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A More Definitive Ablation Procedure for Atrial Fibrillation

### PULMONARY VEIN ISOLATION VERSUS OTHER PROCEDURES IN TREATING ARRHYTHMIAS

You are listening to ReachMD, the Channel for Medical Professionals. Welcome to Heart Matters where leading cardiology experts explore the latest trends, technologies, and clinical development in cardiology matters. Your host for Heart Matters is Dr. Doug Weaver, President of the American College of Cardiology.

Investigators are pursuing more aggressive strategies to maintain sinus rhythm. One area of current increase centers on pulmonary vein isolation as an alternative to AV nodal ablation and biventricular pacing for certain arrhythmia. How effective is pulmonary vein isolation at preventing an arrhythmia relapse. Our guest today is Dr. Mohammed Khan, an electrophysiologist in private practice at Cardiovascular Associates based in the suburbs of Chicago. Dr. Khan is the lead author of a research published in the New England Journal of Medicine on pulmonary vein ablation to treat atrial fibrillation in patients with heart failure.

#### DR. DOUG WEAVER:

Welcome, Dr. Khan.

#### DR. MOHAMMED KHAN:

Thank you for having me.

#### DR. DOUG WEAVER:

Why don't we begin by having you tell us a little bit about the study that appeared in the New England Journal?

#### DR. MOHAMMED KHAN:

The study was actually the first study that looked at the interesting question of patients that have atrial fibrillation along with heart failure. To kind of step back a little bit, atrial fibrillation ablation has probably been around for about 10 years and studies have been undertaken

in patients who had normal ejection fraction are warranted without heart failure and the whole idea of the study was to further the field to see if pulmonary vein isolation which is a type of atrial fibrillation ablation was superior to or not superior to what was commonly used in patients with atrial fibrillation and heart failure and that is AV node ablation and implantation of a biventricular pacemaker. So, we wanted to compare it to the best treatment possible at that time and so the trial is a multicenter randomized control trial. It is not blinded due to the nature of the procedures. Nonetheless, patients were randomized to receiving either pulmonary vein isolation for an atrial fibrillation ablation versus getting an AV node ablation led by ventricular pacer.

**DR. DOUG WEAVER:**

How bad was their heart failure?

**DR. MOHAMMED KHAN:**

Their heart failure had to be New York Heart Association Class II or III and in addition their ejection fractions were 40% or less. We are really talking about a sick group of individuals and the mean ejection fraction in the group turned out to be around 27-28%, so when you compare the characteristics of the patients that were enrolled in those trials, it's equivalent to what you would normally see in a biventricular pacing study. So in other words a very sick group of individuals that often times weren't considered for pulmonary vein isolation so they were randomized into the study and they were followed for six months and essentially the primary point was the composite endpoint and with atrial fibrillation, it's often times difficult to find end points that matter because patients usually don't have atrial fibrillation. However, they don't feel well, they get into congestive heart failure. Their ejection fractions may not be as high as one would want them to be. So our composite endpoint looked at three components. One was 6-minute walk distance. In other words, a component of how much they could do. The other one was a more morphologic component which was ejection fraction and the third one was how they felt and we used the Minnesota Living with Heart Failure Questionnaire, and the trial enrolled 81 patients, 41 were randomized to pulmonary vein isolation and 40 were randomized to AV node ablation with biventricular pacing and it showed #1 that pulmonary vein isolation was successful in about 71% of these individuals in terms of having freedom from atrial fibrillation at 6 months and it also showed that the pulmonary vein isolation procedure was superior to the other strategy, the strategy of using an AV node ablation with biventricular pace making and it was significant on all three accounts on each one of the individual end points in terms of ejection fraction. The ejection fraction difference at 6 months, while they were equal in the beginning, the ejection fractions had improved to 35% in the pulmonary vein isolation group versus 28%. Patients walked longer significantly on a 6-minute walk distance and they felt a lot better on the quality of life questionnaire.

**DR. DOUG WEAVER:**

How much farther did they walk or how much longer were they able to walk?

**DR. MOHAMMED KHAN:**

If you look at the distance, they walked 340 meters in the pulmonary vein isolation group versus 297 meters, so when you look at that and put it in perspective, you know that's a difference of 43 meters and you look at the biventricular pacing trials and that sort of a lot of where these end points came from, that is about the difference that you would see in some of the trials that were done in the past 10 years on biventricular pacing so that is a significant distance.

**DR. DOUG WEAVER:**

And how long had these patients had atrial fibrillation?

**DR. MOHAMMED KHAN:**

The duration of atrial fibrillation wasn't a criteria in the study, however, when you look at the duration of atrial fibrillation, they are on average of about 4 years. About 50% of the participants in this trial had paroxysmal atrial fibrillation and about 50% had persistent or long-standing persistent as the new term is called by Heart Rhythm Society and the American College of Cardiology, 50% of these folks had persistent or long standing persistent atrial fibrillation.

**DR. DOUG WEAVER:**

Did any of the patients require repeat procedures in order to maintain sinus rhythm those had got pulmonary vein isolation?

