

Intramyocardial Injection of Autologous Platelet Rich Plasma combined with Transmyocardial Revascularization

K. E. Wehberg¹, G. Answin², D. Wood¹, J. Todd¹, J. Julian¹, N. Ogburn¹, K. B. Allen³. ¹Peninsula Regional Medical Center, Salisbury, MD, ²Christ Hospital, Cincinnati, OH, ³Mid America Heart and Lung Surgeons, Kansas City, MO,

BACKGROUND: Transmyocardial laser revascularization (TMR) is an option for patients with medically refractory angina not amenable to conventional revascularization. Unfortunately, TMR does not provide angina relief in all cases and has not demonstrated improved myocardial perfusion or function. Recent studies suggest that there may be a synergistic effect on angiogenesis between TMR and exogenously supplied growth factors. We evaluated the role of intramyocardial injection of autologous platelet rich plasma (PRP), which contains angiogenic growth factors, in conjunction with TMR.

METHODS: Twenty-five consecutive patients with diffuse coronary artery disease and medically refractory Class III/IV angina underwent minimally-invasive, robotic-assisted sole therapy TMR. Cardiolute nuclear stress testing with computer calculated ejection fraction (EF) was performed preoperatively and six months postoperatively in all patients. Group 1 (first 14 patients) underwent TMR alone while Group 2 (last 11 patients) underwent TMR plus intramyocardial injection of autologous PRP (0.6cc per injection) between each TMR channel. PRP was prepared from 120cc of autologous whole blood using a point of care platelet separator (Medtronic Magellan) 15 minutes prior to skin incision. Perioperative demographics were similar between both groups including baseline EF (57.5 vs. 53%), angina class (3.7 vs. 3.7), and the number of channels (50 vs. 50).

RESULTS: At six months, blinded angina assessment demonstrated both groups achieved significant angina relief, however, the TMR+PRP group had a lower average angina score (0.4 vs. 1.7, $p=0.07$) and were more likely to be angina free (71% vs. 23%, $p=0.04$) than the TMR alone group. EF improved in the TMR+PRP group (+9.0% vs. -2.0, $p=0.07$ Wilcoxon sum test) compared to the TMR alone group. Two 30 day morbidities occurred in the TMR alone group (atrial fibrillation and left pleural effusion) and one mortality occurred in TMR+PRP group (pulmonary embolism at 14 days).

CONCLUSION: Sole therapy TMR improves angina in patients with medically refractory Class III/IV angina. These preliminary results suggest that combining intramyocardial injection of PRP with TMR may be more efficacious at relieving angina and improving myocardial function than TMR alone. Larger trials will be required to determine the degree of synergistic effect.