

## ターゲティングMRIにより同定された線維化はアブレーションの予後を改善する

**DECAAF: 心房細動患者に対するDE-MRI画像は高周波カテーテルアブレーションの成功率を予測する**

**DECAAF: DE-MRI imaging of patients with atrial fibrillation predicts success of radiofrequency catheter ablation**

心房細動(AF)の患者において、アブレーション治療前の遅延造影磁気共鳴画像(DE-MRI)により心房線維化度がステージ分類で治療成功率の予測に役立つと2013年European Society of Cardiology学会で発表された。DECAAFトライアルは、心房線維化を伴うAFに対しアブレーションを施行された患者260人(平均年齢59歳、発作性AF 64.6%)を対象とした。高解像度DE-MRIがアブレーション最長30日前に施行され心房線維化の存在および範囲を判定され、また、アブレーション後DE-MRIが90日後の経過観察で施行され残存アブレーション範囲を判断した。90日後に不整脈の再発が33.8%の患者において確認された。成功率は、アブレーション前の線維化がstage 1(傷害心房組織が10%未満)であった患者で85.8%、stage 2(傷害が10~20%)の患者で63.3%、stage 3(20~30%)の患者で55%であり、stage 4(30%超)の患者では31%であった( $P < 0.001$ )。アブレーション前の線維化が1%増加するごとに、AF再発リスクは5.8%上昇した(HR 1.058, 95%CI 1.033~1.085)。同様に、線維化の残存が1%増加するごとに、症状再発リスクは8.2%上昇した(HR 1.082)。

### Full Text

In patients with atrial fibrillation, delayed enhancement magnetic resonance imaging (DE-MRI) performed before ablative treatment can stage the degree of atrial fibrosis and help predict whether treatment will be successful or not, according to results of Delayed Enhancement - MRI determinant of successful Catheter Ablation of Atrial Fibrillation (DECAAF) trial.

"The DECAAF results show that stage of atrial fibrosis prior to ablation is a new, powerful, independent predictor of outcome," said lead investigator Nasir Marrouche, M.D., from the CARMA Center at the University of Utah in Salt Lake City, USA.

"By performing this imaging before ablative treatment we can triage patients according to likelihood of treatment success, and avoid ablative procedures in those patients for whom it is unlikely to work. If a patient has late stage 3 or stage 4 fibrosis their chance of being cured is only 30-35% which is really low, but if they're in an early stage their chance of cure is 60-80%," he said.

The DECAAF trial results were presented during a Hotline session at the European Society of Cardiology 2013 Congress. The trial included 260 atrial fibrillation (AF) patients with atrial fibrosis who were undergoing ablation. The patients, from 15 centers in USA, Europe and Australia were a mean age of 59 years, and 64.6% of them had paroxysmal AF.

High resolution Delayed Enhancement MRI (DE - MRI) was performed up to 30 days before ablation in all patients to determine the presence and extent of atrial fibrosis, while post-ablation DE-MRI was performed at 90-days follow-up in 177 of the subjects, to determine the extent of residual ablation.

At the 90-day follow-up, recurrence of arrhythmia was noted in 88 of the 260 patients (33.8%) based on Holter monitors and electrocardiograms.

Multivariate analysis revealed two independent predictors of successful ablation or recurrent symptoms were stage of atrial fibrosis before ablation ( $P < 0.001$ ) as well as residual fibrosis after ( $P < 0.001$ ). Specifically, patients whose pre-ablation fibrosis was stage 1 (defined as less than 10% damaged atrial tissue) had an 85.8% success rate, those with stage 2 (10% - 20% damage) had a 63.3% success rate, those with stage 3 (20% - 30% damage) had a 55% success rate and those with stage 4 (more than 30% damage) had a 31% success rate.

For every 1% increase in fibrosis before ablation was associated with a 5.8% increased risk of recurrent AF (HR 1.058, 95% CI 1.033-1.085). Similarly, for every percentage of residual fibrosis there was an 8.2% increased risk of recurrent symptoms (HR 1.082).

A secondary finding of the study, based on post-ablation imaging, showed that the type of ablation clinicians used also had an impact on success rates. The choice of procedure was not dictated in the study protocol and was left to the discretion of individual treating physicians.

After comparing pre-ablation images of fibrotic tissue, with post-ablation images showing the extent of residual fibrosis, a surprise finding was that pulmonary vein ablation, which is the standard-of-care in atrial fibrillation ablation candidates, is not the best ablative approach, said Dr. Marrouche.

"We do ablation around the pulmonary veins because we have assumed for years that the trigger for AF comes from the vein - that's the standard of care," he said. "But what we found in DECAAF is that ablation of the veins did not predict outcome. In fact, the most important predictor of outcome, along with stage of atrial fibrosis, was the degree of ablation of the fibrotic tissue. Rather than targeting the pulmonary veins, procedures which ablated fibrotic tissue produced better outcomes - the more that was targeted, the better the outcome."

Dr. Marrouche disclosed that he has received honoraria from: Biotronik, Siemens, Boston Scientific, and Boehringer Ingelheim; he has received consulting fees from: Sanofi and eCardio; he has received research grants from eCardio and estech; he has received equipment from Siemens; he has stock options with MRI-Interventions; and holds stock in Marreck Inc.

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