

# Primary Percutaneous Coronary Intervention in the Left Main ST-Elevation

*by Mochamad Yusuf Alsagaff*

---

**Submission date:** 03-Mar-2023 11:02AM (UTC+0800)

**Submission ID:** 2027565603

**File name:** utaneous\_Coronary\_Intervention\_in\_the\_Left\_Main\_ST-Elevation.pdf (918.42K)

**Word count:** 2000

**Character count:** 11204



## Primary Percutaneous Coronary Intervention in the Left Main ST-Elevation Myocardial Infarction and Cardiogenic Shock on Octogenarian Patient with Single Remaining Vessel

Mochamad Yusuf Alsagaff<sup>1</sup>, Kandita Arjani<sup>2</sup>, Yudi Her Oktaviono<sup>3</sup>, Sondang Jasmine Sitorus<sup>4</sup>

Department of Cardiology and Vascular Medicine, Faculty of Medicine, University of Airlangga, Surabaya, Indonesia

### Abstract

The left main coronary artery (LMCA) ST-elevation myocardial infarction has been associated with significant morbidity and mortality. Older age and cardiogenic shock are independent predictors for in-hospital mortality. Here, we report a case of an 89-year-old Javanese man with a history of smoking presented with total LMCA occlusion complicated by cardiogenic shock in an octogenarian that was saved by stenting in thrombolysis in myocardial infarction Flow III right coronary artery.

**Edited by:** Igor Spiroski  
**Citation:** Alsagaff MY, Arjani K, Oktaviono YH, Sitorus SJ. Primary Percutaneous Coronary Intervention in the Left Main ST-Elevation Myocardial Infarction and Cardiogenic Shock on Octogenarian Patient with Single Remaining Vessel. Open Access Maced J Med Sci. 2021 Apr 28; 9(B):363-366. https://doi.org/10.3889/oamjms.2021.6032  
**Keyword:** ST-elevation myocardial infarction augmented vector right; Left main ST-elevation myocardial infarction; Single remaining vessel; Octogenarian  
**\*Correspondence:** Mochamad Yusuf Alsagaff, Department of Cardiology and Vascular Medicine, Faculty of Medicine, Universitas Airlangga, Surabaya, East Java, Indonesia. E-mail: yusuf\_505@fk.unair.ac.id  
**Received:** 17-Mar-2021  
**Revised:** 06-Apr-2022  
**Accepted:** 18-Apr-2020  
**Copyright:** © 2021 Mochamad Yusuf Alsagaff, Kandita Arjani, Yudi Her Oktaviono, Sondang Jasmine Sitorus  
**Funding:** This research did not receive any financial support  
**Competing Interest:** The authors have declared that no competing interest exists  
**Open Access:** This is an open-access article distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0)

### Introduction

The left main coronary artery (LMCA) ST-elevation myocardial infarction has been associated with significant morbidity and mortality. The LMCA culprit lesions in acute coronary syndrome usually present with hemodynamic instability and cardiogenic shock [1]. Older age and cardiogenic shock are independent predictors for in-hospital mortality [2]. Octogenarian people with acute myocardial infarction (AMI) mostly get conservative strategy, although guideline may proceed to myocardial revascularization [3]. Here, we report a case of total LMCA occlusion complicated by cardiogenic shock in an octogenarian that was saved by stenting in thrombolysis in myocardial infarction Flow III right coronary artery (RCA). This case highlights a rare case of STEMI in a single remaining vessel.

### Case Report

An 84-year-old Javanese man with a risk factor of smoking was referred to our emergency unit

with STEMI on augmented vector right (aVR) Killip IV and new-onset RBBB. The patient complained of typical chest pain and had been treated for 8 days at the local hospital. However, the symptoms worsen and become persistent in day 9 of hospitalization. Patients had received 2.5 mg of subcutaneous fondaparinux for 5 days, 75 mg of clopidogrel, 2.5 mg of bisoprolol, 20 mg of atorvastatin, and 100 ng norepinephrine/min through continuous pump. On admission, the blood pressure was 97/64 mmHg with support of 100 ng norepinephrine/min continuous infusion, heart rate 104 beats/min (bpm), respiratory rate 24 times/min, and oxygen saturation of 96% with O<sub>2</sub> supplementation of 6 l/min on a simple mask.

