

Wolf Procedure: Thoughts From a Surgeon

About me: I'm Seth, an ENT doctor who performs surgery. I hope that my medical knowledge and my experience "behind the curtain" in the operating room will be helpful for everyone who is considering having Wolf Mini Maze (now known as Wolf Procedure) surgery.

There are 2 parts to this document. Part 1 is my review of the data on different treatment options for A-fib and why I believe the WP surgery (performed by Dr. Wolf) is the best option for most people. Part 2 is a loosely-organized series of thoughts I have about Dr. Wolf, his surgery, and how to think rationally about outcomes and complications.

Part 1

For any medical decision, you need to weigh 3 things: benefits (or pros) of the treatment, risks (or cons) of the treatment, and alternatives to the treatment.

There are 4 options for treatment of A-fib (assuming it is not caused by hyperthyroid, sleep apnea, or another treatable medical problem)

1. Lifestyle changes/Do Nothing
2. Medications
3. Catheter Ablation
4. Surgery (Many options, of which WP is one)

In the Files section of the Wolf Procedure Facebook page, there is a PDF file called "A Letter From Ross - A-Fib Treatment Matrix 2021". This document contains an excellent and thorough review of the pros and cons of the 4 alternative treatment categories I listed above.

I do not see any reason to reinvent the wheel, so please go review Ross' information if you have not already.

I do have a few things I would update/clarify, mainly details about the outcomes and complication risk of catheter ablation vs. Wolf Procedure surgery. Please see below.

If you want a brief summary of the data, it is this:

- 1. The long term success rate of the Wolf Procedure is superior to catheter ablation for all durations of A-fib. Additionally, WP surgery nearly eliminates future stroke risk from A-fib which catheter ablation does not address.**

2. **The typical post-procedure pain and suffering is mild for both WP and catheter ablation, but is likely worse on average for WP.**
3. **The risk of serious complications is low (1% or less) for both WP and catheter ablation, but is higher for ablation.**

More Detail on All That:

For me, being in my 40s and otherwise healthy, my primary desire is for a permanent cure of my A-fib. My secondary desire is to avoid anticoagulants or other medications with bothersome side effects. Your goals may be the same or not.

I've noticed that EP doctors like to quote 1 year success rates for catheter ablation, which can be 90%. Once you get beyond 1 year, patients start to have recurrences and the success rates drop. However, for those who make it to 5 years after an ablation without recurrence of A-fib, it seems that the results last for most people.

Some specific numbers...

1. Long Term Freedom from A-fib for Catheter Ablation:

- All A-fib Patients (Paroxysmal and Persistent combined):
5 year - 50% success (i.e. no a-fib recurrence) after a single procedure, 70% after multiple procedures
10 year - 52% success after a single procedure, 64% after multiple procedures
- Paroxysmal A-fib group
5 year - 59.7% success after a single procedure, 80% after multiple procedures
- Persistent A-fib group
5 year - 33% success after a single procedure, 60% after multiple procedures

62% of patients in this study had paroxysmal A-fib, 38% had persistent or long-term persistent A-fib

Data is from this study:

Meta-analysis of 67,000 patients in 73 studies

<https://pubmed.ncbi.nlm.nih.gov/37336617/>

This is another study that shows similar results to above

Meta-analysis of 41,000 patients in 58 studies

https://academic.oup.com/eurheartj/article/43/Supplement_2/ehac544.382/6743650

(For those who don't know, a meta-analysis is when researchers combine the results of multiple studies on the same topic. This should provide more robust/reliable results given the large number of subjects).

2. Long Term Freedom from A-fib for Wolf Procedure:

- Long term freedom from A-fib (1-9 years after surgery): 92% for paroxysmal, higher with follow-up ablation, 85% for persistent, 75% for long-term persistent
- From my conversation with Dr. Wolf- patients who stop having A-fib after WP surgery generally do not have recurrences, even years down the road.
- Dr. Wolf's published data from 2014:
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3904324/>

Overall, the 5 and 10 year success rates clearly favor WP over catheter ablation for all durations of A-fib, with the superiority even more dramatic for those with persistent or long-term persistent A-fib.

