microvascular perfusion and can be used as an adjunctive therapy during primary PCI. It was carried out in 2013 by Greco and his colleagues, in Italy. They evaluated the hypothesis that local delivery of thrombolytics can enhance the efficacy of thrombus aspiration in patients with STEMI undergoing primary PCI. A total of 102 patients with STEMI and angiographic evidence of massive thrombosis in the culprit artery were randomly assigned to receive a local, intra-thrombus bolus of 200,000 U of urokinase (n = 51) or saline solution (n = 51) by way of an infusion microcatheter, followed by manual aspiration thrombectomy. The use of intra-thrombus urokinase was associated with a significantly higher incidence of TIMI flow 3 (90% vs 66%, p = 0.008). Regarding, post PCI TIMI frame count, in the DISSOLUTION trial, it was lower in the urokinase group (19±15 vs 25±17, p = 0.033) when compared to the control group (p= 0.000). The postprocedural myocardial perfusion in the DISSOLUTION trial was significantly increased with the use of urokinase (MBG 2 and MBG 3, 68% vs 45%, p = 0.028) [7].

A landmark study performed by Rentrop on intracoronary streptokinase in the 1980s, on patients with acute myocardial infarction. This has shown that ICSK improved microvascular perfusion, reduced infarct size, improved LV function during follow up, reduced the in-hospital mortality rate [8].

Conclusion

Using low-dose fibrinolytic therapy at the time of primary PCI (Intraprocedural) might play a vital role in minimizing the risk of microvascular thrombus.

References

1. Steg PG, James SK, Atar D, Badano LP, Blomstrom-Lundqvist C, et al. (2012) ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. Eur Heart J 33(20): 2569-2619.

2. Mazhar J, Maschicharan M, Farshid A (2016) Predictors and outcome of no-reflow post primary percutaneous coronary intervention for ST elevation myocardial infarction. IJC Heart Vasc 10: 8-12.

3. Silvain J, Beygui F, Barthélémy O, Pollack C Jr, Cohen M, et al. (2012) Efficacy and safety of enoxaparin versus unfractionated heparin during percutaneous coronary intervention: systematic review and meta-analysis. BMJ 3: 344-553.

4. Yunoki K, Naruko T, Inoue T, Sugioka K, Inaba M, et al. (2013) Relationship of thrombus characteristics to the incidence of angiographically visible distal embolization in patients with ST-segment elevation myocardial infarction treated with thrombus aspiration. JACC Cardiovasc Interv 6(4): 377-385.

5. Sezer M, Çimen A, Aslanger E, Elitok A, Umman B, et al. (2009) Effect of intracoronary streptokinase administered immediately after primary percutaneous coronary intervention on long-term left ventricular infarct size, volumes, and function. J Am Coll Cardiol 54(12): 1065-1071.

6. Bainey KR, Welsh RC, Mehta S (2015) Meta-analysis of intracoronary thrombolytic as an adjucant to primary percutaneous coronary intervention in S-T segment elevation myocardial infarction. Canadian Journal of Cardiology 31(10): 1-313.

7. Cesare Greco, Francesco Pelliccia, Gaetano Tanzilli, Tinti MD, Salenzi P, et al. (2013) Usefulness of local delivery of thrombolytics before thrombectomy in patients with S-T segment elevation myocardial infarction undergoing primary percutaneous coronary intervention (the delivery of thrombolytics before thrombectomy in patients with S-T segment elevation myocardial infarction undergoing primary percutaneous coronary intervention [DISSOLUTION] randomized trial). Am J Cardiol 112(5): 630-635.

8. Rentrop KP, Feit F, Blanke H, Stecy P, Schneider R, et al. (1984) Effects of intracoronary streptokinase and intracoronary nitroglycerin infusion on coronary angiographic patterns and mortality in patients with acute myocardial infarction. N Engl J Med 311(23): 1457-1463.