

Channeling CO₂

New laser gets the blood flowing for heart patients

CO₂

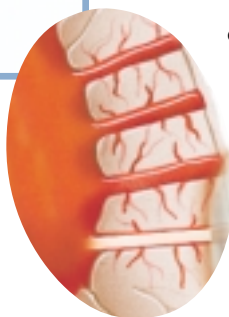
With Transmyocardial Revascularization (TMR), surgeons use the Heart Laser System to operate on a beating heart, synchronizing the laser's pulse with the patient's heartbeat.

When Coarsegold resident Raymond Raab was diagnosed with several blocked coronary arteries, he was told that his condition was considered inoperable. That's when he sought a second opinion and discovered that he had options with Transmyocardial Revascularization (TMR), a breakthrough laser technology available at Saint Agnes Medical Center.

Each year, it is estimated that 80,000 Americans are classified as having severe coronary artery disease (CAD). Typically, despite the maximum drug therapy, these patients are extremely restricted in their daily activities. They experience unrelenting angina – spasmodic attacks of chest pain caused by lack of oxygen to the heart muscle and possibly shortness of breath and fatigue. CAD can lead to heart attack and is the major cause of death in the United States, resulting in about 500,000 deaths annually.

Ventilating the Heart

TMR, performed with the Heart Laser System, is a safe and effective laser treatment that improves blood flow and relieves chest pain that restricts a patient's quality of life. It is performed on a beating heart, generally through a small chest incision. The surgeon uses the one-pulse of the Heart Laser System to create between 20 to 40 one-millimeter-wide channels into the left ventricle of the heart. The computer-controlled laser is synchronized with the heartbeat and is triggered to fire when the ventricle is filled with blood and the heart is relatively still. The CO₂ laser places



The Heart Laser System creates channels in damaged heart muscle (represented in white).



Blood flow resumes to the oxygen-deprived heart muscle.

channels through oxygen-deprived myocardium, or heart muscle, into the heart's left ventricle. Clinical studies have demonstrated that the creation of these channels allows oxygen-rich blood to flow into the heart muscle again, despite blocked arteries.

Interestingly, the concept of creating channels for cardiac circulation is modeled after the reptile heart. Unlike the human heart, which is nourished by blood flowing in arteries on the wall of the heart muscle, the reptile heart is primarily nourished by internal channels that supply blood from the heart chamber into the heart muscle.

Benefits Abound

Saint Agnes added the technology to its expanding Heart and Vascular Center services in October 2001. The Heart Laser System is used in conjunction with bypass surgery or by itself for patients with severe coronary artery disease. Benefits include increased heart circulation for the patient, which reduces the potential for post-operative chest pain. "Studies show that TMR therapy has significantly improved the ability of those affected with coronary artery disease to carry out daily activities that were difficult for them prior to this therapy," says Kimberly Horton, RN, MSN, FNP, director of Cardiovascular Clinical Services for the Heart and Vascular Center at Saint Agnes. "It also provides another avenue of treatment for individuals who may not benefit from traditional coronary bypass surgery."

In Raab's case, cardiac surgeon Robert D. Stewart, MD, used the procedure in conjunction with bypass surgery to clear blocked bloodlines. After a weeklong hospital stay and another week recuperating at home, Raab was back to his daily routine. "I feel good. I don't have pain anymore, and I'm walking one mile every morning," says Raab, who admits he is amazed by the technology involved in the procedure. "I'm flabbergasted. I've heard about it and read about it, and I still don't completely understand it," he says. "But I do know that I'm carrying on just like normal." ❁