

## Atrial Fibrillation Therapies: Total Thoracoscopic Modified Maze and Convergent Procedures

Total thoracoscopic modified Maze (TTm Maze) and Convergent are minimally invasive procedures. They combine a surgical and catheter-based treatment for atrial fibrillation.

*If you have  
any questions,  
please ask your  
physician.*

### Atrial fibrillation

Atrial fibrillation (AF) is a fast, irregular heartbeat that occurs in the upper chambers of the heart. AF can be persistent (continuous) or paroxysmal (episodes of AF that occur occasionally and tend to stop on their own). In both types of AF, the irregular heartbeat causes abnormal blood flow in the upper chambers of the heart. This may cause blood clots to form inside the heart. These blood clots can leave the heart and travel to the brain, causing a stroke. The most frequent place in the heart to form clots during AF is the left atrial appendage (a pocket-like section of the left atrium).

### TTm Maze and Convergent procedures

The TTm Maze and Convergent procedures do not require open-heart surgery (an incision through the breastbone). For TTm Maze, the surgeon makes 6 to 8 small incisions (1/4- to 1/2- inch long) on both sides of the chest. For the Convergent procedure, the surgeon makes a 1 1/2-inch incision in the upper abdomen and 3 to 4 small incisions (1/4- to 1/2-inch) in the left chest. Both procedures are done in 2 phases. An electrophysiologist (heart rhythm specialist) will do the second phase several months later. This will be done through a puncture site in the groin.