That being said, I do think catheter ablation has an unnecessarily bad reputation here. It is a very safe and relatively effective treatment, especially if done early after diagnosis of paroxysmal A-fib. There are lots of people who get good outcomes with ablation, but we don't hear their stories in the WP Facebook group because they are out living their lives and not worried about A-fib anymore. Since we only hear from folks who have failed catheter ablation, it is easy to get the impression that it is a useless procedure that never works.

Risk of Complications - Catheter Ablation vs. Wolf Procedure

Recent data for a large number of catheter ablations performed between 2016-2020 shows an overall complication rate of 2.5% with a major complication rate of 0.9%. The most common major complications were significant bradycardia (slow heart rate), heart failure, and pericardial effusion (fluid around the heart) requiring intervention. Notably, stroke/TIA risk was substantially lower than in older studies, with only a 0.16% (1 in 625) risk in this series of over 76,000 procedures. There was a 0.05% risk of death (1 in 2,000).

The study is here: <https://pubmed.ncbi.nlm.nih.gov/36858707/> and you can request a free copy of the full article [HERE](#).

Published head to head studies of ablation vs. surgery show that ablation has a significantly lower risk of complications. However, the complication rate for surgery is highly dependent on the exact surgery performed and the experience of the surgeon. There is no published study that directly compares catheter ablation vs. WP surgery performed exclusively by Dr. Wolf.

From asking Dr. Wolf directly and from his published work, there are no complications of WP surgery that occur in more than 1% of cases. The risks of stroke/TIA and death are lower for WP than for catheter ablation. Observed stroke risk for WP is 2 in 3,000 cases (0.067%) and observed risk of death is 0%.

In summary, complications are very low for both WP and ablation, but are actually lower for WP.

Typical Pain and Suffering - Catheter Ablation vs. Wolf Procedure

I don't have any hard data to base this on, but my impression is that the average recovery for both ablation and WP is relatively mild. There seems to be, on average, more pain and a longer recovery to "feeling back to normal" for WP than ablation. And the worst 10% of recoveries from WP could be pretty rough (arrhythmias, nerve pain around the ribs, weakness, fatigue, and/or shortness of breath lasting for months). Increased age, increased weight, physical deconditioning, and having other medical problems would all increase the likelihood of a slower and harder recovery from surgery.

Summing It All Up

The long term success of WP in stopping A-fib is obviously superior to catheter ablation, as of 2023. The secondary benefit of never needing to take blood thinners for the rest of your life is also a huge benefit that cannot be obtained from catheter ablation.

In the hands of Dr. Wolf (and likely Dr. O in Japan), this surgery is a routine operation that is quite safe and clearly more effective than ablation.

BUT!!!

In the hands of any other surgeon, all of the above analysis should be started over from scratch depending on that surgeon's results. And that might be impossible if the surgeon doesn't do long-term follow-up or have Linq device data like Dr. Wolf has. Most published studies do not report better outcomes with surgery vs. ablation, and they also show significantly worse complications with surgery. If you only have access to an "average surgeon," catheter ablation is the better option in my opinion.

Part 2

Thoughts on Complications and Bad Outcomes

Unfortunately, we live in an imperfect world. Any medical intervention, whether it is a medication or a procedure, could have a bad outcome. That might mean the treatment did not help (or made things worse), or there was some unforeseen complication. I frequently tell my own patients that I cannot ever guarantee results from a surgery, and if any other doctor tells them a procedure is 100% successful, they should find a second opinion.

Ultimately, what we are all looking for is a treatment with a high success rate (it will never be 100%) and a low complication rate (it will never be 0%).

Many non-medical people believe that complications or failures only occur if the surgeon screws something up or “isn’t good.” This is false.

The world’s best and most experienced surgeon using meticulous technique will still have some complications and bad outcomes.. But a mediocre surgeon with sloppy technique will have more.

You see, there are 2 types of bad outcomes (this would include failures of treatment or complications)

1. Technique-Dependent
2. “Act of God”

Technique-Dependent bad outcomes are exactly that- they are dependent on how good the surgeon is. It is impossible to truly know how good a surgeon is at doing surgery. But we can get a pretty good idea by asking how many times he or she has performed the surgery we are considering.