Electrocardiogram showed sinus tachycardia, 104 bpm, and left axis deviation, with ST elevation in aVR and incomplete RBBB (Figure 1). Laboratory tests showed an increment of cardiac markers with CKMB of 23.7 U/L and troponin-I of 8.26 ng/ml. From transthoracic echocardiography, we found mild mitral, aortic, and mild tricuspid regurgitation without thrombus or vegetation. There was a decrease in systolic left ventricular (LV) function (EF Teich 41%), with diastolic LV function LV pseudonormal, and normal systolic RV function. There was hypokinetic in anteroseptal BM, inferoseptal BM, septal A, and

anterior BMA from LV segmental analysis. No LV hypertrophy was found.

Laboratories value	
Leukocytes	10,110
Hemoglobin	11.8
Platelets	145,000
Serum glutamic-oxaloacetic transaminase/serum glutamic pyruvic transaminase	43/29
Albumin	1.19
Creatinine	0.78
BUN	68
CK-MB	23.7
Blood sugar	213
Sodium	140
Potassium	4.3
Chloride	100
Troponin-I	8.26
Triglycerides /total cholesterol	75/129

Emergency coronary angiography was obtained and resulted in ostial left main chronic total occlusion (Figure 2). There was a significant stenosis (90%) in distal RCA (Figure 3) with Grade II collateral perfusion from RCA to LCA (Figure 4). We tried to open the culprit lesion at first. However, the guiding catheter failed to engage in the LCA. Based on those findings, an emergency bypass was planned for complete revascularization, and intra-aortic balloon pump (IABP) was implanted during the procedure due to hemodynamic instability (Figure 5). The patient case was then discussed within the heart team, and we decided to open up RCA, as it will simplify the complicated procedure.

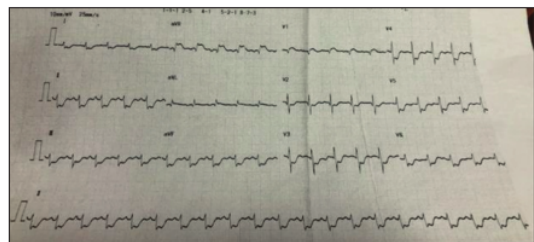


Figure 1: An electrocardiogram shows ST elevation in leads augmented vector right and ST depression in all

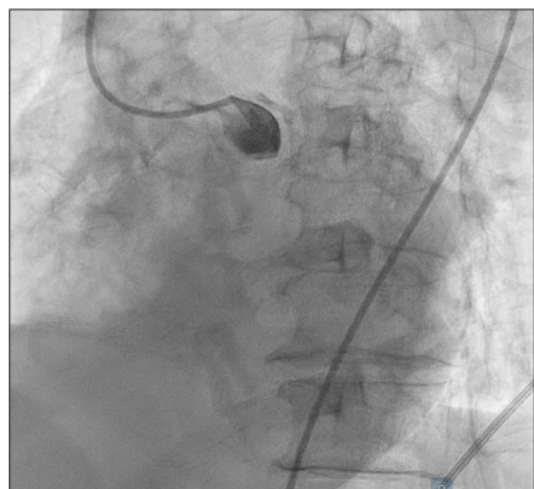


Figure 2: Coronary angiogram at the first attempt showed total occlusion in ostial left main coronary artery

Considering that the RCA was the single remaining vessel that perfused all part of the threatening myocardium, we execute quick direct stenting on the RCA. It was a pristine procedure followed by an immediate improvement in the patient's symptoms and hemodynamic. Within 24 h, IABP and vasoactive drugs were weaned. The patient was discharged 7 days after percutaneous coronary intervention (PCI) procedure with optimal medical therapy (100 mg of aspirin, 75 mg of clopidogrel, 40 mg of atorvastatin, 2.5 mg of bisoprolol, 5 mg of ramipril, 5 mg of isosorbide dinitrate, 40 mg of furosemide, and 25 mg of spironolactone).