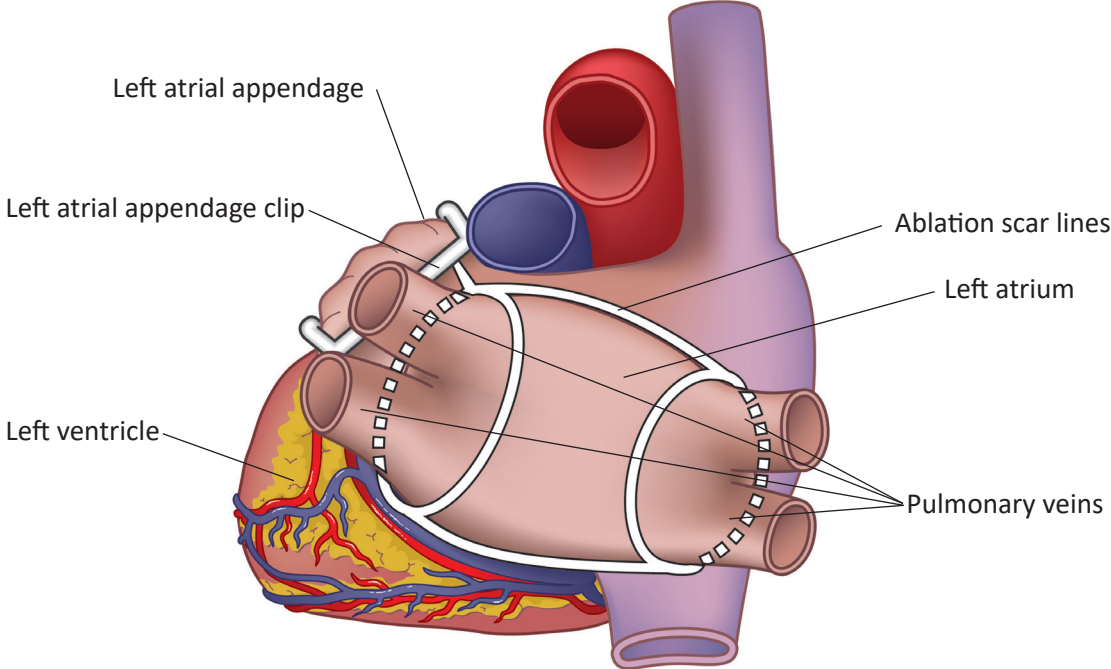
#### ***Phases of the procedures***

##### **Phase 1**

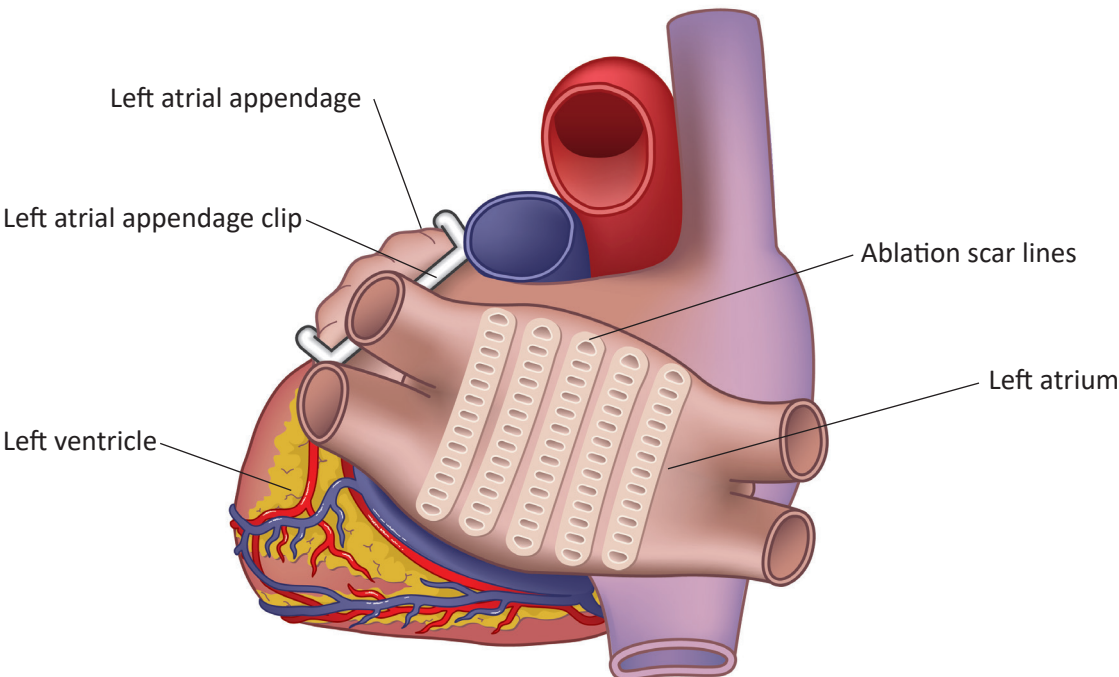
In the first phase, the surgeon inserts specialized equipment through small incisions on the side of the chest to reach the heart. The surgeon then creates a pattern of scar lines on the outside of the heart using high-powered energy. The scar line pattern for the TTm Maze procedure goes around the pulmonary veins and parts of the left atrium (Figure 1). The scar lines for the Convergent procedure, go across the back of the left atrium (Figure 2). Over the next few months, the scar lines will form scar tissue. The scar tissue blocks the electrical path of the AF.

During the first phase, the surgeon also closes the left atrial appendage from the outside using a special clip (Figure 1 and 2). This prevents blood clots from forming in this region and reduces the risk of stroke.

**Figure 1. TTM Maze procedure: Phase 1**



**Figure 2. Convergent procedure: Phase 1**



## **Phase 2**

In the second phase, which occurs 2 to 3 months later, an electrophysiologist will do an ablation procedure inside the heart. This physician will guide a catheter into the heart through the large veins in the leg. The procedure will also use radiofrequency waves to destroy remaining abnormal electrical pathways inside the heart that may be causing AF.

## **Indications for the procedures**

Most people who have these procedures have a long history of AF that has failed to respond to other treatments. Common reasons to have these procedures may include:

- Failed AF control with medication
- One or more failed catheter ablations
- Not able to have a catheter ablation due to various reasons

These people may also have:

- Symptoms of AF that affect their lifestyle
- A history of bleeding on blood thinners

## **Benefits of the procedures**

The TTm Maze and Convergent procedures have the following benefits:

- Patients have few or no symptoms related to AF. Up to nine in 10 people who have TTm Maze show no signs of AF 1 year after the procedure.
- There is a reduced risk of blood clots and stroke.
- Some patients may reduce or stop taking antiarrhythmic medications and/or blood thinners.
- There is less bleeding and little scarring compared to open-heart surgery.
- There is a faster recovery time compared to open-heart surgery.

## **Risks of the procedures**

Complications may happen in up to 1 or 2 out of every 20 people who have the TTm Maze or Convergent procedures. Complications can include:

- Fluid collection around the heart or lungs
- Trouble breathing that comes and goes
- Bleeding
- Infection
- Pain and discomfort

## **What to expect**

During the surgery, you will be asleep under general anesthesia to keep you comfortable. Your healthcare team will monitor you throughout the procedure.

After the procedure, your care team will continue to monitor you. Most patients stay in the hospital for 3 to 5 days. As you recover, your physician will decide how long you need to be in the hospital. Your care team will give you discharge instructions about medications and self-care before you go home. They will also give you a follow-up schedule for the next steps.

## **Contact information**

If you have any questions, please ask your physician. Or, call the Northwestern Medicine Bluhm Cardiovascular Institute at 312.NM.HEART (312.664.3278, TTY: 711).