# Short Term Clinical Outcome Of Angiography Guided Complete Versus Infarcted Related Artery Revascularization In Primary Percutaneous Coronary Intervention, Mansoura Experience

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**KEYWORDS**

STEMI (ST-Elevation Myocardial Infarction), Multivessel disease, Complete revascularization, Culprit-only revascularization, MACE (Major Adverse Cardiac Events).

**ABSTRACT**

This prospective observational study compared short term clinical outcomes between culprit-only revascularization (IRA-only PCI) and complete revascularization in 38 STEMI patients with multivessel disease. Complete PCI demonstrated reduced major adverse cardiac events (MACE).

## Introduction

Acute ST-Elevation Myocardial Infarction (STEMI) is a life threating medical emergency usually caused by complete blockage of a coronary artery, usually results when a thrombus forms on a ruptured atherosclerotic plaque, totally occluding a coronary artery and causing ischemia, necrosis, and infarction of the affected myocardium.(Kumar and Clark 2020)

Percutaneous coronary intervention (PCI) is the preferred technique of revascularization over fibrinolysis in acute STEMI patients. However studies report that, multivessel disease is detected in approximately 40% of patients with ST segment elevation myocardial infarction (STEMI), and 70% of patients with non-ST segment elevation myocardial infarction (NSTEMI). (Ibrahim, Sharma et al. 2017)

Studies done in the past showed that the non-infract related artery revascularization at the time of primary PCI was linked to adverse outcomes. (Kornowski, Mehran et al. 2011). However meta-analyses and randomized trials have argued against these results showing improved outcomes by reducing ischemia, preventing further cardiac events, and improving left ventricular function. (Gershlick, Khan et al. 2015)

It is imperative to determine the appropriate reperfusion strategy for non-infarct related artery (IRA) lesions; Some physicians have taken the view that the unstable plaque or stenoses in non-infarct arteries may cause future acute cardiac events that could be prevented by performing complete PCI during the initial procedure. Others have suggested that medical conservative therapy is appropriate and reduces the risks of clinical events in complete PCI. Here is the dilemma (Mehta, Wood et al. 2019).

**Patients and methods:**
This study was conducted on 38 STEMI patients with mean age was (62.5 ± 9.09) whose coronary angiography showed multivessel disease and underwent primary percutaneous coronary intervention from March 2023 to May 2024.These patients will be divided into 2 groups according to strategy of revascularization during the setting of primary PCI either culprit only or complete revascularization (defined anatomically as treating all epicardial vessels having a visual diameter stenosis > 70 % ) .These 2 groups will be compared at baseline on admission and after 6 weeks & 6 months of revascularization regarding clinical outcomes. Patients were enrolled in this study if they met the following criteria: presentation within 24 hours of symptom onset (typical chest pain lasting >30 minutes) with multivessel coronary artery disease; ST-segment elevation ≥1mm in at least two consecutive leads; successful primary PCI (angioplasty and/or stent implantation) of the infarct-related artery (IRA) with TIMI flow grade 2 or 3; drug-eluting stent (DES) placement in both IRA and non-IRA lesions; and repeat PCI for residual lesions on the same admission. Patients were excluded if they had: single-vessel disease; cardiogenic shock; coronary artery chronic total occlusion; coronary dissection; previous MI, coronary stenting, or CABG; prior fibrinolytic therapy; heart failure; cancer; peripheral arterial disease; significant valvular heart disease; or chronic kidney disease (GFR <30 ml/min).

**Clinical History:** Personal and medical histories were recorded, including age, gender, residence, family history of coronary artery disease (CAD), time from chest pain onset, previous chest pain, and CAD risk factors (hypertension, diabetes, smoking, dyslipidemia, and family history).

**Clinical Examination_**Patients underwent comprehensive clinical examinations, emphasizing general signs (pulse, blood pressure, respiratory rate, temperature) and cardiovascular signs (left ventricular failure signs, murmurs, jugular venous distension, lower limb edema).

