

Cardiology 2018 : Effect of Diabetes on Myocardial Infarct and No Reflow Size in an Experimental Rat Model and Clinical Trial - Wangde Dai- HMRI Cardiovascular Research Institute

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Several studies suggest that clinical outcomes after acute myocardial infarction are worse in diabetics than non-diabetics. Patients with diabetes have higher rates of heart and renal failure, cardiogenic shock and in hospital mortality compared to non-diabetic patients with acute coronary syndromes. In one pooled analysis from the TIMI group, there was nearly a doubling of 30-day mortality among diabetics compared to non-diabetics who suffered either ST elevation or unstable angina/non-ST elevation myocardial infarction. The exact cause of this worse clinical outcome in diabetics remains controversial. Some studies suggested that diabetes is associated with worse signs of no reflow. Other studies did not show that diabetes was associated with bigger infarcts or micro vascular damage; but some studies showed that hyperglycemia on admission was associated with greater myocardial injury, and that this relationship was actually strongest in the non-diabetic patients. Ota ET al. also showed that hyperglycemia on admission for ST elevation myocardial infarction was associated with micro vascular obstruction on cardiac magnetic resonance imaging. Thus there is remaining controversy regarding the effect that diabetes has on myocardial infarct size and micro vascular obstruction (no reflow phenomenon). We determined the effect of diabetes on these two parameters in both an experimental rat model of diabetes as well as in a recent clinical trial in patients with STEMI. Our hypothesis was that since diabetes is associated with micro vascular disease that the size of the myocardial infarction and no-reflow areas in both animal model and in patients would be larger in the diabetic cohorts

Methods: Adult Zucker Diabetic Fatty (ZDF) and Sprague Dawley (SD) rats (n=15 each group) were subjected to left coronary artery occlusion for 30 min followed by 3 h of reperfusion. In the clinical trial, the myocardial infarct (MI) size and the zone of microvascular obstruction were assessed in 258 non-diabetic MI patients and 34 diabetic MI patients.

Results: There was no difference in infarct size (median) in ZDF rats (49.9%) versus SD rats (59.6%; $p=0.32$); there was no difference in no-reflow size (mean \pm SEM) in ZDF rats ($32.5 \pm 3.5\%$) versus SD rats ($32.7 \pm 4.3\%$; $p=0.97$). In the clinical study, CK-MB and Troponin I area under the curve at 72 h were comparable between the 2 groups. Infarct size by MRI on day 4 was 37.9 ± 1.8 ml in 216 non-diabetic patients and 34.8 ± 4.7 ml in 27 diabetic patients ($p=0.559$). The ratio of micro vascular obstruction on day 4 on the MRI was 0.179 ± 0.018 of the left ventricle in 200 non-diabetic patients and 0.220 ± 0.060 of the left ventricle in 23 diabetic patients.

Conclusions: Both animal and clinical studies demonstrated no evidence for a larger infarct size, or larger area of no reflow in the diabetic compared to non-diabetic conditions.

Biography:

Wangde Dai has completed his PhD at the age of 25 years from Andhra University and postdoctoral studies from Stanford University School of Medicine. He is working at HMRI Cardiovascular Research Institute. He has published more than 25 papers in reputed journals and has been serving as an editorial board member of reputed

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