**LASER STIMULATED STEM CELLS TREATMENT POST-MYOCARDIAL INFARCTION IN HUMANS: SAFETY AND FEASIBILITY STUDY**

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*Objective:* Determine the long term safety and possible feasibility of low-level laser therapy (LLLT) application to the bone marrow (BM) on patients post acute myocardial infarction (AMI).

*Background*: The promising field of cell-based therapy offers a complementary mode of treatment to patients post acute myocardial infarction (AMI). LLLT have been found to have a photobiostimulatory effect on various biological processes.

*Methods*: Patient suffers acute ST segment elevation MI and candidate to primary percutaneous coronary intervention (PPCI) were included. In the active group, LLLT was applied to the tibia bone for 100 sec non-invasively prior to PPCI, 24 and 72 hrs post-PPCI. The control group had the same protocol, but the LLLT source was powered-off. Blood samples were taken on admission and during first week post MI. Echocardiography performed 1, 20 and 270 days after PPCI post MI.

*Results*: Twenty four patients were enrolled. Levels of CPK accumulation (area under curve up to 5 days post AMI) were 202±75 (arbitrary units) for the laser group with significant statistical trend (P<0.09) to be lower than the value (302±53) in the placebo group indicating possible cardioprotection of the ischemic heart by laser treatment to the BM. Leukocytes count were 11200±3200 on admission and 9600±4300 at 72 hours post AMI in the active group and 12300±4300 on admission and 9400±4700 at 72 hours for the placebo group. Platelets count also showed no change during the first week post-MI .The door-to-balloon time was 59±12 min in the laser group compared with 61±9 in the control group. No adverse effects were observed in the laser treated patients.

*Conclusion:* Applying LLLT to the BM in order to photobiostimulate stem cells for the benefit of the infarcted heart is a safe procedure for application in humans, and offers a novel approach in cell therapy adjunctive to the PPCI.