**Diagnostic Evaluation:**
1.Electrocardiography (ECG): Standard 12-lead ECGs assessed ST elevation, localization, and right ventricular infarction (RVI) via right pericardial leads (V3R, V4R) in inferior myocardial infarction cases.
2 .Laboratory Investigations: Cardiac troponin, lipid profiles, serum creatinine, fasting and postprandial blood sugar, and hemoglobin A1c (HbA1c) levels were measured.
3 .Echocardiography: Baseline 2D echocardiography (GE Vivid iq ultra edition) assessed left ventricular ejection fraction (LVEF), segmental wall motion abnormalities, ischemic mitral regurgitation, and mechanical complications.
4 .Coronary Angiography: Invasive coronary angiography evaluated culprit artery, diseased vessels, non-culprit lesion stenosis, stent deployment, contrast usage, revascularization strategy, and Syntax score.

**Interventional Procedures**
1 .Primary percutaneous coronary intervention (PCI) was performed for infarct-related arteries.
2 .Thrombus aspiration and glycoprotein IIb/IIIa inhibitors with dual antiplatelet therapy (DAPT) were administered according to guidelines.
3 .Drug-eluting stents were deployed in both culprit and non-culprit lesions.

**Follow-up and Medical Care**
Patients received standard medical care, secondary preventive measures, lifestyle modification counseling, smoking cessation guidance, high-intensity statin therapy, DAPT, and heart failure medication when indicated.

Follow-up assessments were conducted via telephone interviews at 6 weeks and 6 months to evaluate major adverse cardiac events (MACE). These events included cardiovascular mortality (death due to myocardial infarction, low-output failure, fatal arrhythmia, unwitnessed death, or procedure-related death). Non-fatal events assessed were non-fatal myocardial infarction, non-fatal stroke (rapidly developing focal or global cerebral disturbances lasting >24 hours), acute heart failure (new onset or worsening symptoms and signs), ischemia-driven revascularization (revascularization due to anginal symptoms or new ischemic ECG changes), and major

bleeding (hospitalization or >5g/dL hemoglobin loss). Additional adverse events evaluated included acute kidney injury, unstable angina, and acute coronary syndrome.

**Results:**

This study evaluated 38 STEMI patients, with 81.6% being male and a mean age of 62.5 ± 9.09 years. Patients were classified into two groups based on selected artery revascularization: infarct-related artery PCI (n=23) and complete PCI (n=15). Demographic Data, Comparison of demographic data among studied groups showed no significant differences in age, gender, residency, hypertension, diabetes, smoking, or family history of coronary artery disease.

Clinical and Echocardiographic Data Analysis of clinical and echocardiographic data at presentation revealed significant differences between groups, Time from symptom onset to PCI was longer in the IRA-only PCI group (p=0.024). Left ventricular ejection fraction (LVEF) was significantly reduced in the complete PCI group (p=0.017). Mitral valve regurgitation was more frequent in the IRA-only PCI group (p=0.018). Angiographic Data

, Comparison of angiographic data showed total occlusion of the culprit artery was more frequent in the IRA-only PCI group (p=0.030). Right coronary artery (RCA) involvement was significantly higher in the IRA-only PCI group (p=0.006). Procedure Data, Procedure data analysis revealed significantly longer procedure times in the complete PCI group (p=0.017). No differences were observed in access site, contrast amount, aspiration catheter use, or glycoprotein IIb/IIIa inhibitor use. Clinical Outcomes At 6 weeks and 6 months, cardiovascular-related death, non-culprit revascularization, and unstable angina were more frequent in the IRA-only PCI group without statistical significance. No differences were observed in non-fatal MI, stroke, acute heart failure, or major bleeding. Major Adverse Cardiac Events (MACE) Comparison of demographic, echocardiographic, and angiographic data according to MACE showed older age and IRA-only PCI strategy were associated with higher MACE rates (p=0.054). Hypertension, diabetes, smoking, and family history of cardiovascular disease were more frequent in the MACE group without statistical significance. Survival Analysis Survival analysis revealed significant differences in MACE estimates between complete PCI (33.3% at 6 and 24 weeks) and IRA-only PCI groups (52.2% at 6 weeks, 65.2% at 24 weeks, p=0.023).

