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Key Words: atrial fibrillation, hypertrophic cardiomyopathy, septal myectomy, surgical ablation

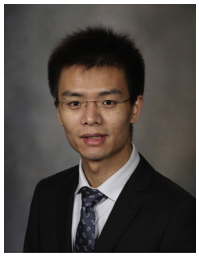
Discussion

Presenter: Dr Hao Cui

Dr Nicholas G. Smedira *(Cleveland, Ohio)*. Presented today is a series of approximately 2000 patients undergoing myectomy and some form of ablation for AF. Dr Cui correctly points out that the impact of AF on the long-term survival of patients with HCM and hypertrophic obstructive cardiomyopathy is unclear, and there's little doubt for those of us who commonly treat these patients that AF definitively impacts their quality of life and need to access medical care. As he also noted, it's prevalent—as many as 1 in 5 patients will develop AF over their lifetime. It's easy to understand how a rapid and irregular heart rate is deleterious to patients with left ventricular outflow tract obstruction or diastolic dysfunction. Noteworthy is the authors show really outstanding surgical results.

One of the major challenges we faced interpreting reviews of interventions for AF is that the guideline definitions of AF that are generated by the various societies, which were appropriately used to classify the patients in this study, do not consistently reflect clinical AF burden. As an example, in your article, 10% of patients undergoing surgical ablation had a prior ablation procedure. Conversely, 6.4% of patients not having a surgical ablation at the time of the myectomy had a prior ablation.

I often think of needing a catheter ablation as reflecting a greater AF burden, but if it cures the patient of AF and you see the patient in the setting of outflow tract obstruction and they have not had AF in let's say 18 months, are they cured of their AF? From this article, I cannot tell what the timeframe was for identifying when the patient had their last AF episode. Could you clarify whether a patient could have had an ablation and no recurrence and still be included in this study?



Dr Hao Cui *(Rochester, Minn)*. Yes. Generally, we include all of the patients with a history of AF in the AF group. They include even those patients who had a prior catheter ablation, although we're not sure if the patients are really free from AF.

Regarding the surgical treatment, usually we decide on the basis of recent episodes of AF. If the patient had a transcatheter ablation 3 years ago and this patient has had no recurrences of AF, usually we don't perform ablation on this patient. If the patient had a prior ablation and then has recurrent episodes, we usually perform a surgical ablation for this patient.

Dr Smedira. So, if I understand correctly, if they don't have recurrence, you would not perform an ablation at the time of myectomy?

Dr Cui. No.

Dr Smedira. Okay. In your article, there's no mention of antiarrhythmic medications as a risk factor and they were not included in your in your analysis. It's my impression that the presence of some of these medications, many of them toxic—amiodarone or Tikosyn—is a reflection of the AF burden, and often patients want to come off those medications as part of the desire to have a surgical ablation. Did you look at the use of these medications? Do you think it would have been helpful in your analysis?

Dr Cui. Yes, I think using the medications would be useful in analysis, but unfortunately, we don't have this data.

Dr Smedira. Survival for patients with AF in your study was worse than for patients without AF. Survival tends to improve to the point of approaching the survival curves of patients without AF only for patients undergoing a cut-and-sew maze procedure, but not PVI. I'm trying to determine why a cut-and-sew is so advantageous. Do you have any data on whether your patients remained in sinus rhythm after the cut-and-sew procedure? Is it obtaining sinus rhythm that's important to the survival advantage? The reason I ask that is that in Rowin and colleagues' article that you quoted out of New York, 36% of their patients at 8 years had symptomatic recurrence, and we have an article that we hope will be published soon in which I looked at my cut-and-sew maze experience, and we had a 50% rate of AF recurrence at 8 years. Do you know what rhythm the patients were in when you did the analysis?

Dr Cui. No, we don't have the rhythm follow-up in this study, because usually they need consecutive 72-hour monitoring of the heart rhythm, and for that reason, we were unable to do such follow-up. Regarding the maze and PVI, we are not clear if there's any difference in the rhythm control.

Dr Smedira. One interesting aspect of Rowin and colleagues' article, when they looked at the natural history of AF in these patients, was that the cause of death in the few patients who died was thromboemboli, specifically cerebral thromboemboli. We know one of the distinct advantages of the cut-and-sew maze procedure is the elimination of the left atrial appendage. Do you have any information on the cause of death? When you did the exclusion of the left atrial appendage in the PVI, was that with a clip or did you over-sew internally inside the LA? We know that oversewing may be associated with recurrence of opening of the LA and increase thromboemboli.

Dr Cui. Yes. I think from Rowin and colleagues' article, embolic events may be the major cause of death in patients with AF. We don't have the cause of death in this study. With the left atrial appendage, from the recent decade, we usually use amputation rather than ligation.

Dr Smedira. Okay, so it's unlikely that was the oversewing. My last question is, have you continued to use the cut-and-sew or have you migrated to the Cox-maze IV, and would you recommend that surgeons should use a cut-and-sew in the HCM patient population?

Dr Cui. In our clinic, we prefer Cox-maze III, the cut-and-sew technique. We think that the cut-and-sew technique may have more reliable transmurality. An important consideration for choosing the cut-and-sew technique or other energy source for ablation is the crossclamp time added to the septal myectomy. In this study, in patients undergoing isolated septal myectomy plus Cox-maze III procedure, the average crossclamp time is 47 minutes, and I think it's acceptable to continue to use it.

Dr Smedira. I agree. Dr Schaff and I have shared the same opinion. I don't know what Dr McCarthy's opinion is, but I always thought the cut-and-sew was the definitive way to go in these patients since it's so problematic. However, my personal data comparing the 2, the IV and III, haven't supported that, although the numbers are small.

Dr Patrick M. McCarthy *(Chicago, Ill)*. This is an excellent article and another outstanding report from Mayo with excellent results for HCM surgery. I have a comment and a question. It's interesting that AF ablation in valve surgery and in coronary bypass has now been shown in multiple studies to improve survival. But it didn't have that response here. As Dr Smedira commented, it's hard to get a good result in patients with HCM. That group of patients have a very thick left atrial wall. Unlike patients with degenerative mitral valve disease, the LA may be 1 cm or more thick. If you perform radiofrequency ablation for the pulmonary veins, as I assume you did, or if you do cryoablation, it doesn't work well in thick tissue and you don't have a reliably transmural lesion. That may explain why the cut-and-sew technique had better results. Those 2 curves diverged significantly, so if you had enough patients, I expect it would have been a significant difference in survival. Do you know where the failures are? If we have patients who fail after AF ablation, we try to map them and then do an ablation. By doing that, we learn where we failed. I would anticipate in this group, if you mapped them, that you might find that you had failed because of nontransmural lesions.

Dr Cui. I think you have a good point. In our study we are increasingly finding that in patients with HCM, we didn't find that the patients with a high resting pressure gradient had a higher prevalence of AF. So, I think the failure of the ablation may be associated with the diastolic dysfunction. I think this is a problem, but whether it's the exact reason, I'm not sure.

Dr McCarthy. It's an interesting point, and I'm not really sure why these patients fail. We haven't treated enough of them or seen enough of them with a cut-and-sew maze to really know exactly where the failures are. Certainly, the diastolic dysfunction causes a lot of the symptoms that Dr Smedira referred to earlier.