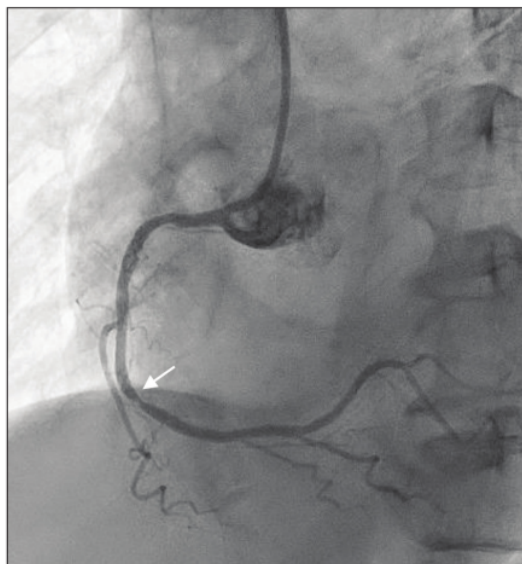


Figure 3: From the left anterior oblique view, there was critical stenosis 90% on distal right coronary artery (white arrow).



Figure 4: There was collateral from mid right coronary artery to distal left anterior descending

## Discussion

The LMCA ST-elevation myocardial infarction has been associated with significant morbidity and mortality [1], due to circulatory failure and malignant tachyarrhythmia [4]. These patients' clinical picture is predominantly catastrophic compared to a more distal coronary artery occlusion, as they usually present with sudden cardiac death or profound cardiogenic shock [5]. On the other hand, the elderly become a negative prognostic factor of AMI survival and tend to be treated less aggressively compared to the young [6].

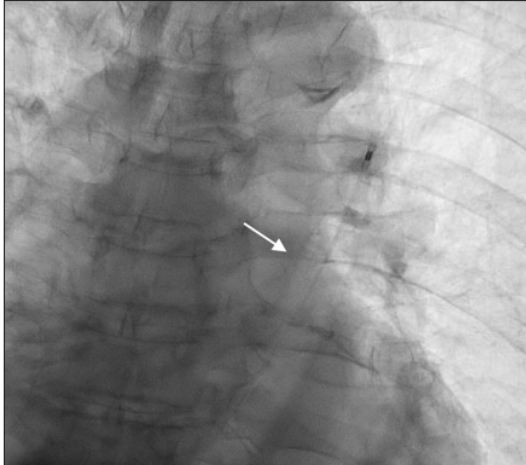


Figure 5. Intra-aortic balloon pump was inserted (white arrow)

Grygier *et al.* reported the left main occlusion in an 80-year-old woman. The patient also presenting with acute myocardial infarction complicated by cardiogenic shock due to the left main occlusion, then successful percutaneous intervention has been done to stabilize until bypass grafting was performed and resulted improvement of the patient [7].

We reported a case of an octogenarian patient diagnosed as a left main STEMI with clinical presentations of typical chest pain and cardiogenic shock. Emergency angiography was performed and revealed chronic total occlusion in ostial LMCA. There was a single remaining vessel RCA with significant stenosis (90%) on the distal and collateral Grade II from RCA to LCA. As a surrogate blood supply, the coronary collaterals rescue the myocardium jeopardized by abruptly occluded arteries, preventing myocardial necrosis and favoring recovery after revascularization [7]. This is a rare case of how a person can be survived by perfusion on a single remaining coronary artery through the collateral's blood flow.

In the first attempt, we failed to engage the left main culprit lesion and decided to plan coronary artery bypass grafting (CABG) for complete revascularization. During this procedure, we inserted

IABP for hemodynamic support while waiting for the definitive treatment. Even though the evidence is limited regarding IABP's benefit, it should be considered as a rescue therapy to stabilize the patient and preserve organ oxygenation [8]. Regardless of CABG established as the standard management for stable LMCA disease, hesitancy encloses the optimal revascularization strategy for patients with STEMI and LMCA occlusion who survived to hospitalization, and treatment guidelines in this scenario are vague. PCI is technically feasible in most patients with myocardial infarction. It should be taken into account as a viable alternative to CABG for specific indications, including those with LMCA occlusion and cardiogenic shock, as witnessed in our patient [9]. For those reasons, we changed the plan and performed a second attempt PCI to open the single remaining artery, as the recent guideline recommends it, in the case of STEMI on cardiogenic shock [10]. After direct stenting in distal RCA, we found an augmentation of collateral blood flow and clinical improvement on patient symptoms and hemodynamic profile.