**Table (1):** Individual characteristics.

| **Parameter** | | **value** |
|---|---|---|
| **Gender** | **Male n(%)** | **31 (81.6%)** |
| | **Female n(%)** | **7 (18.4%)** |
| **Mean age (years)** | | **62.5 ± 9.09** |
| **groups** | **Infarct-related artery PCI n(%)** | **23 (60.5%)** |
| | **Complete PCI n(%)** | **15 (39.5%)** |

PCI: Percutaneous coronary intervention

**Table (2):** Comparison of demographic data among studied groups:

| **Parameter** | | **Complete PCI group (n=15)** | **IRA-only PCI group (n=23)** | **P-value** |
|---|---|---|---|---|
| **Age* (years)** | **Mean ± SD** | **61.1 ± 6.36** | **63.4 ± 10.54** | 0.454 |
| **Gender** | **Male, N (%)** | **13 (86.7%)** | **18 (78.3%)** | 0.681 |
| | **Female, N (%)** | **2 (13.3%)** | **5 (21.7%)** | |
| **Residency** | **Urban** | **7 (46.7%)** | **8 (34.8%)** | 0.464 |
| | **Rural** | **8 (53.3%)** | **15 (62.5%)** | |
| **HTN** | **Negative, N (%)** | **6 (40.0%)** | **10 (43.5%)** | 0.832 |

| | | | | |
|---|---|---|---|---|
| | **Positive, N (%)** | **9 (60.0%)** | **13 (56.5%)** | |
| **DM** | **Negative, N (%)** | **7 (46.7%)** | **10 (43.5%)** | 0.847 |
| | **Positive, N (%)** | **8 (53.3%)** | **13 (56.5%)** | |
| **Smoking** | **Nonsmoker, N (%)** | **4 (26.7%)** | **10 (43.5%)** | 0.329 |
| | **Smoker, N (%)** | **11 (73.3%)** | **13 (56.5%)** | |
| **Family history of CAD** | **Negative, N (%)** | **13 (86.7%)** | **21 (91.3%)** | 1.00 |
| | **Positive, N (%)** | **2 (13.3%)** | **2 (8.7%)** | |
| **Dyslipidemia** | **Negative, N (%)** | **15 (100.0%)** | **23 (100.0%)** | ------ |

Independent T testt*, Chi-Square test (Fisher's Exact test). P between 2 groups.
HTN: Hypertension ,DM: Diabetes mellites ,CAD: coronary artery disease
**significant (P value < 0.05)

**Table (3):** Comparison of clinical and Echocardiographic data at presentation among studied groups:

| **Parameter** | | **Complete PCI group (n=15)** | **IRA-only PCI group (n=23)** | **P-value** |
|---|---|---|---|---|
| **Site of MI** | **Anterior STEMI** | **9 (60.0%)** | **17 (73.9%)** | 0.367 |
| | **Inferior STEMI** | **6 (40.0%)** | **6 (26.1%)** | |
| | **Lateral STEMI** | **0 (0.0%)** | **0 (0.0%)** | |
| **Time from symptoms to PCI (hours)**** | **Median (Min-Max)** | **6.0 (1-24)** | **9.0 (2-24)** | **0.024** |
| **Door to needle time (min)**** | **Median (Min-Max)** | **90.0 (20.0-240.0)** | **90.0 (30.0-180.0)** | 0.813 |
| **Baseline serum creatinine* mg/dl** | **Mean ± SD** | **0.9 ± 0.337** | **1.0 ± 0.277** | 0.263 |
| **LV EF*(%)** | **Mean ± SD** | **42.8 ± 7.03** | **48.0 ± 5.60** | **0.017** |
| **Antiplatelet drug** | **Clopidogrel** | **4 (26.7%)** | **7 (30.4%)** | 1.00 |
| | **Ticagrelor** | **11 (73.3%)** | **16 (69.6%)** | |
| **Wall motion abnormality** | **None** | **2 (13.3%)** | **0 (0.0%)** | 0.149 |
| | **Wall motion LAD** | **9 (60.0%)** | **18 (78.3%)** | 0.225 |
| | **Wall motion inferior wall** | **3 (20.0%)** | **5 (21.7%)** | 0.897 |
| | **Global HK** | **1 (6.7%)** | **0 (0.0%)** | 0.394 |
| **Mitral valve regurgitation** | **Absent** | **4 (26.7%)** | **0 (0.0%)** | **0.018** |
| | **Present** | **11 (73.3%)** | **23 (100.0%)** | |
| **Degree** | **mild** | **9 (81.8%)** | **19 (82.6%)** | 0.295 |
| | **Moderate** | **1 (9.1%)** | **4 (17.4%)** | |
| | **Sever** | **1 (9.1%)** | **0 (0.0%)** | |

