

Transmyocardial Laser Revascularization (TMR/TMLR)

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Background

TMR is an excellent tool in cardiac surgery to use for some patients who cannot be completely revascularized by either percutaneous catheter intervention (PCI) or coronary artery bypass surgery (CABG). TMR uses either a CO2 laser or holmium YAG laser to create transmyocardial channels. Most times, 20-40 channels are created in a viable ischemic area that cannot be bypassed. The procedure usually occurs either before going on bypass or after coming off and safety glasses should be worn by all in the operating room.



Hypothesized TMR Mechanism of Action



Angiogenesis – numerous experimental studies have shown that TMR leads to an increase in the density of arterial vessels.

Denervation – angina relief may be due to some degree of cardiac sympathetic denervation.

Outcome Studies

In numerous randomized and nonrandomized clinical trials, patients undergoing TMR with or without CABG, have demonstrated a significant (and often statistical) improvement in anginal symptoms. See reference below for trial data.

TMR Recommendations (all of the following have at least the level of evidence of consensus expert opinion)		
	TMR as Sole Therapy	TMR as adjunct to CABG
Class I	Severe coronary disease not amendable to CABG or angioplasty with EF > 30%	None
Class II	Above with EF < 30% or Unstable angina on IV antianginal therapy	Patients with a viable ischemic area that cannot be bypassed (lack of targets, severe suitable disease or lack of conduits)
Class III	Patients with: stable angina (or without), cardiogenic shock, decompensated heart failure, or uncontrolled arrhythmias	Patients in whom CABG is not the standard of care

Class I : Conditions for which there is evidence or general agreement that a given procedure or treatment is useful and effective

Class II : Conditions for which there is conflicting evidence or a divergence of opinion about the usefulness or efficacy of a procedure or treatment

Class III : Conditions for which there is evidence or general agreement that the procedure or treatment is not useful and in some cases may be harmful.

References and additional reading

The Society of Thoracic Surgeons practice guideline series: Transmyocardial Laser Revascularization. Ann Thorac Surg 2004; 77:1494-1502 Bridges, Horvath, Nugent, Shahian, Haan, Shemin, Allen, Edwards