

The Total Thoracoscopic Maze Procedure: For the Treatment of Atrial Fibrillation



The Ohio State University Medical Center is one of only a few centers in the United States performing the most minimally invasive of surgeries to treat and effectively cure atrial fibrillation. This surgery, performed by John Sirak, MD, is called a total thoracoscopic maze procedure. It is a closed-chest, beating-heart procedure and is performed without the use of the heart-lung bypass machine. The totally thoracoscopic approach offers patients a quick recovery and minimal discomfort after surgery. This procedure has shown to be 90 percent effective after one year in maintaining sinus rhythm without the use of any anti-arrhythmic medications in patients with all types of atrial fibrillation.

Why Is This Important?

According to the American Heart Association, atrial fibrillation (AF or a-fib) is the most common of all heart rhythm disorders, affecting more than 2.2 million Americans. The Rotterdam Study found that 22 percent of women and 24 percent of men will develop atrial fibrillation in their lifetime. AF doubles the risk of death through an increased incidence of stroke and, even more seriously, heart failure. Pure medical treatment of AF does not completely protect a patient from these dangers.

The Total Thoracoscopic Maze Procedure

There are several different surgical procedures that can be used to treat atrial fibrillation; however, most of them involve an open-chest approach. In recent years, innovative new minimally invasive approaches to treat AF have been developed that successfully address the autonomic, as well as the more commonly understood anatomic, causes of atrial fibrillation. The ability to verify intraoperatively both treatment objectives in a single, totally thoracoscopic procedure makes this operation uniquely effective against all forms of atrial fibrillation.

The Surgery

Three or four small incisions, each about one-quarter inch long, are made on each side of the chest. A fiber-optic camera and specialized tools are used to perform the entire procedure through these tiny incisions.

The operation addresses the three primary sources of atrial fibrillation, as well as the primary cause of AF-related stroke. First, the pulmonary veins are electrically isolated from the left atrium. This blocks abnormal impulses from the pulmonary veins responsible for initiating atrial fibrillation. Second, autonomic nerve fibers, which make the heart abnormally susceptible to atrial fibrillation, are identified and ablated using real-time mapping techniques. Third, extended connecting ablations are performed on key areas of the left and right atria, including a connecting line to the annulus of the mitral valve. These critical connecting lesions interrupt the circular re-entry pathways typical of chronic atrial fibrillation. Finally, the left atrial appendage, a redundant structure associated with stroke-causing clot, is safely closed using a stapling device.

All four steps of the procedure are verified using a combination of real-time echocardiography and electrical testing. This rigorous testing of every part of the operation, coupled with the truly minimally invasive approach, makes this operation unique among treatments for atrial fibrillation. It is highly effective even in patients with permanent forms of AF. The operation is completed in about three hours. Hospitalization is typically one or two nights.

After Surgery

Most patients remain in normal rhythm without rhythm-control medication. A small portion of patients with chronic atrial fibrillation may have relapses in the early post-operative period. This is due to inflammation from the operation itself that causes some temporary irritability in the heart's electrical system. The inflammation is gone in 3-4 weeks, leaving nearly all patients in normal sinus rhythm.

Blood-thinning medicine is continued in all patients for three months after surgery. It is then stopped in patients who remain in normal rhythm. Rhythm-control medications are stopped after surgery. For the small amount of patients who have atrial fibrillation after surgery, rhythm-control medications are used for 3-4 weeks until the heart heals and the inflammation affecting the heart's electrical system is gone.

For more information or to refer a patient, please call (614) 293-5502.