



Extracorporeal Shockwave Myocardial Revascularization (ESMR) Therapy: A Novel Therapy for Refractory Angina

Muhammad Dzafir Ismail^{1, 2,}, Ahmad Syadi Mahmood Zuhdi¹, Zulhilmi Yaakob¹, Wan Himratul Azliza Wan Harun¹, Chee Kok Han¹, Alexander Loch¹, Muhammad Athar Saddiq¹, Sivarani R.M.Sathasivam¹, Nor Ashikin Md Sari¹, Wan Azman Wan Ahmad¹*

¹ Cardiology Unit, University Malaya Medical Centre

² Cardiology Unit, University of Malaya, Kuala Lumpur, Malaysia

Introduction: With improvement in cardiovascular care, there is a rapidly growing group of patients who remain severely disabled by symptoms of myocardial ischemia but yet not amenable to conventional revascularization therapy. ESMR is a shockwave therapy given to the area of ischemic myocardium which theoretically induces angiogenesis and hence improvement in myocardial perfusion and clinical symptoms.

Objectives: To analyse the effect of ESMR in patients with refractory angina in improving angina symptoms and myocardial perfusion.

Methods: Sixteen patients (81% with three vessels disease and 19% with two vessels disease) who fulfill these inclusion criteria:

1. Patient with refractory angina
2. Presence of angina which cannot be controlled by medical therapy, percutaneous coronary intervention or coronary artery bypass graft surgery
3. Patients with Canadian Cardiovascular Society angina class II to IV
4. Proven reversible myocardial ischemia as shown by SPECT
5. Patient was declined PCI or CABG by the attending cardiologist or surgeon were recruited and treated with ESMR 3 sessions per week for 3 cycles at intervals of three weeks. Each patient had total of nine sessions with 500 shocks in each session. They were assessed clinically using CCS angina class, Seattle Angina Questionnaire, exercise tolerance test and myocardial perfusion.

Results: There were significant improvement in CCS angina class (p-value=0.001), angina symptoms based on SAQ (p-value=0.023) and decreased in nitroglycerin usage (p-value=0.024). An increased in the duration of exercise stress test was demonstrated (7.47 vs. 9.85 minutes; p-value<0.0001) and correlated with an improvement in METS (4.88 vs. 6.12; p-value<0.0001). There was also improvement in mean defect extent score at stress on SPECT, pre and 3 months post ESMR treatment, 29.36±9.75% and 24.63±11.26% (p-value=0.021) respectively.

Conclusion: We observed an overall improvement in both clinical symptoms and myocardial perfusion after ESMR therapy. This exciting novel therapy offers new hope in symptomatic CAD patients not amenable to conventional therapy.

References: 1. Fukumoto et.al. Extracorporeal cardiac shock wave therapy ameliorates myocardial ischemia in patients with severe coronary artery disease. *Coron Artery Dis*, Volume 7(1). February 2006.63-70.

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