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Effect of metformin on outcome in patients undergoing primary percutaneous coronary intervention for st-segment elevation myocardial infarction

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Introduction

The oral antihyperglycemic agent metformin was associated with favorable outcome and smaller myocardial infarct size in patients with diabetes undergoing percutaneous coronary interventions (PCI) for ST-segment elevation myocardial infarction (STEMI) [1,2]. However, these findings have not been validated.

Objectives

To determine the effect of chronic metformin treatment on cardiovascular morbidity and mortality in patients with diabetes presenting with STEMI subsequently undergoing PCI.

Methods

From January 2004 until June 2013, all consecutive critically ill patients undergoing primary PCI for STEMI at the University Medical Center Groningen were included in a registry and 1-year follow-up was obtained. Our primary endpoint consisted of the composite endpoint of myocardial infarction, target vessel and target lesion revascularization, and all-cause mortality (MACE). The secondary endpoint, myocardial infarction size, was estimated using peak levels of creatine kinase (CK), the myocardial band of CK (CK-MB), troponin T, and high-sensitive troponin T (hs-troponin T). The effect of metformin on myocardial infarct size from the 2004-2010 cohort has been reported previously [1]. Therefore myocardial infarction size was reported for patients admitted from 2011 until 2013 and the combined 2004-2013 cohort.

Results

In total, 4776 consecutive patients underwent primary PCI for STEMI, 719 (15%) diabetic patients were included in the final analysis and 215 (30%) patients used metformin at admission. MACE and mortality rates were 21% and 12% for patients with diabetes, 23% and 19% for metformin patients, 21% and 15% for patients on sulfonylurea, and 30% and 20% for patients on insulin, respectively. Metformin was not associated with reduced risk for MACE (adjusted hazard ratio (aHR): 1.19 (95% confidence interval (95%CI) 0.78-1.81), P = 0.42) or survival benefit (aHR: 0.23 (CI95% 0.80-2.51), P = 0.23) compared to diabetic patients not using metformin. Insulin use was an independent predictor for MACE (aHR 1.73 (CI95% 1.13-2.65), P = 0.01) and all-cause mortality (aHR 1.81 (CI95% 1.03-3.21), P = 0.04). Baseline levels of CK, CK-MB, and hs-troponin T were comparable between both groups. Median (interquartile range) peak levels of CK, CK-MB, and hs-Troponin T were all non-significant lower in the metformin group (table 1). When both cohorts were combined, peak levels of CK, CK-MB, and troponin T were all significantly lower in patients using metformin, as depicted in table 1.

Conclusions

Chronic metformin use in patients presenting with STEMI was associated with smaller infarct-size and not with lower MACE and mortality rates, as compared to other patients with diabetes.

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Table 1

	2011-2013 cohort			Combined 2004-2013 cohort		
Peak value	**Metformin (n = 83)**	**No metformin (n = 72)**	**P-value**	**Metformin (n = 254)**	**No metformin (n = 537)**	**P-value**
CK (U/L)	846 (297-2317)	1083 (481-3005)	0.25	1000 (297-3594)	1371 (597-3034)	0.01
CK-MB (U/L)	112 (52-211)	120 (60-309)	0.33	138 (52-256)	174 (74-310)	< 0.01
Hs-Troponin T (ng/L)	2175 (592-5337)	2076 (912-5512)	0.70			
Troponin T (μg/L)				2.53 (0.55-7.63)	3.93 (1.39-8.67)	0.01

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