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Efficacy of DE-MRI-guided fibrosis ablation vs. conventional catheter ablation of atrial fibrillation

Submission date 01/12/2015	**Recruitment status** No longer recruiting	[X] Prospectively registered [X] Protocol [_] Statistical analysis plan [_] Results [_] Individual participant data [_] Record updated in last year
Registration date 08/12/2015	**Overall study status** Completed	
Last Edited 13/01/2022	**Condition category** Circulatory System	

Plain English summary of protocol

Background and study aims

Atrial fibrillation (AF) is the term used to refer to a heart condition which causes an irregular and often abnormally fast heart rate (arrhythmia); in some cases the heart can beat faster than 100 beats per minute. Symptoms include feeling dizzy, being short of breath and feeling tired. Patients may also be aware of heart palpitations, where the heart feels like its pounding, fluttering or beating irregularly. The exact cause of the condition is unknown but is more common with age and effects some groups of people more than others. It is the most common cause of heart (cardiac) arrhythmia, affecting millions of people in the United States and around the world. Treating AF continues to be a challenge. Over the last 15 years, the catheter-based AF ablation procedure, which involves destroying the area of the heart causing the condition, has been widely adopted. Approximately 50% of patients treated with catheter ablation have been suffering from a persistent type of the arrhythmia. Unfortunately, ablation results in this population have been dismal, not only because of low success rates in suppressing arrhythmias, but also from a healthcare cost point of view. In fact, the long-term success of such a procedure has been reported to be as low as 20%, and patients may need more than two ablation procedures to just stop arrhythmia temporarily. A major issue contributing to the low success of catheter ablation is the lack of a protocol to appropriately select patients that would respond to this treatment. Currently, cardiologists base their decision to ablate persistent AF on various co-existing diseases (comorbidities), a concept that has not been proven successful. With the introduction of AF ablation as a first line therapy option, a better and more accurate selection protocol is urgently needed. There is a strong association between AF and atrial tissue fibrosis (thickening and scaring of tissue in the heart). Recently, a novel DE-MRI (Delayed-Enhancement MRI) based imaging technique has been shown to reveal the degree of fibrotic atrial tissue in patients suffering from AF. A number of studies have shown that the amount of atrial tissue fibrosis present is directly related to how successful the treatment is likely to be. In addition, in one study involving a number of different study sites, the best predictor for how successful the treatment is related to whether there are areas of atrial fibrosis covered by ablation lesions (scaring caused by the ablation treatment). The aim of this study is to examine how successful targeting atrial fibrosis tissue during an ablation procedure is at treating persistent AF.

Who can participate?
Adults (aged at least 18) with persistent SF.

What does the study involve?
Patients are randomized to receive either conventional pulmonary vein isolation (PVI) ablation or PVI plus fibrosis-guided ablation. All patients are then followed up for the next 18 months to assess whether there is a recurrence of the persistent abnormal heart rhythms.

What are the possible benefits and risks of participating?
Subjects in either treatment arm receiving fibrosis-guided ablation targeting atrial fibrosis may stay in a normal heart rhythm and may have fewer AA recurrences than those who receive conventional pulmonary vein isolation (PVI) ablation. The study also makes use of new technologies that allow closer and more frequent monitoring of patients' heart rhythm. All participants will receive the mobile heart monitoring device (ECG Check) to complete regular monitoring of their heart rhythm after the ablation procedure. This may allow for earlier detection of atrial arrhythmia recurrence and may also reveal other arrhythmias of clinical significance. The second MRI scan will provide information about early post-ablation scar formation and the presence and degree of pulmonary vein stenosis (narrowing of the veins that carry oxygen-rich blood from the lungs to the heart). This information may be clinically beneficial to all participants in the study. The general risks of catheter-based ablation for AF include perforation of the heart, pulmonary vein stenosis, stroke, and bleeding or pain at the insertion site. There are also potential risks related to the fibrosis-guided ablation procedures: Due to the longer time under anesthesia, more areas being ablated and longer total procedure time, subjects in the fibrosis-guided ablation group are at greater potential risk for scarring, nerve damage, esophageal (food pipe) injury, perforation of the heart, and atrial esophageal fistulas (a rare complication in which the esophagus is damaged by the catheter used in the ablation procedure. The small amount of blood drawn for the study will pose a very small risk e.g. bleeding, pain, or hematoma/bruise at the puncture site.

Where is the study run from?
This is a multicentre, international study with trial participating sites in Spain, China, Canada, Australia, Italy, France, Netherlands and Germany.

When is the study starting and how long is it expected to run for?
April 2016 to April 2019

Who is funding the study?
1. St June Medical (USA)
2. Siemens USA
3. Medtronic (USA)

Who is the main contact?
1. Dr Christina Pacchia (public)
2. Dr Nassir Marrouche (scientific)

Contact information

Type(s)
Public

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Additional identifiers

ClinicalTrials.gov (NCT)
NCT02529319

Protocol serial number
NCT02529319

Study information

Scientific Title
Efficacy of DE-MRI-guided fibrosis ablation vs. conventional Catheter Ablation of Atrial Fibrillation: DECAAF II

Acronym
DECAAF II

Study objectives
We hypothesize that patients receiving fibrosis-guided ablation in addition to conventional PVI ablation will have fewer atrial arrhythmias (AA) recurrences than those who receive PVI ablation alone.

