Heart Sci J 2022; 3(2): 1-2

Contents list available at www.heartscience.ub.ac.id

Heart Science Journal

Journal Homepage : www.heartscience.ub.ac.id

Editorial

# The Current Perspective of Primary Percutaneous Coronary Intervention for ST-Elevation Myocardial Infarction Patients

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ARTICLE INFO

*Keywords*:
Primary Percutaneous Coronary intervention;
ST-Elevation Myocardial Infarction;
Revascularization.

ABSTRACT

Primary percutaneous coronary intervention (PPCI) is the preferred reperfusion strategy in patients with ST-Elevation Myocardial Infarction (STEMI) within 12 h of symptom onset. Angiographically successful PPCI was defined as less than 30% residual stenosis by visual assessment and grade 3 Thrombolysis in Myocardial Infarction (TIMI) flow achievement. Radial access is preferred over femoral access. Drug-eluting stent (DES) implantation is superior to bare-metal stent (BMS) implantation or balloon angioplasty. In STEMI patients with cardiogenic shock, non-infarct related artery percutaneous coronary intervention (PCI) during the index procedure should be considered.

Acute coronary thrombosis causes complete coronary artery obstruction, resulting in ST-segment elevation myocardial infarction (STEMI). Exposition of the lipid-rich core into the artery lumen during atherosclerotic plaque rupture/erosion causes the creation of unstable platelet aggregates, which may induce an intermittent decrease in coronary flow and distal embolization. Early fibrin production increases the platelet aggregation, promoting prolonged flow obstruction and activation of blood coagulation proximally and distally to the occlusion. The fibrin network entraps erythrocytes and inflammatory cells, resulting in a red thrombus.[1] Therefore, the goal of reperfusion therapy in acute STEMI is to achieve patency of the epicardial infarct-related artery and restore myocardial tissue perfusion.[2]

Primary percutaneous coronary intervention (PPCI) refers to the revascularization strategy of taking STEMI patients directly to the cardiac catheterization laboratory to undergo mechanical revascularization using balloon angioplasty and stent implantation with or without aspiration thrombectomy.[3] A meta-analysis of randomized controlled trials (RCTs) revealed that PPCI was better than fibrinolytic therapy in reducing overall short-term death, non-fatal reinfarction, and stroke.[4] PPCI is the preferred reperfusion strategy in patients with STEMI within 12 h of symptom onset, provided it can be performed expeditiously (within 120 min from STEMI diagnosis) by an experienced team. It is recommended that percutaneous coronary intervention (PCI)-capable centers deliver a 24/7 service and are able to perform PPCI with no delay.[5,6]

Periprocedural antiplatelet and anticoagulant administration are essential strategies. Patients having PPCI had to be given dual antiplatelet therapy (DAPT), aspirin with a P2Y12 inhibitor (clopidogrel, prasugrel, or ticagrelor), and a parenteral anticoagulant (unfractionated heparin [UFH] or bivalirudin). As long as there are no contraindications, STEMI patients undergoing PPCI must receive DAPT for up to 12 months.[5,6] Because of the increased guiding catheter thrombosis risk,[7] fondaparinux is not recommended as a periprocedural anticoagulant in PPCI. Routine post-procedural anticoagulant administration is not recommended following a successful PPCI unless there is a separate indication for either prophylactic doses for venous thromboembolism (VTE) prevention in patients requiring prolonged bed rest or full-dose anticoagulation (mechanical valves, intracardiac thrombus, or atrial fibrillation [AF]). If the evidence of thrombotic adverse events or no-reflow phenomenon presents, GP IIb/IIIa inhibitors should be tried for rescue treatment.[5,6] The administration of the high-dose statin can be considered before PPCI in STEMI patients. It has a significant influence on post-procedural myocardial perfusion by enhancing Thrombolysis in Myocardial Infarction (TIMI) flow in patients undergoing PCI, and it also reduces the risk of major adverse cardiovascular events (MACE).[8]

Angiographically successful PPCI was defined as less than 30% residual stenosis by visual assessment and grade 3 TIMI flow achievement.[9] From the technical aspects, the current guidelines strongly recommend PPCI of the infarct-related artery by (1) radial access over femoral access; and (2) drug-eluting stent (DES) implantation over bare-metal stent (BMS) implantation or balloon angioplasty.[5,6] A meta-analysis study by Karrowni et al. showed that the radial access was related to a lower risk of mortality, major bleeding, and access site bleeding than the femoral route. However, it was associated with a prolonged procedure time.[10] The DES implantation is safe in patients with acute STEMI.