**DR. MOHAMMED KHAN:**

Yes, and that is an important point that you bring up is that the way that the pulmonary vein isolation procedure is done, on average about 70 or 80% of individuals who undergo pulmonary vein isolation procedure end up requiring only one procedure. Often times when ablation is still in there to isolate the pulmonary veins, there will often times be a recovery of conduction around the pulmonary veins or there will be a little gap that was not isolated to begin with and it often times requires a second procedure and in terms of the number of individuals who underwent a second procedure of the 41 patients, it was less than 10 patients who underwent the second procedure.

**If you are joining us now, you are listening to Heart Matters on ReachMD, The Channel for Medical Professionals. I am your host, Dr. Doug Weaver. Our guest is Dr. Mohammed Khan, an electrophysiologist in private practice at Cardiovascular Associates based in the suburbs of Chicago. We are discussing pulmonary vein isolation to treat atrial fibrillation.**

**DR. DOUG WEAVER:**

Dr. Khan when you look in retrospect at the findings of your study, do you think there are candidates that are particularly suitable for this versus all of them that were enrolled in the trial, were that some that seemed to benefit even greater?

**DR. MOHAMMED KHAN:**

That's an excellent point that you bring up. One of the things that we looked at in the subgroups was patients that had paroxysmal atrial fibrillation versus those that had persistent or longstanding persistent atrial fibrillation and one of the interesting findings that we discovered was that those patients that had more severe atrial fibrillation, atrial fibrillation had been there despite patients getting cardioversion for instance or despite trying multiple antiarrhythmic medications, those were the patients that seemed to have a larger improvement in their ejection fraction. They seemed to have a greater increase in their 6-minute walk distance and they seemed to have a greater improvement in their quality of life questionnaire scores. So I think that as a little bit counter into it when you think about it, the sickest did the best, but often times the sickest are the ones that we think well they are too little, too sick to undergo invasive options such as pulmonary vein isolation procedure, but that's what the data show and I think that speaks to the fact that if patients who otherwise don't have significant other comorbidities, but other than having a cardiomyopathy and atrial fibrillation are symptomatic from that from heart failure, those patients really should be considered for atrial fibrillation ablation. Now the one caveat of all of this is that the

12 centers which participated in these trials were all centers which had extensive amount of experience with pulmonary vein isolation for atrial fibrillation ablation. This is not something that I would recommend for someone who has had minimal experience with atrial fibrillation to undertake. Usually it requires having done 100s, if not 1000s of cases to be able to do these types of procedures. They are long. They take anywhere from 3 to 6 hours or even longer and there are potential complications associated with invasive procedure. Although complication rate as many trials have shown over the past five to ten years have gone down significantly and the success rate has gone up in those intervening years.

**DR. DOUG WEAVER:**

Perforation and pulmonary vein stenosis used to be problem, is it still?

**DR. MOHAMMED KHAN:**

Pulmonary vein stenosis is a problem that we see very infrequently. It used to be that and it has a lot to do with the technique of the ablation itself and also has to do with newer technology and imaging tools, the technique for ablating the pulmonary veins has changed so that the ablation doesn't occur actually in and around the pulmonary vein os, it occurs more in what we call the pulmonary vein antrum, and that does mean that we ablate a little bit farther away from the pulmonary vein so as to not cause stenosis and so we would routinely ask patients that would need pulmonary vein dilatation or stenting and in my experience you know I haven't seen that for the past 5 years. Now, perforation still is a problem. The rates of perforation I think have gone down and especially at experienced centers where they do a lot of volume and that I think there definitely is a learning curve to that with the newer technologies and it has to do with technical issues of manipulation and pressure and temperature and those sort of things, but that complication rate is also going down.

**DR. DOUG WEAVER:**

Let's talk about the success rates for pulmonary vein isolation in all situations, not just heart failure. What as a success rate can we expect in patients that have paroxysmal atrial fibrillation versus those that have chronic atrial fibrillation let's say for a year or less and those that have it for a much longer durations.

**DR. MOHAMMED KHAN:**

It all really depends on where they get the atrial fibrillation ablation done. I know that in the studies that have been published, the success rates range for paroxysmal atrial fibrillation and these are patients that have normal ejection fraction and have paroxysmal atrial fibrillation. Those patients, you know, success rates I think the published rates are anywhere from I would say may be in the 70% range, may be 65-70% up to 85 to 90% and some of the differences in the studies may be the patient population, the way that the patients are followed or how long they are followed for and the techniques for atrial fibrillation ablation. Even though we term atrial fibrillation ablation as one type of technique, there are different techniques or a mix of techniques and those are undergoing trials currently so there still is a variation in terms of success for that. For chronics or long-standing persistent atrial fibrillation, the success rates if you look at the published rates; I think there were several studies out, Bordeaux, France, by Dr. and his colleagues and those rates are more in the range of 60-70%, so definitely a lower success rates in those patients, but nonetheless when you compare that success rate with other therapies such as AV node ablation with biventricular pacemaker or antiarrhythmic medications, there is a significant difference favoring the ablation procedure.

**DR. DOUG WEAVER:**

We've been talking with Dr. Mohammed Khan about pulmonary vein isolation to treat atrial fibrillation in patients with heart failure. Dr. Khan, thank you for being our guest.

**DR. MOHAMMED KHAN:**

Thank you very much.

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