**Title: ACC 23: Pulsed Field Ablation in Persistent Atrial Fibrillation Patients: The PULSED AF Trial**

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**Dr Atul Verma**

"- I'm Atul Verma and I'm a cardiologist and cardiac electrophysiologist at McGill University Health Centre in Montreal, Canada.

What is the background of this trial?

This trial is one of the first large global trials evaluating the effectiveness and safety of pulsed field ablation for catheter ablation of atrial fibrillation. Pulsed field ablation is a new technique compared to old techniques for ablation. So in the past when we were ablating tissue, we either had to burn it with radiofrequency or freeze it with cryotherapy, so it was always thermal. Pulsed field ablation is non-thermal, so by exposing the tissue to very high-intensity but very short frequency electrical pulses, we can cause hyperpermeabilisation of the cell membrane and then the cells eventually die.

What are the benefits of this novel technology?

In the past when we were using thermal ablation and we still do, it worked very well for ablating cardiac tissue but there was also a risk of damaging collateral tissues like the phrenic nerve, the oesophagus, and this could result in some very serious complications. With pulsed field ablation. The pre-clinical data in animals has shown that the oesophagus, phrenic nerve, pulmonary veins are very resistant to this type of energy source. So that means, the chance of us causing pulmonary vein stenosis, esophageal damage or phrenic nerve damage is almost zero.

Can you tell us about the study design, eligibility criteria and outcome measures?

This was a dual-cohort prospective clinical trial where we had two cohorts of patients. One was a paroxysmal AF cohort of 150 patients and the other was a persistent AF cohort with 150 patients. In terms of eligibility criteria, all of the patients had to be resistant to antiarrhythmic drugs, so none of the patients were allowed to enter the trial unless they had previously failed antiarrhythmic drugs and all of them had to be undergoing their first ablation procedure for atrial fibrillation. The key findings of the study, first of all from an efficacy point of view, is that the success rates of ablation in both the paroxysmal and the persistent cohorts seemed to be very consistent with the success rates of thermal ablation.

What are the findings presented at ACC?

So, we beat the benchmarks that were established by the clinical trial and found about a 66% success rate in the paroxysmal AF population and a 55% success rate in the persistent AF population. And this was using very rigorous monitoring. So, not only did the patients have intermittent holter monitoring, but they also had transtelephonic monitoring where they had to send us a transmission every week and every time they had symptoms. So, we had more than 12,000 recordings from the patients over the course of this trial. If we look at strictly using a primary efficacy point of freedom from atrial fibrillation, because there were actually multiple ways by which the patients could fail in this trial, then the success rates were more like 70% in the paroxysmal group and 62% in the persistent group. From a safety point of view, this was very, very safe technology. The overall complication rate was less than 1%. It's one of the smallest complication rates ever reported in a large global catheter ablation trial for atrial fibrillation. And the procedure times were also remarkably short. One of the other advantages of pulsed field ablation is it can be delivered in a very short period of time. And so, the average procedure time was about 60 minutes and this included a 20-minute waiting period. So if you eliminate the waiting period, we're talking about procedure times much less than an hour.

What are the potential implications of this data on practice and further research?

Well, I think that everyone in the EP community is very excited about pulsed field ablation. Many think that it will completely replace thermal ablation. I'm not sure it'll happen right away, but I think over the next five years, that is going to happen. Keep in mind that thermal ablation has been around for 25 years and this is the first generation of a pulsed field ablation system. And so, obviously, there's going to be a lot of refinement that happens over the next five to 10 years and I hope this will lead to even better success rates than what we're seeing today.

What are the next steps?

So you know, this study I worked on with Medtronic for their pulseselect system. They are developing a number of other pulsed field technologies. So, I think that's going to be very exciting to see how that all fits together. And I think as a whole, the field is going to really try and see how flexible pulsed field can be by delivering it off of different types of catheters. So, it's going to be a very, very exciting time.