Independent T testt*, Mann-whitney test**, Chi-Square test (Fisher's Exact test). P between 2 groups.
**significant (P value < 0.05)
LV: left ventricle, EF: Ejection fraction

**Table (4):** Comparison of angiographic data among studied groups:

| Parameter | | Complete PCI group (n=15) | IRA-only PCI group (n=23) | P-value |
|---|---|---|---|---|
| **Culprit artery lesion** | **Subtotal** | **7 (46.7%)** | **3 (13.0%)** | **0.030** |
| | **Total** | **8 (53.3%)** | **20 (87.0%)** | |
| **Culprit artery thrombus burden** | **Absent** | **7 (46.7%)** | **6 (26.1%)** | 0.191 |
| | **Heavy** | **8 (53.3%)** | **17 (73.9%)** | |
| **Culprit artery, N (%)** | **LAD** | **9 (60.0%)** | **18 (78.3%)** | 0.276 |
| | **LCX** | **3 (20.0%)** | **1 (4.3%)** | |
| | **RCA** | **3 (20.0%)** | **4 (17.4%)** | |
| **Number of stents**** | **Median (Min-Max)** | **1.0 (1-2)** | **1.0 (1-2)** | 0.930 |
| **First stent diameter (mm)**** | **Median (Min-Max)** | **3.0 (2.5-3.5)** | **3.0 (2.25-3.5)** | 0.746 |
| **First stent length (mm)**** | **Median (Min-Max)** | **30.0 (18-48)** | **34.0 (20-48)** | 0.248 |
| **Second stent diameter (mm)**** | **Median (Min-Max)** | **(N=3) 2.75 (2.75-3.5)** | **(N=9) 2.75 (2.5-3.0)** | **-----** |
| **Second stent length (mm)**** | **Median (Min-Max)** | **28.0 (18-38)** | **28.0 (18-48)** | **------** |
| **non-culprit vessel affected location** | **LAD** | **3 (20.0%)** | **2 (8.7%)** | 0.365 |
| | **LCX** | **9 (60.0%)** | **9 (39.1%)** | 0.208 |
| | **RCA** | **2 (13.3%)** | **14 (60.9%)** | **0.006** |
| | **LM** | **1 (6.7%)** | **2 (8.7%)** | 1.00 |
| | **OM** | **4 (26.7%)** | **1 (4.3%)** | 0.069 |
| **Syntax score*** | **Mean ± SD** | **23.06 ± 3.62** | **22.32 ± 9.56** | 0.739 |

Independent T testt*, Mann-whitney test**, Chi-Square test (Fisher's Exact test). P between 2 groups.
**significant (P value < 0.05)

**Table (5):** Comparison of procedure data among studied groups:

| Parameter | | Complete PCI group (n=15) | IRA-only PCI group (n=23) | P-value |
|---|---|---|---|---|
| **Access site ,n(%)** | **Radial** | **3 (20.0%)** | **0 (0.0%)** | 0.054 |
| | **Femoral** | **12 (80.0%)** | **23 (100.0%)** | |
| **Time of procedure (min)**** | **Median (Min-Max)** | **45.0 (30-90)** | **40.0 (20-60)** | **0.017** |
| **Amount of contrast (ml)**** | **Median (Min-Max)** | **200.0 (50-250)** | **150.0 (70-500)** | 0.172 |
| **Aspiration catheter use** | **No** | **9 (60.0%)** | **17 (73.9%)** | 0.367 |
| | **Yes** | **6 (40.0%)** | **6 (26.1%)** | |
| **GpIIb/IIIa use during or after procedure** | **No** | **10 (66.7%)** | **12 (52.2%)** | 0.376 |
| | **Yes** | **5 (33.3%)** | **11 (47.8%)** | |

