The Egyptian Heart Journal (2016) 68, 153–158

HOSTED BY

Egyptian Society of Cardiology

The Egyptian Heart Journal

www.elsevier.com/locate/ehj
www.sciencedirect.com

ORIGINAL ARTICLE

Infarct size assessment by cardiac magnetic resonance and peak troponin I after aspiration thrombectomy and intracoronary abciximab assisted primary percutaneous coronary intervention in a real-world cohort of patients with ST-segment elevation myocardial infarction: A single-center study

Mohamed A.H. Abdelhafez [a,c,*], Karim El-Chilali [a], Björn Plicht [a], Alexander Lind [a], Hatem Abd Al Rahman [c], Amr Youssef [c], Salwa R. Demitry [c], Felix Nensa [b], Thomas Schlosser [b], Philipp Kahlert [a], Raimund Erbel [a]

[a] *West German Heart and Vessels Center Essen, Department of Cardiology, Germany*
[b] *Department of Diagnostic and Interventional Radiology and Neuroradiology, Essen University Hospital, University Duisburg-Essen, Germany*
[c] *Department of Cardiology, Assiut University, Assiut, Egypt*

Received 11 January 2016; accepted 10 June 2016
Available online 7 July 2016

KEYWORDS

STEMI;
Thrombectomy;
CMR

Abstract *Objectives:* To assess the effect of manual thrombectomy on infarct size by cardiac magnetic resonance (CMR) and peak troponin I (TnI) levels.
Background: Use of manual thrombectomy during primary percutaneous coronary intervention (primary PCI) and its effect on infarct size is still debatable.
Methods: 70 patients (30 patients with thrombectomy and 40 without) who underwent primary PCI for ST-elevation myocardial infarction (STEMI) with adjunct intracoronary abciximab between January 2007 and August 2013 and had CMR afterwards were included.

Abbreviations: STEMI, ST-elevation myocardial infarction; CMR, cardiac magnetic resonance; Primary PCI, primary percutaneous coronary intervention; TnI, troponin I; TnI-24 h, TnI at 24 h; TIMI flow grade, Thrombolysis In Myocardial Infarction flow grade; CABG, coronary artery bypass; LGE, late gadolinium-enhancement; RCTs, randomized controlled trials; ROC, receiver-operator characteristic curves.

* Corresponding author at: Department of Cardiology, Assiut University Hospitals, Assiut-Egypt, University Street, 71526 Assiut, Egypt. Fax: +20 088 2356753.
E-mail address: mohamed.abdelhafez@aun.edu.eg (M.A.H. Abdelhafez).

Peer review under responsibility of Egyptian Society of Cardiology.

http://dx.doi.org/10.1016/j.ehj.2016.06.001

Results: No significant difference in the baseline characteristics except for a higher baseline TnI (11.6 ± 16.7 vs. 2.4 ± 7.9, P = 0.009) and more visible thrombus and or TIMI 0 flow ($P = 0.04$) in the thrombectomy group. No significant difference was found in infarct size assessed by CMR (18.1 ± 13.2 vs. 16.45 ± 11.7, $P = 0.6$) or peak TnI (75.9 ± 126 vs. 51.3 ± 50.4, $P = 0.26$) between the two groups. A moderate positive correlation was found between Peak as well as TnI at 24 hours (TnI-24 h) and CMR-determined infarct size (r = 0.5 and r = 0.7 respectively, $P < 0.001$). TnI-24 h ($B = 0.152$, 95.0% Confidence Interval (CI) 0.116–0.187, $P < 0.001$) as well as final TIMI grade ($B = -10{,}848$, 95.0% CI −15.109 to −6.587, $P < 0.001$) predicts infarct size.
Conclusions: In a retrospective real world cohort of patients with STEMI, no difference was found in infarct size assessed by CMR or peak TnI between the groups with and without thrombectomy. TnI-24 h as well as final TIMI flow predicts infarct size.