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https://doi.org/10.21776/ub.hsj.2022.003.02.1
Received 9 February 2022; Received in revised form 30 February 2022; Accepted 15 March 2022
Available online 30 April 2021

Moreover, DES implantation can improve clinical outcomes by lowering the reintervention risk compared to BMS.[11] The current guideline does not recommend the routine thrombus aspiration in STEMI patients.[5] The Swedish Coronary Angiography and Angioplasty Registry (SCAAR) registry revealed that compared to PCI alone, routine thrombus aspiration prior to PCI had no effect on 30-day mortality in STEMI patients undergoing PPCI.[12] Multivessel disease affects around 50% of STEMI patients. Before hospital discharge, STEMI patients with multivessel disease should be considered for routine revascularization of non-infarct related artery lesions. However, in STEMI patients with cardiogenic shock, non-infarct related artery PCI during the index procedure should be considered. In STEMI patients with cardiogenic shock or unstable hemodynamics because of mechanical complications, an intra-aortic balloon pump (IABP) support should be considered.[5,6]

## Conflict of Interest

There is no conflict o interest

## References


1. Silvain J, Collet JP, Nagaswami C, et al. Composition of Coronary Thrombus in Acute Myocardial Infarction. J Am Coll Cardiol. 2011;57(12):1359-1367. doi:10.1016/j.jacc.2010.09.077

2. Mongeon FP, Coelho-Filho OR, Coelho OR, Rinfret S. Adjunctive Thrombectomy in Primary Percutaneous Intervention for Acute Myocardial Infarction. Arq Bras Cardiol. 2011;97(4):e91-e101. doi:10.1590/s0066-782x2011001300019

3. Levine GN. ST-Elevation Myocardial Infarction. In: Cardiology Secrets. Elsevier; 2018:152-163. doi:10.1016/B978-0-323-47870-0.00017-9

4. Keeley EC, Boura JA, Grines CL. Primary angioplasty versus intravenous thrombolytic therapy for acute myocardial infarction: a quantitative review of 23 randomised trials. The Lancet. 2003;361(9351):13-20. doi:10.1016/S0140-6736(03)12113-7

5. Ibanez B, James S, Agewall S, et al. 2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. Eur Heart J. 2018;39(2):119-177. doi:10.1093/eurheartj/ehx393

6. Lawton JS, Tamis-Holland JE, Bangalore S, et al. 2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization. J Am Coll Cardiol. 2022;79(2):e21-e129. doi:10.1016/j.jacc.2021.09.006

7. The OASIS-6 Trial Group*. Effects of Fondaparinux on Mortality and Reinfarction in Patients With Acute ST-Segment Elevation Myocardial Infarction: The OASIS-6 Randomized Trial. JAMA J Am Med Assoc. 2006;295(13):1519-1530. doi:10.1001/jama.295.13.joc60038

8. Xiao Y, He S, Zhang Z, Feng H, Cui S, Wu J. Effect of High-Dose Statin Pretreatment for Myocardial Perfusion in Patients Receiving Percutaneous Coronary Intervention (PCI): A Meta-Analysis of 15 Randomized Studies. Med Sci Monit. 2018;24:9166-9176. doi:10.12659/MSM.911921

9. Kukreja N, Onuma Y, Garcia-Garcia H, Daemen J, van Domburg R, Serruys PW. Primary Percutaneous Coronary Intervention for Acute Myocardial Infarction: Long-Term Outcome After Bare Metal and Drug-Eluting Stent Implantation. Circ Cardiovasc Interv. 2008;1(2):103-110. doi:10.1161/CIRCINTERVENTIONS.108.787762

10. Karrowni W, Vyas A, Giacomino B, et al. Radial Versus Femoral Access for Primary Percutaneous Interventions in ST-Segment Elevation Myocardial Infarction Patients. JACC Cardiovasc Interv. 2013;6(8):814-823. doi:10.1016/j.jcin.2013.04.010

11. Kastrati A, Dibra A, Spaulding C, et al. Meta-analysis of randomized trials on drug-eluting stents vs. bare-metal stents in patients with acute myocardial infarction. Eur Heart J. 2007;28(22):2706-2713. doi:10.1093/eurheartj/ehm402

12. Fröbert O, Lagerqvist B, Olivecrona GK, et al. Thrombus Aspiration during ST-Segment Elevation Myocardial Infarction. N Engl J Med. 2013;369(17):1587-1597. doi:10.1056/NEJMoa1308789