Mann-whitney test**, Chi-Square test (Fisher's Exact test). P between 2 groups.
**significant (P value < 0.05)
GPIIb/IIIa: Glycoprotein IIb/IIIa

**Table (6):** Reason of stopping the procedure after culprit artery revascularization.

| Parameter | N (%) |
|---|---|
| **Small sized non dominant artery** | **2 (8.7%)** |
| **CTO** | **5 (21.7%)** |
| **Symptoms guided revascularization** | **8 (34.9%)** |
| **Unstable patient** | **3 (13.0%)** |
| **Heavy thrombus burden** | **2 (8.7%)** |
| **Deferred stenting of non-culprit** | **3 (13.0%)** |

CTO: Chronic total occlusion

**Table (7):** Comparison of clinical outcome at 6 weeks among studied groups:

| Parameter | | Total | Complete PCI group | IRA-only PCI group | P-value |
|---|---|---|---|---|---|
| **CVS related death** | **Positive, N (%)** | **N=38 5 (13.2%)** | **N=15 1 (6.7%)** | **N=23 4 (17.4%)** | 0.630 |
| **Death from any cause** | **Positive, N (%)** | **N=33 0 (0.0%)** | **N=14 0 (0.0%)** | **N=19 0 (0.0%)** | ----- |
| **Non-culprit revascularization( deferred stenting)** | **Positive, N (%)** | **N=33 0 (0.0%)** | **N=14 0 (0.0%)** | **N=19 3 (15.8%)** | 0.244 |
| **Non-fatal MI** | **Positive, N (%)** | **N=33 0 (0.0%)** | **N=14 0 (0.0%)** | **N=19 0 (0.0%)** | ----- |
| **Unstable angina** | **Positive, N (%)** | **N=33 4 (12.1%)** | **N=14 1 (7.1%)** | **N=19 3 (15.8%)** | 0.620 |
| **Non-fatal stroke** | **Positive, N (%)** | **N=33 0 (0.0%)** | **N=14 0 (0.0%)** | **N=19 0 (0.0%)** | ----- |
| **Acute heart failure** | **Positive, N (%)** | **N=33 0 (0.0%)** | **N=14 0 (0.0%)** | **N=19 0 (0.0%)** | ------ |
| **Ischemia derived revascularization** | **Positive, N (%)** | **N=33 0 (0.0%)** | **N=14 0 (0.0%)** | **N=19 0 (0.0%)** | ----- |
| **Major bleeding** | **Positive, N (%)** | **N=33 0 (0.0%)** | **N=14 0 (0.0%)** | **N=19 0 (0.0%)** | ----- |
| **ARF** | **Positive, N (%)** | **N=33 0 (0.0%)** | **N=14 0 (0.0%)** | **N=19 0 (0.0%)** | ----- |

Chi-Square test (Fisher's Exact test). P between 2 groups. CVS: Cardiovascular ,MI: Myocardial infarction ARF: acute renal failure.