This is a rare case of an octogenarian patient with STEMI in the left main that was successfully saved by PCI on the non-infarct related, single remaining RCA. An aggressive approach is compulsory in life-threatening conditions, even in the elderly, as one life matters.

## Conclusion

PCI can be a safe option in an elderly with single remaining vessel STEMI complicated by cardiogenic shock.

## References

1. Yeo KK, Singh G, Chua K, Yap J, Armstrong E, Waldo SW, *et al.* Left main coronary artery st-elevation myocardial infarction: clinical characteristic and outcomes from a multicenter registry. *J Am Coll Cardiol.* 2014;63(Suppl 12):A158. [https://doi.org/10.1016/s0735-1097\(14\)60158-3](https://doi.org/10.1016/s0735-1097(14)60158-3)
2. Granger CB, Goldberg RJ, Dabbous O, Pieper KS, Eagle KA, Cannon CP, *et al.* Predictors of hospital mortality in the global registry of acute coronary events. *Arch Intern Med.* 2003;163(19):2345-53. <https://doi.org/10.1001/archinte.163.19.2345> PMID:14581255
3. Al Kindi H, Samaan A, Hosny H. Noble and excel: The debate for excellence in dealing with left main stenosis. *Glob Cardiol Sci Pract.* 2018;2018(1):3. <https://doi.org/10.21542/gcsp.2018.3> PMID:29644230
4. Baek JY, Seo SM, Park HJ, Kim PJ, Park MW, Koh YS, *et al.* Clinical outcomes and predictors of unprotected left main stem culprit lesions in patients with acute ST segment

- elevation myocardial infarction. *Catheter Cardiovasc Interv.* 2014;83(7):E243-50. <https://doi.org/10.1002/ccd.23420>  
PMid:22105969
5. Kanic V, Vokac D, Granda S. Acute total occlusion of the left main coronary artery treated with percutaneous intervention and simultaneous implantation of intra-aortic balloon pump. *Clin Case Rep.* 2017;5(12):2088-92. <https://doi.org/10.1002/ccr3.1227>  
PMid:29225863
6. Bhatia LC, Naik RH. Clinical profile of acute myocardial infarction in elderly patients. *J Cardiovasc Dis Res.* 2013;4(2):107-11.  
PMid:24027366
7. Grygier M, Araszkiwicz A, Lesiak M, Grajek S. Acute Myocardial Infarction in an 80 year-old woman caused by left main occlusion with concomitant chronic total occlusions: Successful treatment with percutaneous revascularization. *Cardiol J.* 2009;16(6):568-72.  
PMid:19950095
8. Wang B, Han YL, Li Y, Jing QM, Wang SL, Ma YY, *et al.* Coronary collateral circulation: Effects on outcomes of acute anterior myocardial infarction after primary percutaneous coronary intervention. *J Geriatr Cardiol.* 2011;8(2):93-8. <https://doi.org/10.3724/sp.j.1263.2011.00093>  
PMid:22783292
9. Ibanez B, James S, Agewall S, Antunes MJ, Bucciarelli-Ducci C, Bueno H, *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):119-77. <https://doi.org/10.5603/kp.2018.0041>  
PMid:28886621
10. Lee MS, Bokhoor P, Park SJ, Kim YH, Stone GW, Sheiban I, *et al.* Unprotected left main coronary disease and ST-segment elevation myocardial infarction: A contemporary review and argument for percutaneous coronary intervention. *JACC Cardiovasc Interv.* 2010;3(8):791-5. <https://doi.org/10.1016/j.jcin.2010.06.005>  
PMid:20723848

# Primary Percutaneous Coronary Intervention in the Left Main ST-Elevation

## ORIGINALITY REPORT

16%

SIMILARITY INDEX

11%

INTERNET SOURCES

14%

PUBLICATIONS

0%

STUDENT PAPERS

## PRIMARY SOURCES

- |   |   |    |
|---|---|----|
| 1 | <a href="http://brieflands.com">brieflands.com</a><br>Internet Source   | 1% |
| 2 | <a href="http://escholarship.org">escholarship.org</a><br>Internet Source   | 1% |
| 3 | Vojko Kanic, Damijan Vokac, Samo Granda. "Acute total occlusion of the left main coronary artery treated with percutaneous intervention and simultaneous implantation of intra-aortic balloon pump", Clinical Case Reports, 2017<br>Publication | 1% |
| 4 | <a href="http://phcogj.com">phcogj.com</a><br>Internet Source   | 1% |
| 5 | <a href="http://www.i-scholar.in">www.i-scholar.in</a><br>Internet Source   | 1% |
| 6 | Gui Zhou, Ying Wang, Rong-He Xu, Zhi-Xiong Cai. "Successful percutaneous coronary intervention for acute and chronic occlusion of the left main coronary artery: report of two  | 1% |

