

# Cardiac: Conditions & Treatments

## Atrial Fibrillation: Maze - Frequently Asked Questions

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1. The need for a pacemaker post Maze was brought up and the connection with Sick Sinus Syndrome was discussed. A few questions came up as a result of this discussion, as follows:

**a) What is Sick Sinus Syndrome and how is it related to the need for a pacemaker in some patients?**

Sick sinus syndrome is when the sinus atrial (SA) node (the heart's internal pacemaker) does not perform properly to maintain a normal heart rate of between 60 to 100 beats a minute. The heart rate may go from being very slow (bradycardia) to very fast (tachycardia) without any external reason or not fire at all so there is no heart beat for a period of time (sinus pause or sinus arrest. Sick sinus syndrome, a common sinus dysfunction seen in patients with atrial fibrillation, is thought to develop for at least one of three reasons: a. The underlying etiology of what creates sick sinus syndrome actually creates an environment for atrial fibrillation to develop; b. Longstanding/permanent atrial fibrillation creates fibrosis of the SA node thus damaging it so that it will not function properly; c. Anti arrhythmic drugs directly influence the SA node to some extent.

**b) There seems to be a belief that up to 15% of Maze patients require a pacemaker post Maze?**

What is the more accurate number based on your experience? Data previously reported the incidence of pacemaker insertion post maze was between 15- 20%. These percentages was based on Dr. Cox's report after performing the cut and sew maze procedure where he was very aggressive in placing a pacemaker if a patient had a heart rate of < 60. Dr. Pasic from Berlin Heart Institute reported that he found over 50 to 60% of the patients who received pacemakers for heart rates < 60 after surgery no longer needed the pacemakers 6 months later. We have seen the incidence of the post procedure pacemaker insertion decrease to between 5-8% of patients needed a pacemaker post surgery due to the advent of new technology (radiofrequency and cyrothermia) now used to perform the maze procedure. Presently, approximately 10% of our patients have received a pacemaker post surgery.

**c) Why is this condition and the need for a pacemaker not discussed in connection with catheter ablations?**

Many adhere to the theory that more SA node dysfunction is identified the more successful the maze procedure. Also, many patients undergoing the maze procedure are sicker and require other cardiac surgery procedures to include multi heart valve repair. The pacemaker incidence after valve surgery is 3 to 5% and can be higher in the elderly.

2. A few people posted that they had unsuccessful Maze procedures concomitant with other heart surgery i.e. mitral valve repair, etc. **What options does someone in this position have? Another Maze? Catheter ablation?**

One must be careful when defining failure of the maze procedure to determine whether someone had undergone a full maze or a modified procedure based on the experience or preference of the surgeon. If one underwent a pulmonary vein isolation (PVI), sometimes known as the mini-maze, when one had long standing /permanent atrial fibrillation and a large left atrium this may also lead to an unsuccessful outcome. In this case, the option of repeated surgery would make sense. Catheter ablation is always another alternative. However, catheter ablation is not an option for those patients who have had a mitral valve replacement for fear of damaging the new valve especially when the new valve is mechanical.

3. Maze vs. Catheter Ablation

- a) **When would a Maze be recommended for a patient in lieu of a catheter ablation?**

Based on the 2007 Heart Rhythm Society Guidelines that are just being released the indications for a maze procedure are: 1. Symptomatic AF patients undergoing other cardiac surgery, 2. Selected asymptomatic AF patients undergoing cardiac surgery in whom the ablation can be performed with minimal risk. Stand alone AF surgery should be considered for symptomatic AF patients who prefer a surgical approach, have failed one or more attempts at catheter ablation or are not candidates for catheter ablation.

- b) **In Dr. Ad's experience, what percentage of his Maze patients have the surgery together with mitral valve repair / replacement or other heart procedures versus stand alone surgery? Is there an increasing trend for the surgery as a first line treatment for the lone atrial fibrillation patient, even a paroxysmal afibber?**

In our center approximately 1/3 of our patients are the stand alone surgical maze procedure and the rest are having other cardiac surgery procedures such as a valve repair/replacement and or coronary artery bypass. However, our numbers are very different from other centers

where approximately 95% of the patients undergoing the maze procedure also have other cardiac surgery so only 5% actually are having a stand alone maze procedure. It is hard to declare a trend. Surgery is the recommended first line treatment intervention when a patient is high risk for catheter ablation especially when a left atrial thrombus exists. Catheter ablation has a high failure rate in this group of patients.

**c) Does it make sense for an otherwise healthy lone afibber to have surgery before undergoing the lesser invasive catheter ablation?**

The 2007 Heart Rhythm Society guidelines state that Stand alone AF surgery should be considered for symptomatic AF patients who prefer a surgical approach, have failed one or more attempts at catheter ablation or are not candidates for catheter ablation. However, patients should be aware that although catheter ablation is less invasive it does carry a real risk for bleeding, pulmonary vein stenosis, tracheal-esophageal fistula and stroke. Thus far no head to head study has been done to compare the relatively simple AF cases treated with catheter ablation to surgical ablation with regard to success and outcomes.

**d) What kind of factors should a prospective patient consider when choosing between catheter ablation and surgery for the treatment of AF, especially in light of the fact that more EP's are doing Maze-like lesions?**

The factors one should look for include: 1. The expertise and proven results of the operator, 2. The rate of complications for the operator, 3. What are their follow up protocols and 4. The understanding of the pre disposing factors for failure such as: the duration of AF, the type of AF, and the left atrial size. Long standing persistent (new term for permanent) is the hardest to ablate.

**e) If a lone atrial fibrillation patient decides to have a Maze but sometime down the road this person needs open heart surgery for an unrelated medical issue, will the Maze procedure interfere with having such a future procedure?**

The maze procedure will not interfere with any other cardiac surgery that may be needed. The risk will increase due to having to have repeated cardiac surgery.

