



TRIPLER ARMY MEDICAL CENTER

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“Cool” laser is Tripler’s latest weapon in the fight against vascular disease

TRIPLER ARMY MEDICAL CENTER -- Since March, sick patients at greatest risk of losing their legs because of clogged arteries have a new type of minimally invasive surgery that can clear the blockages and save them from amputations.

“We have technologies today that didn’t exist 10-15 years ago,” said Tripler’s chief of vascular surgery, Lt. Col. (Dr.) Dwight Kellicut. “It was either open surgery or amputation. Sick patients got amputations or got very, very sick from big surgery cases.”

Today, standard vascular surgery includes replacing or bypassing a dysfunctional artery by placing a stent, or by taking a vein section from elsewhere in the body to bypass or replace the diseased section of an artery. Angioplasty, the use of surgical balloons to enlarge a section of a clogged artery, is also common.

Tripler’s latest weapon in the battle against vascular disease is a pulsating blue light at the tip of a catheter threaded slowly through a major artery of the body to the diseased section of an artery.

From a 3-millimeter incision, often made on the leg opposite to the one with the diseased artery, a laser-tipped catheter .9 to 2.5 millimeters wide, is slowly pushed through the body’s arterial system to the clogged area of an artery.

The front end of the catheter is attached to a thin surgical wire that can be threaded through the selected arterial route and can then pierce through the clogged area, creating a space for the laser device to flash its light to dissolve plaque that has accumulated on the artery walls.

As the wire pushes through to the clogged section of the artery, surgeons like Kellicut can slowly chip away at the plaque, millimeter by millimeter, in an operation that can take four to six hours.

Tripler uses excimer laser ablation equipment manufactured by Spectranetics®, a company based in Colorado. Its laser generator, mounted on a wheeled cart, discharges ultraviolet light when xenon and chloride molecules are forced to unite briefly when ionized.

In returning to their natural states, the unstable xenon-chloride molecules emit ultraviolet light as a byproduct. The ultraviolet light is then transported through the catheter to be aimed at the arterial walls, where it is efficiently absorbed by any plaque buildup. The

“cool” blue light (less than 50 degrees C.) is still hot enough to quickly break apart the plaque and allow it to dissolve safely into the blood stream.

The equipment is designed to emit the laser light in millisecond pulses. This allows the arterial walls enough time to cool off between the bursts of light, thus protecting the arterial walls from being damaged by prolonged heat.

Studies of this technique earlier this decade showed a success rate of better than 90%. “Every limb we save, it’s a huge saving for everyone. Most importantly, it preserves the quality of life for our patients,” Kellicut said.

Kellicut trained in a program which pioneered this laser technology when he studied vascular surgery on a two-year Army fellowship at Greenville Hospital System in South Carolina three years ago. When he was assigned to Tripler in 2008 as chief of vascular surgery, he applied for an Advanced Medical Practices grant to acquire the excimer laser equipment at Tripler.

The grant was approved last year, and the laser equipment arrived last October. However, it had to wait until Kellicut returned in December from an eight-month deployment to Iraq. Since March, two other surgeons have trained to use the excimer technology and the procedure has been used six times, all successful.

Kellicut said arterial occlusions in legs are a commonly seen in Hawaii’s large diabetic population. “What we hope to do at Tripler is to be able to use this laser treatment for people and lower their amputation rates. We can now talk to our diabetic patients about a treatment that’s never been before at Tripler.”



Tripler’s Lt. Col. (Dr.) Dwight Kellicutt discusses the excimer laser ablation surgery procedure with interventional radiologist Dr. Brian Ching. Kellicut holds a catheter similar to those used during the vascular surgery operation. U.S. Army photo by Leslie Ozawa



Tripler's chief of vascular surgery, Lt. Col. (Dr.) Dwight Kellicut, displays the catheter tip of an excimer laser instrument that can remove plaque from clogged arteries in lower legs, saving them from being amputated. U.S. Army photo by Leslie Ozawa