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Transmyocardial and Percutaneous Myocardial Laser Revascularization

To the Editor:

In their discussion of the 5-year follow-up results after transmyocardial laser revascularization (TMR), Horvath et al1 made a number of statements that we believe may be misleading. Horvath et al1 compared the improvement in exercise time after TMR to the improvement in exercise time from another trial that used percutaneous myocardial laser revascularization (PMR).2 This comparison may be unsound for a number of reasons, including the marked difference in the baseline characteristics of the patient populations from the 2 trials (26% Canadian Cardiovascular Score [CCS] class III angina and 74% CCS class IV angina in the TMR trial versus 61% CCS class III angina and 39% CCS class IV angina in the PMR trial). Interestingly, the TMR study with characteristics most similar to the PMR trial (73% CCS class III and 27% CCS class IV)3 showed a 40 second improvement in exercise time after TMR, whereas there was a 77 second improvement after PMR.2 However, we believe that such comparisons must be viewed with skepticism and interpreted with care. It would be wrong to conclude from this crude analysis that PMR is misleading. Horvath et al1 compared the improvement in exercise time after TMR or PMR have not shown improvements in myocardial perfusion and function after CO2 TMR. These improvements in exercise time and reduction in angina symptoms (with PMR) are lower than those observed with surgical TMR.”

Horvath et al concluded that differences in symptoms and exercise time after TMR and PMR reflect the degree of revascularization achieved. This has not been proven. Those randomized clinical trials published to date that measured both myocardial perfusion and exercise times at baseline and after TMR or PMR have not shown improvements in myocardial perfusion consistent with revascularization, despite improvements in exercise time.2-4 Surprisingly, Horvath et al1 claimed that 1 of these studies demonstrated an improvement in myocardial perfusion, even though the authors reported that it did not.2 The subsequent quantitative analyses of these data have revealed that TMR resulted in a deterioration in perfusion in the regions treated by TMR5 and confirmed that Horvath et al’s interpretation of the original quantitative data were incorrect.

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Response

In response to the letter submitted by Dr McNab and colleagues, we agree that there have been statements made regarding percutaneous laser myocardial revascularization (PMR) and transmyocardial laser revascularization (TMR) that may be misleading. We disagree that we have authored such statements.

McNab et al take issue with our comparison of PMR and TMR and our conclusion that TMR is more effective than PMR. Our conclusion is based on a quote from the study in question.1 Those authors report “the improvement in exercise time and reduction in angina symptoms (with PMR) are lower than those observed with surgical TMR.” McNab et al write that we “stated that differences in symptoms and exercise time after TMR and PMR reflect the degree of revascularization achieved.” No such statement is in our article. It is an interesting concept in that, regardless of the mechanism of action, one would expect a full thickness treatment to achieve a different “degree of revascularization” than a partial thickness treatment. That supposition, however, may be simplistic and perhaps misleading. The main difference between PMR and TMR is not channel depth, but the wavelength of laser light used. To date, PMR only used Holmium: Yttrium Aluminum Garnet (Ho:YAG) devices; TMR is performed with either CO2 or Ho:YAG. Lumping all TMR results together and, additionally, comparing them with PMR just because all studies used a “laser” is misleading. It is analogous to prescribing calcium channel blockers or β-blockers indiscriminately to patients who have suffered myocardial infarctions just because both medications are “blockers.” The differences in the results of laser revascularization are not PMR versus TMR as much as they are Ho:YAG versus CO2. We stand by the discussion in our article2 that there are numerous studies that demonstrate an improvement in myocardial perfusion and function after CO2 TMR. These results have not been reported with Ho:YAG TMR or Ho:YAG PMR. Our study2 highlights another important difference, namely the sustained angina relief with CO2 TMR.

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