4. Post Ablation Treatment

**a) One board member had an ablation after experiencing chronic AF for three years. She is in NSR one year later but experiences "sinus**

**tachycardia” (HR 85-100) about 30% of the time. What might be a follow up treatment under these circumstances?**

A heart rate of 85 to 100 beats per minute should not carry any risk for the patients if the rhythm is truly sinus rhythm and not atrial flutter. Beta blockers may be a solution if this heart rate creates an issue for the patient.

**b) A second member is a 71 year old male who had a failed catheter ablation and a failed Wolf mini-maze (six months post op) and wants to know what kind of procedure, if any, is available to him?**

The questions are 1. To what degree are his symptoms? If he is asymptomatic given the fact that the left atrial appendage was ligated during the surgical pulmonary vein isolation, the risk of having a stroke is very low. 2. Is warfarin (coumadin) contraindicated in his case? If he has had any significant bleeding issues especially a bleed in the head then the tendency to have a more invasive procedure would be higher. Repeated catheter ablation might be a good start however, if surgery is needed the full maze procedure would be recommended.

#### 5. Effect on Atrial Tissue in Maze vs. Catheter Ablation

While performing a catheter ablation, since the EP is “inside” the heart but looking from the outside using technology, is there more unintended atrial damage versus the full Maze where the surgeon has much better visualization of the heart and can better see what he/ she is doing? If this is the case, and I realize this might be theory, but can you speculate on the type of long term effects this might have on catheter ablation patients?

In general the word damage can be misleading. Catheter ablation is done on a beating atrium and while trying to create linear ablation lines, the EP is connecting many ablation dots in an effort to create a linear ablation line. These dots are ablated tissue and some may be displaced therefore theoretically may cause problems such as a new arrhythmia; however, this is not proven. Another way to look at this is that though catheter ablation can cause problems such as pulmonary vein stenosis, left and right atrium perforation and tracheal-esophageal fistula, the EP’s are well aware of the risks and know of many ways to avoid/ diminish problems. The surgical ablation is more controlled and precise, however, it is surgery and this is considered to be a” built in” limitation by many.

6. After consulting a Maze surgeon who only does the full cut and sew Maze, one member was told that even with the cut and sew Maze there may be

focal points or drivers that the surgeon cannot access and a follow up catheter ablation may also be necessary.

- a) **Is this true? If yes, what are those areas?**
- b) **If true for the cut and sew Maze, is this also the case for Dr. Ad's Cryosurgical Maze? Is the cryosurgical technology more effective in locating these drivers?**

I believe the surgeon meant that the maze procedure is designed as a maze meaning that there are corridors that still conduct after the procedure and if it happened to be that a focus exists within the corridor it may still cause a problem. This is a relatively rare outcome following a maze procedure that was done appropriately!!! (the key!) - Especially when all four pulmonary veins were isolated in a box Maze III. If such foci were "missed" (the procedure was not designed to ablate foci outside the pulmonary veins) but mainly to address macro reentry circuits atrial tachycardia is usually the consequence (and not atrial flutter) and this can be easily approached and ablated. However, this is a more common scenario following a catheter ablation and the speculation is that it is due to the multiple dots that some of them are not well connected and may serve as an arrhythmogenic source, but there is no real evidence to support this statement.

b. There are no differences between the use of cryothermia or the cut and sew method to perform the maze procedure in regards to outcomes again when both technique are being used perfectly.

#### 7. Success Rate and Related Issues:

- a) Our current success rate at the last known follow up for our patients who have undergone the maze procedure using only cryothermia as the energy source to perform the procedure is over 90%. We are currently defining success as normal sinus or junctional rhythm with no episodes of atrial fibrillation lasting more than 30 seconds.
- b) If the maze procedure is found to be unsuccessful, the patient is asymptomatic and the left atrial appendage has been closed then ventricular rate control is a very good option. However, if the patient is symptomatic then catheter ablation for touch ups should be considered.
- c) Washington University is the only facility with really long term follow up (using the original series from Dr. Cox for the "cut and sew" maze) and their success rate is well over 90%. We do believe that some failures occurs around two years following the procedure but it is too early to determine if this phenomenon occurs only in patients who have undergone the procedure combined with other cardiac surgery or as an alone procedure.

## 8. Risk factors of the Maze

There are no studies which support the statement that the addition of the Maze procedures increases the mortality and morbidity if done with other cardiac procedures. Actually, we presented a paper in the Heart Rhythm Society's recent meeting that showed that the addition of the maze procedure did not increase morbidity or mortality for patients undergoing the cardiac surgery. I would suggest that when reviewing morbidity and mortality issues, one should actually review the risk factors associated with open heart surgery and the heart lung machine rather than the addition of the maze especially since the stand alone maze is usually performed on healthier people who are less likely to experience morbidity and mortality.

## 9. Timing Issues

We all know that long standing atrial fibrillation is related to remodeling and increased left atrium size. Unfortunately, some patients experience severe remodeling with paroxysmal atrial fibrillation so the type of the AF doesn't necessarily correlate with the degree of remodeling. However, we do know that the earlier the atrial fibrillation is treated the greater the chances are to be cured, but the exact time frame is unknown (ex 1, 3, 5 years). One should keep in mind that the duration is only one variable. The successful treatment of atrial fibrillation may also be dependent upon age, left atrium size and concomitant heart pathologies. Usually long term atrial fibrillation is the most difficult to treat but my experience has also shown that long term paroxysmal atrial fibrillation can also be very difficult to handle. This may tell us that some people with atrial fibrillation have significant tissue changes even early in the course of the arrhythmia.