Practice makes perfect, and a surgeon who has performed a specific procedure hundreds or thousands of times will always be better at it than another surgeon who rarely performs that surgery.

It is unusual that surgeons have such detailed data on their outcomes and complications as Dr. Wolf has. We are fortunate to have this information available to help make our decision.

I do believe that with the experience Dr. Wolf has with this surgery, the risk of any technique-dependent bad outcome is extraordinarily low.

However, there is a 2nd type of bad outcome, which I decided to call “Act of God.” Basically, this is a bad outcome that could not have been foreseen and had nothing to do with the surgical technique.

For example, a patient might have an uneventful WP surgery but still have A-fib afterward due to an atypical focus of arrhythmia outside of the areas treated during the surgery.

Or, another patient might develop pneumonia a few days after surgery, despite nothing being different in their case than the previous 100 patients who did not develop pneumonia.

Our bodies are all unique, and heal in different ways. Sometimes, weird stuff happens and it is not predictable. Fortunately, with WP surgery, the odds are strongly in our favor for successful outcomes and uncomplicated recoveries.

Finally, remember that Dr. Wolf is not the only doctor involved with your surgery. There is also an anesthesiologist present who will intubate and extubate your airway, place an arterial line, drive an ultrasound camera into your esophagus, and otherwise keep you alive and make sure you wake up at the end. Anesthesia comes with its own list of serious complications, but in my experience of 20+ years in various operating rooms, those complications are very rare. And at a center like Methodist DeBakey, you are guaranteed to get an anesthesiologist with lots of experience with complex cardiac patients.

How to Think About Statistical Outcomes

I like to use this thought exercise when discussing statistical odds. I would recommend any of you considering WP surgery to use this when thinking about your potential results.

Imagine a cardboard box with 100 ping pong balls inside in a random assortment. Your job is to reach inside the box without looking and draw out 1 ball. The color of the ball represents your outcome from the Wolf Procedure. If it is green, the surgery will succeed and you will be cured of A-fib for many years or permanently. If it is red, the surgery will fail and you will continue to have A-fib.

- If you have paroxysmal A-fib, your box has 92 green balls and 8 red balls
- If you have persistent A-fib, you have 85 green balls and 15 red balls
- And if you have long-term persistent A-fib, you have 75 green balls and 25 red balls

After drawing out your first ball, you get a 2nd cardboard box, again with 100 ping pong balls inside. This time, the color of the ball determines if you have a complication from your surgery or not. A green ball means no complications. A red ball means you will have any complication (could be minor or serious). For everyone, there are 99 green balls and 1 red ball.

Finally, you get a 3rd cardboard box with 100 ping pong balls, this time with green, yellow, and red. The color of the ball determines how easy or unpleasant your recovery from surgery will be. A green ball means you'll leave the hospital 2 days after surgery with minimal pain and return to your normal activities within a few weeks. A yellow ball means you'll have more significant

symptoms like higher pain levels, a lot of nausea/vomiting, shortness of breath, etc, and it will take longer than a month to really start feeling better. A red ball means you'll have a rough recovery- prolonged hospital stay, arrhythmia issues, severe pain or shortness of breath, and/or many months before feeling decent again.

This 3rd box is harder to guess the distribution of colors, and it is probably dependent on your age, weight, and other health issues. This would be a good question for Dr. Wolf.

As a rough guess for myself (otherwise healthy, normal body weight 44 year old who exercises regularly), I would put 80 green balls, 15 yellow balls, and 5 red balls in the 3rd box. You can adjust accordingly for yourself.

If you want to consider statistical odds for very rare events, just increase the size of your box and the number of ping pong balls. Imagine a refrigerator sized cardboard box with 10,000 ping pong balls inside. If we are thinking about the risk of stroke with WP surgery, it is 2 in 3,000. So, in a giant box of 10,000 balls, about 6 of them would be unlucky "stroke" balls, and 9,994 would be "no stroke". It may be helpful to think about very rare but scary complications in this way- yes they can happen but it is extremely unlikely.