**significant (P value < 0.05)

**Table (8):** Comparison of clinical outcome at 6 months among studied groups:

| Parameter | | Total | Complete PCI group | IRA-only PCI group | P-value |
|---|---|---|---|---|---|
| **CVS related death** | **Positive, N (%)** | **N=33 0 (0.0%)** | **N=14 0 (0.0%)** | **N=19 0 (0.0%)** | ----- |
| **Death from any cause** | **Positive, N (%)** | **N=33 0 (0.0%)** | **N=14 0 (0.0%)** | **N=19 0 (0.0%)** | ----- |
| **Non-fatal MI** | **Positive, N (%)** | **N=33 0 (0.0%)** | **N=14 0 (0.0%)** | **N=19 0 (0.0%)** | ----- |
| **Unstable angina** | **Positive, N (%)** | **N=33 11 (33.3%)** | **N=14 4 (28.6%)** | **N=19 7 (36.8%)** | 0.719 |
| **Non-fatal stroke** | **Positive, N (%)** | **N=33 0 (0.0%)** | **N=14 0 (0.0%)** | **N=19 0 (0.0%)** | ----- |
| **Acute heart failure** | **Positive, N (%)** | **N=33 1 (3.0%)** | **N=14 0 (0.0%)** | **N=19 1 (5.3%)** | 1.00 |
| **Ischemia derived revascularization** | **Positive, N (%)** | **N=33 0 (0.0%)** | **N=14 0 (0.0%)** | **N=19 0 (0.0%)** | ----- |
| **Major bleeding** | **Positive, N (%)** | **N=33 1 (3.0%)** | **N=14 1 (7.1%)** | **N=19 0 (0.0%)** | 0.424 |
| **ARF** | **Positive, N (%)** | **N=33 0 (0.0%)** | **N=14 0 (0.0%)** | **N=19 0 (0.0%)** | ----- |
| **Repeat revascularization** | **Positive, N (%)** | **N=33 0 (0.0%)** | **N=14 0 (0.0%)** | **N=19 0 (0.0%)** | ------ |

Chi-Square test (Fisher's Exact test). P between 2 groups. CVS: Cardiovascular, MI: Myocardial infarction ARF: acute renal failure. **significant (P value < 0.05)

**Table (9):** Comparison of demographic, echocardiographic and angiographic data among studied groups according to Major adverse cardiac events:

| Parameter | | Without MACE group (n=18) | MACE group (n=20) | P-value |
|---|---|---|---|---|
| **Age*(years)** | **Mean ± SD** | **60.8 ± 8.18** | **64.0 ± 9.82** | 0.299 |
| **Gender** | **Male** | **15 (83.3%)** | **16 (80.0%)** | 1.00 |
| | **Female** | **3 (16.7%)** | **4 (20.0%)** | |
| **Groups** | **Complete PCI** | **10 (55.6%)** | **5 (25.0%)** | 0.054 |
| | **Infarct-related artery PCI** | **8 (44.4%)** | **15 (75.0%)** | |
| **Residency** | **Urban** | **9 (50.0%)** | **6 (30.0%)** | 0.208 |
| | **Rural** | **9 (50.0%)** | **14 (70.0%)** | |
| **HTN** | **Negative** | **9 (50.0%)** | **7 (35.0%)** | 0.350 |
| | **Positive** | **9 (50.0%)** | **13 (65.0%)** | |
| **DM** | **Negative** | **9 (50.0%)** | **8 (40.0%)** | 0.536 |
| | **Positive** | **9 (50.0%)** | **12 (60.0%)** | |
| **Smoking** | **Nonsmoker** | **8 (44.4%)** | **6 (30.0%)** | 0.357 |
| | **Smoker** | **10 (55.6%)** | **14 (70.0%)** | |

| | | | | |
|---|---|---|---|---|
| **Family history of CAD** | **Negative** | **17 (94.4%)** | **17 (85.0%)** | 0.606 |
| | **Positive** | **1 (5.6%)** | **3 (15.0%)** | |
| **Site of MI** | **Anterior STEMI** | **12 (66.7%)** | **14 (70.0%)** | 0.825 |
| | **Inferior STEMI** | **6 (33.3%)** | **6 (30.0%)** | |
| | **Lateral STEMI** | **0 (0.0%)** | **0 (0.0%)** | |
| **LV EF* (%)** | **Mean ± SD** | **46.1 ± 7.67** | **45.8 ± 5.74** | 0.886 |
| **Antiplatelet drug** | **Clopidogrel** | **5 (27.8%)** | **6 (30.0%)** | 0.880 |
| | **Ticagrelor** | **13 (72.2%)** | **14 (70.0%)** | |
| **Tricuspid valve regurgitation** | **Absent** | **6 (33.3%)** | **5 (25.0%)** | 0.572 |
| | **mild** | **12 (66.7%)** | **15 (75.0%)** | |
| **Mitral valve regurgitation** | **Absent** | **2 (11.1%)** | **2 (10.0%)** | 0.778 |
| | **mild** | **14 (77.8%)** | **14 (70.0%)** | |
| | **Moderate** | **2 (11.1%)** | **3 (15.0%)** | |
| | **Sever** | **0 (0.0%)** | **1 (5.0%)** | |
| **Culprit artery lesion** | **Subtotal** | **6 (33.3%)** | **4 (20.0%)** | 0.468 |
| | **Total** | **12 (66.7%)** | **16 (80.0%)** | |
| **Culprit artery thrombus burden** | **Absent** | **8 (44.4%)** | **5 (25.0%)** | 0.207 |
| | **Heavy** | **10 (55.6%)** | **15 (75.0%)** | |
| **Culprit artery location** | **LAD** | **12 (66.7%)** | **15 (75.0%)** | 0.830 |
| | **LCX** | **2 (11.1%)** | **2 (10.0%)** | |
| | **RCA** | **4 (22.2%)** | **3 (15.0%)** | |
| **Syntax score*** | **Mean ± SD** | **21.1 ± 6.32** | **23.9 ± 8.72** | 0.268 |