1. Introduction

The presence of coronary thrombus during primary PCI has been linked to lower post procedural TIMI flow (Thrombolysis In Myocardial Infarction (TIMI) flow grade), decrease in myocardial perfusion grade, no-reflow, and drug eluting stent thrombosis.[1] Microembolization can lead to the occlusion of arterioles in the microcirculation thus impairing end myocardial perfusion whereas embolization of larger atherosclerotic particles can lead to the occlusion of pre-arterioles and side branches leading to the phenomenon of no- or slow-reflow.[2,3] Several trials have shown that device-based removal of thrombus from the coronary artery has an inconsistent effect on reperfusion surrogate and clinical end points.[4] Meta-analyses of adjunctive thrombectomy trials have reported a definite improvement in surrogate markers of reperfusion.[5] However, still there is a debate about the effect of thrombus aspiration on the infarct size which appears to be the most meaningful surrogate clinical end point in assessing new therapeutic tools in the setting of acute myocardial infarction.[6] We aimed to assess the effect of manual aspiration thrombectomy with adjunct intracoronary abciximab during primary PCI on infarct size by CMR and peak TnI levels in a retrospective real world cohort of patients with STEMI. Also, we have assessed the correlation between infarct sizes by CMR and peak TnI levels.

2. Methods

2.1. Study design and population

We have searched our database for all patients who were admitted for acute STEMI between January 2007 and August 2013 ($n = 458$ patients), with the culprit in a native coronary artery ($n = 435$ patients) and who received adjunct intracoronary abciximab ($n = 198$ patients) and, additionally, underwent CMR examination afterward ($n = 70$ patients). Of those patients, 30 patients were treated with manual thrombus aspiration assisted primary PCI and another 40 without. Infarct size was assessed in both groups by CMR and was studied as the primary end point. Infarct size assessed by peak serum TnI levels as well as its correlation with infarct size assessed by CMR was studied as a secondary end point.

2.1.1. Inclusion criteria

Patients with acute STEMI (defined by chest pain suggestive of myocardial ischemia for at least 30 min, and an electrocardiographic (ECG) with ST-segment elevation of >0.1 mV in ⩾2 leads) referred for primary PCI within 24 h of symptom onset were included.

2.1.2. Exclusion criteria

Patients who required intra-aortic balloon counter pulsation or mechanical ventilation were excluded as were patients with previous coronary artery bypass (CABG), patients with left main coronary stenosis and patients who did not receive intracoronary abciximab.

2.1.3. Percutaneous coronary intervention (PCI) procedure

Medication consisted of 500 mg of aspirin I.V if aspirin was not received before, a loading dose of an ADP receptor blocker (clopidogrel, ticagrelor or prasugrel) and intracoronary abciximab (*0.25 mg/kg bolus was administered through the guiding catheter without post procedure I.V infusion unless intra-procedural thrombotic complications occurred*). A heparin bolus of 50–70 IU per kg was administered after sheath insertion, with a repeat bolus (2000–5000 IU) when needed to maintain an activated clotting time of >250 sec. PCI was performed by standard techniques. After the lesion was crossed with the guidewire, the use of manual thrombus aspiration was depending on the operator's discretion. Aspiration was performed using manual thrombectomy devices (Eliminate™ aspiration catheter and Quick-Cat Extraction Catheter). Then, a bare metal or drug eluting stent was implanted either directly or after predilation according to the operator's discretion. Treatment after PCI included aspirin 100 mg per day, ADP receptor blockers (oral clopidogrel, ticagrelor, or prasugrel), beta-blockers, lipid-lowering agents, and angiotensin-converting enzyme inhibitors.

2.2. Thrombectomy catheters

The eliminate™ (TERUMO) is an aspiration catheter intended for removing fresh, soft emboli and thrombus from vessels in the coronary and peripheral vasculature. The Eliminate® catheter is a dual lumen rapid exchange catheter. Outside diameter is proximally 1.40 mm, distally 1.70 mm and internal