To conclude- use this thought exercise to get a better understanding of your odds of success and your risk of complications for WP (or any other medical intervention, for that matter).

Which leads us to our next item...

Anecdotes vs. Statistical Data

Personal stories are helpful, and fortunately we have access to many of them in the WP Facebook group and in Dr. Wolf's online webinars. I've been a member of the WP group for about a month at the time of writing this, and I've already seen several members of the group post pictures and reports from the hospital while having their surgery with either Dr. Wolf or Dr. Ohtsuka.

We see many old patients celebrating their 1, 5, or even 10+ year anniversaries of having surgery and still doing great in normal sinus rhythm.

Unfortunately, we also hear less encouraging stories. Some folks are still having a-fib, flutter, or other issues after their WP and other treatments. Some people had painful and prolonged recoveries. And others had scary complications.

How can we make sense of all these stories?

First of all, it is important to realize our minds place much more importance on personal stories than statistical data. We especially pay attention to negative stories of potential threats. This is true for almost all humans, myself included.

The quote “one death is a tragedy, one million deaths is a statistic” is attributed to Joseph Stalin. Despite being one of the worst people in history, he clearly had an understanding of human psychology. Large numbers and percentages just don’t have the emotional impact for us that personal stories carry.

We can’t make ourselves stop doing this, but we can learn to be aware that we are doing it.

When we hear stories from people who had WP surgery and it did not cure their A-fib, or they had a complication, it is normal and natural for us to feel fear and worry that it could happen to us. Likewise, when we hear success stories, it is natural to feel hopeful and positive.

I think it is great to hear a lot of stories from those who have already had the WP surgery, and that there is a Facebook group where we can learn from and support each other. But we should realize that everyone’s story is different, and not let any one story have too much influence on our decision for WP or any other treatment.

One last thing on anecdotes. In the Facebook group, there are a mix of success stories and problem stories. I’ve heard that the people who are still having issues with A-fib after WP are called the “5 percenters.” Recently, I saw someone commented that “there sure seem like a lot of people in that 5%.”

I would propose the reason it seems like there are so many in the 5% group is that they are overrepresented in the active users in the Facebook group. Most of the 90+% of WP patients who no longer have A-fib probably don’t spend much time posting in an online A-fib group. But the 5% who are still having problems do- asking questions and sharing concerns.

Ultimately, my biggest recommendation is to use statistics to make your decision, not personal stories. Referring back to my ping-pong ball analogy above: think about drawing a ball from each box and playing the odds. The odds are very much in our favor with this surgery- there are a lot more green balls than red ones!

A Few Random Odds and Ends That I’ve Thought About

1. Surgery- same steps every time vs “art”

Some surgeries are a routine series of steps done in the same order every time. And other surgeries are more of an “art” that is different from one patient to the next. An example of the former in my own practice is tonsillectomy. Every time I take out tonsils, I do the same steps in the same order. An example of a more “artistic” surgery would be a rhinoplasty or a “nosejob.” You could do 3 nosejobs in a day, and do 3 very different surgeries depending on whether each nose was too big, too small, too crooked,

etc. More examples would be cancer operations (depends on how big and where the tumor is), or trauma operations (depends on where the injuries are).

In my opinion, the more variable “art” surgeries are more difficult because something can always surprise the surgeon, even if he or she has a lot of experience.

WP seems to be in the “routine series of steps” category of surgeries from what I can tell. For us, this is actually a good thing, because Dr. Wolf has performed this same sequence of steps thousands of times.

2. Speaking of Dr. Wolf’s Experience...

Doing a little math, if Dr. Wolf has performed 3,000 WP operations and each operation takes 2.5 hours, that is $3,000 \times 2.5 = 7,500$ hours.

7,500 hours divided by 24 hours in a day is 312.5 days that Dr. Wolf has spent in his career doing the mini maze surgery.

That means if Dr. Wolf started operating at midnight January 1st and continued doing surgery non-stop 24/7 without any breaks, it would take him until November 9th at 12:00 pm to finish all 3,000 cases!