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## The use of direct heart hypothermia by MET cooler reduces left ventricular systolic function impairment in animal experimental model of myocardial infarction: Ongoing study

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**Background:** The reduction of heart damage and improvement of patient outcome are the main goals in the treatment of myocardial infarction. For both crucial are the shortening of time to reperfusion and use of appropriate pharmacological treatment. Two commonly recognized milestones in this area are the techniques of mechanical reperfusion and new generations of antiplatelet drugs. Restrain of myocardial metabolic activity seems to be possible third way, which may have an impact on myocardial damage especially during the critical ischemia. The use of direct heart hypothermia to reduce myocardial metabolic activity is very promising tool for reducing left ventricle damage and improve patient's prognosis.

**Method:** The study is conducted using an animal model. We compare 20 domestic swine (Polish Landrace Pig), 10 in the Study Group (SG) and 10 in the Control Group (CG). The animals in both groups were randomly paired by age, sex and body mass. Animals in the CG are sequentially given analgesia, sedation and respiratory therapy. After that we get an arterial access (femoral artery), perform coronary-angiography and by using Balloon Catheter (BC) perform inflation in proximal part of LAD (POBA) (target prox/mid LAD with a diameter of 2.5-4.0 mm behind ostium DG1). After 45 minutes the BC is removed from the LAD. The animal is observed, monitored (if necessary appropriate medication is given). Past 48-hours since POBA the EF assessment (Ejection Fraction) of LV is performed. Then the subject is euthanized and staining of heart tissue is performed with quantitative assessment of Infarct Area (IA) and Area at Risk (AAR). Similarly, in SG the coronary angiography is performed with POBA LAD. After removal of BC from the LAD, a dry puncture of pericardium (pericardial catheter inserted to the pericardial sac) is performed, with subsequent 12 hours procedure of direct hypothermia of heart (saline 30 °C). 48 hours since POBA, there the evaluation of EF is made, subject is euthanized, then same staining procedures as in control group performed with quantitative assessment OD AI and AAR.

**Result:** Comparison of baseline EF and MVO in CG1 and SG1 showed no significant differences (all  $p > 0.05$ ). MVO was significantly reduced at SG2 and EF was significantly greater in SG2 comparison to the CG2. Similarly, for the EF and MVO significant difference was observed between the SG2 and CG2 ( $p < 0.001$ ).

**Conclusion:** Direct Heart Hypothermia (DHH) method by METcooler in acute experimental heart ischemia is a viable and safe method in an animal model. Dry pericardial puncture and lowering the temperature in the pericardial sac by applying a closed refrigerant circuit are relatively simple procedures that can be performed if necessary in a regular cath-lab/cardiology department. Preliminary results demonstrate that the DHH may be considered in the future as an additional method to reduce cardiac damage in the course of myocardial infarction.

### Biography

Tomasz Kameczura is Interventional cardiologist experienced in invasive cardiology, currently dealing with ACS's and elective PCI's and is the founder of NewTechMed LLC/NY/USA.

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