cases and review of the literature", Acta  
Cardiologica, 2017

Publication

---

7	<a href="http://lib.bioinfo.pl">lib.bioinfo.pl</a> Internet Source	1 %
8	"Full Issue PDF", Journal of the American College of Cardiology, 2017 Publication	1 %
9	<a href="http://www.ncbi.nlm.nih.gov">www.ncbi.nlm.nih.gov</a> Internet Source	1 %
10	Wang Bin, Han Ya-Ling, Li Yi, Jing Quan-Min, Wang Shou-Li, Ma Ying-Yan, Wang Geng, Luan Bo, Wang Xiao-Zeng. "Coronary collateral circulation: Effects on outcomes of acute anterior myocardial infarction after primary percutaneous coronary intervention", Journal of Geriatric Cardiology, 2011 Publication	1 %
11	<a href="http://academic.oup.com">academic.oup.com</a> Internet Source	1 %
12	<a href="http://saber.ucv.ve">saber.ucv.ve</a> Internet Source	1 %
13	<a href="http://www.ijtonline.in">www.ijtonline.in</a> Internet Source	1 %
14	<a href="http://www.mdpi.com">www.mdpi.com</a> Internet Source	1 %

---

15 Sang-Geon Cho, Minchul Kim, Seung Hun Lee, Ki Seong Park, Jahae Kim, Jang Bae Moon, Ho-Chun Song. "Evaluation of Non-infarct-Related Arteries Using C-11 Acetate PET in STEMI With Multivessel Disease", Journal of Cardiovascular Imaging, 2022  
Publication 1 %

---

16 [nardus.mpn.gov.rs](http://nardus.mpn.gov.rs)  
Internet Source 1 %

---

17 [ueaeprints.uea.ac.uk](http://ueaeprints.uea.ac.uk)  
Internet Source 1 %

---

18 [www.cardio.med.tohoku.ac.jp](http://www.cardio.med.tohoku.ac.jp)  
Internet Source 1 %

---

19 Lee, Seung Hun, Ju Han Kim, Myung Ho Jeong, Hyukjin Park, Yun Ah Jeong, Youngkeun Ahn, Jong Hyun Kim, Shung Chull Chae, Young Jo Kim, Seung Ho Hur, In Whan Seong, Taek Jong Hong, Donghoon Choi, Myeong Chan Cho, Chong Jin Kim, Ki Bae Seung, Wook Sung Chung, Yang Soo Jang, Jeong Gwan Cho, Jong Chun Park, and Seung Jung Park. "Clinical Characteristics and Outcomes of Acute ST-Segment Elevation Myocardial Infarction in Younger Korean Adults", Korean Circulation Journal, 2015.  
Publication <1 %

---



20

Michael S. Lee, Pooya Bokhoor, Seung-Jung Park, Young-Hak Kim et al. "Unprotected Left Main Coronary Disease and ST-Segment Elevation Myocardial Infarction", JACC: Cardiovascular Interventions, 2010

Publication

<1 %

21

[ir.ymlib.yonsei.ac.kr](http://ir.ymlib.yonsei.ac.kr)

Internet Source

<1 %

22

Rafał Januszek, Kamil Bujak, Mariusz Gąsior, Jacek Legutko, Stanisław Bartuś. "Survival rate after acute myocardial infarction in patients treated with percutaneous coronary intervention within the left main coronary artery according to time of admission", Medicine, 2021

Publication

<1 %

Exclude quotes  On

Exclude matches  Off

Exclude bibliography  On

# Primary Percutaneous Coronary Intervention in the Left Main ST-Elevation

---

GRADEMARK REPORT

---

FINAL GRADE

**/100**

GENERAL COMMENTS

**Instructor**

---

PAGE 1

---

PAGE 2

---

PAGE 3

---

PAGE 4

---