Independent T testt*, Chi-Square test (Fisher's Exact test). P between 2 groups. HTN : Hypertension, DM: Diabetes mellites, CAD: Coronary artery disease ,MI myocardial infarction, LV: Left ventricle , EF : Ejection fraction **significant (P value < 0.05)

**Discussion:**

Cardiovascular diseases remain the leading cause of death globally, with approximately 18 million fatalities reported in 2019 (Li, Cao et al. 2023)STEMI, a subset of acute coronary syndrome, has the highest mortality rate among acute coronary syndrome cases (Shariefuddin, Pramudyo et al. 2024).Early reperfusion therapy and re-establishment of blood flow are crucial for STEMI patients. Percutaneous coronary intervention (PCI) is the preferred strategy.

Multivessel disease, present in approximately 50% of STEMI patients, is associated with worse clinical outcomes (Piccolo, Manzi et al. 2023)Guideline-based recommendations for treating non-culprit lesions vary. The 2017 European Society of Cardiology (ESC) guidelines recommended routine reperfusion of non-culprit lesions before hospital discharge (Ibanez, James et al. 2018)In contrast, the 2023 ESC guidelines advocate for complete revascularization within 45 days (Byrne, Rossello et al. 2024)

This study aimed to compare short term clinical outcomes between STEMI patients with multivessel disease undergoing culprit-only revascularization (IRA-only PCI) versus complete revascularization. Our

analysis revealed no significant differences in demographic data between both groups, suggesting management strategy rather than underlying risk factors influenced clinical outcomes.

Clinical and echocardiographic data showed increased time from symptom onset to PCI in the IRA-only PCI group, reduced left ventricular ejection fraction (LVEF) in the complete PCI group, and more frequent mitral valve regurgitation in the IRA-only PCI group. Angiographic data indicated total occlusion of culprit arteries and right coronary artery involvement were more frequent in the IRA-only PCI group.

Procedure data revealed longer procedure times in the complete PCI group without increased procedural complications. Clinical outcomes at six weeks and six months showed no statistically significant differences, although cardiovascular-related death, non-culprit revascularization, and unstable angina were more frequent in the IRA-only PCI group.

Cumulative incidence of major adverse cardiac events (MACE) was significantly higher in the IRA-only PCI group (65.2% vs. 33.3%, P=0.023). Older age and IRA-only PCI strategy were associated with higher MACE rates (P=0.054). Our findings support complete PCI revascularization, aligning with previous studies (Mehta, Wood et al. 2019)

**Limitations and Future Directions**

1. Larger, multicenter randomized trials.
2. Long-term follow-up (>2 years).
3. Cost-effectiveness analysis.
4. Investigation of patient selection criteria.

**Conclusion**

This study highlighted the short-term benefits of complete PCI in reducing the risk of cardiovascular events. However, complete PCI had many challenges, as longer procedure times and treating of complex multiple lesions. Therefore, patient selection is a key solution This study highlighted the short-term benefits of complete PCI in reducing the risk of cardiovascular events. However, complete PCI had many challenges, as longer procedure times and treating of complex multiple lesions. Therefore, patient selection is a key solution. Future studies should investigate long-term outcomes and cost-effectiveness.

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