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Oral presentation



# Erythropoietin doubles the incidence of microvascular obstruction in primary PCI - a randomized controlled trial in acute MI using CMR primary endpoints

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## Introduction

Previous animal studies have reported that the acute administration of EPO at the onset of myocardial reperfusion reduces infarct size by 40-50%. Whether EPO has the same effect in ST-elevation myocardial infarction (STEMI) patients undergoing primary percutaneous coronary intervention (PPCI) is unknown.

## Purpose

To assess the efficacy of erythropoietin (EPO) as adjunctive therapy to PPCI in STEMI patients using cardiac magnetic resonance (CMR) endpoints.

## Methods

Fifty one STEMI patients presenting for PPCI within 12 hours of chest pain were randomized to receive either a single intravenous bolus of EPO (50,000 iu in 10 mls normal saline) with a further bolus given 24 hours later, or placebo. Patients with TIMI flow>1, cardiac arrest, cardiogenic shock or significant coronary collateralization were excluded. Both patient and cardiologist were blinded to the treatment allocation. Troponin-T and CK-MB were measured over 24 hours. CMR scans (LV volumes, LV ejection fraction-EF, late gadolinium enhancement-LGE, microvascular obstruction-MVO, infarct-endocardial surface area-ESA) were performed at day 3 and repeated at 4 months.

## Results

The groups were matched with no differences in chest pain to balloon time or area at risk (AAR) by coronary angiography (modified BARI and APPROACH jeopardy scores) or CMR (infarct-ESA). There were no significant differences with respect to LVEF, myocardial infarct size, or the myocardial salvage index (see table 1). However, EPO treatment doubled the incidence of MVO and acutely increased LV size (indexed LV end diastolic and systolic

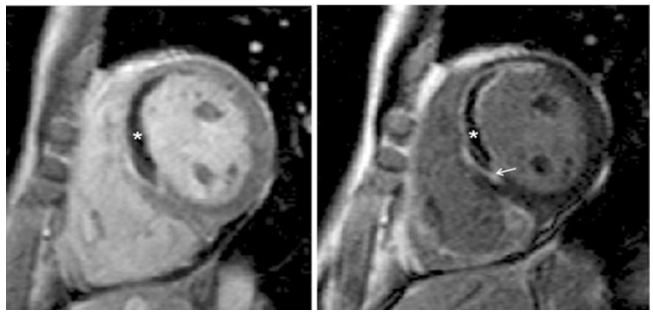

**Figure 1**

**Table 1: CMR endpoints day 3 post-PPCI**

| Endpoint | Placebo | Erythropoietin | P value |
|---|---|---|---|
| LVEF | 53 ± 11% | 51 ± 7% | P = 0.26 |
| 24 hr AUC Trop-T | 101.7 ± 67.5 μg/l | 114.6 ± 78.3 μg/l | P = 0.56 |
| 24 hr AUC CK-MB | 3512 ± 2692 μg/l | 4682 ± 2946 μg/l | P = 0.15 |
| LGE/AAR | 67.8 ± 2.0% | 71.5 ± 17.0% | P = 0.58 |
| Myocardial salvage index | 0.36 ± 0.23 | 0.29 ± 0.17 | P = 0.28 |
| MVO (incidence) | 42% | 82% | P = 0.008* |
| LVEDVi | 73 ± 13 ml/m$^2$ | 84 ± 10 ml/m$^2$ | P = 0.003* |
| LVESVi | 34 ± 11 ml/m$^2$ | 41 ± 9 ml/m$^2$ | P = 0.035* |

volumes: LVEDVi and LVESVi) on the acute CMR scan (see figure 1 and table 1). On the follow-up CMR scan at 4 months there were no significant differences in myocardial infarct size, LVEF and LV internal dimensions between the two treatment groups. The figure depicts representative early and late gadolinium enhancement short-axis images showing the presence of significant microvascular obstruction (see *) within an area of infarction (see arrow) in a patient presenting with an acute LAD myocardial infarct

## Conclusion

In this randomized clinical trial, no beneficial effects of EPO as an adjunct to PPCI were demonstrated-in fact, the effects were potentially detrimental with an increased incidence of MVO and greater LV internal dimensions acutely. This study highlights the importance of CMR endpoints in assessing the efficacy of reperfusion treatment strategies in acute myocardial infarction.