Ethics approval required

Old ethics approval format

Ethics approval(s)
University of Utah Institutional Review Board, 18/12/2015, ref: 82681

Study design
Prospective randomized multicenter trial

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Atrial fibrillation (AF)

Interventions
Consented patients will be randomized to one of two study groups to receive conventional PVI ablation (Group 1) or PVI + fibrosis-guided ablation (Group 2).

In Group 1 (control group), PVI ablation will be performed as recommended by the HRS consensus statement and physicians will be blinded to the pre-ablation MRI fibrosis results. The operator will create lesions around the PV antra. Entrance block in all pulmonary veins will be confirmed using standard techniques. Successful ablation is operationally defined as an abolishment of PV electrograms (EGMs). Assessment for the presence of exit block by pacing within the antral lesion set will be at the discretion of the operator. If normal sinus rhythm cannot be restored at the end of the PVI portion of the procedure despite cardioversion in patients randomized to the conventional ablation group (Group 1), the operator may pursue further measures, such as triggering ablation, to eliminate recurrent arrhythmia if needed. The creation of a right atrial cavotricuspid isthmus line is also left at the discretion of the operator.

In Group 2 (intervention arm), processed DE-MRI images will be merged with the 3D mapping system at the Clinical Center. All patients will undergo the previously described pulmonary vein isolation procedure (PVI). Pulmonary vein entrance block at the end of the ablation procedure should be confirmed and is defined as loss of pulmonary vein potentials using standard techniques. After PVI and PV entrance block have been confirmed, fibrosis-guided ablation will ensue. The operator will encircle by ablating at the perimeter of the fibrosis and ensure loss of capture in the fibrotic isolated area at 10 milli-amp stimulation, and/or completely cover all fibrotic areas with ablation lesions. The tagged ablation lesions should confirm encircling and/or covering of the entire contiguous fibrotic areas indicated by the mapping system. Ablation to the fibrotic areas should be performed as per the operator’s standard point lesion energy delivery strategy. It is suggested that a minimum of 8-10 s (and if available 10 g of force) lesions should be delivered. It is recommended that energy delivery (power and temperature) should be adjusted as needed when ablating within the posterior wall region over the region of the esophagus. The operator may connect 2 neighboring fibrotic areas or anchor fibrotic area to anatomic structure such as the isolated PV or valve annuli to avoid creating slow conduction zones or unanchored islands of fibrosis that might be deemed to be potentially arrhythmogenic. If the normal sinus rhythm cannot be restored after PVI and ablation of fibrotic areas followed

by cardioversion in patients randomized to the fibrosis-guided ablation group (Group 2), the operator may to pursue further measures to eliminate recurrent arrhythmia, as described above for the conventional ablation group (Group 1).

Total duration of treatment in both arms will range from 1-2 hours.
Follow-up for both arms will be 18 months post treatment.
All investigators will attend an in-person training symposium for the intervention arm (Group 2)

Intervention Type
Procedure/Surgery

Primary outcome(s)
The recurrence of atrial arrhythmia post-ablation, defined as a non-self-terminating bout of atrial fibrillation, atrial flutter, or atrial tachycardia demonstrated by at least two consecutive, valid ECG tracings occurring within 6 hours up to a maximum of 7 days of each other after the 90-day post-ablation blanking period.

The study outcome is formally defined by at least two consecutive, valid ECG tracings indicating an atrial arrhythmia (AA) (atrial fibrillation, atrial flutter or atrial tachycardia).

Key secondary outcome(s))
1. Measuring individual components of primary outcome (AF, AFl, AT), measured using ECG readings using either iPhone (daily recordings) or 12-lead ECG (baseline, 3 month, 12 and 18 month visit)
2. Symptomatic AA, measured using ECG readings using either iPhone (daily recordings) or 12-lead ECG (baseline, 3 month, 12 and 18 month post ablation) in conjunction with a 5-question survey about how the patient is feeling (symptoms of AA) answered weekly throughout the study
3. AF cycle length/regularity/termination, measured using 12-lead ECG at 3 month, 12 or 18 month post ablation)
4. CV-related hospitalization, measured using chart review and verbal medical history for each patient at baseline, 3 month, 12 and 18 months post ablation
5. CV related mortality, measured using chart review and verbal medical history for each patient at baseline, 3 month, 12 and 18 months post ablation
6. Quality of life, measured using the Toronto Atrial Fibrillation Severity Scale (AFSS) at 3, 12, and 18 months post ablation
7. AF burden, measured using the Toronto Atrial Fibrillation Severity Scale (AFSS) at 3, 12, and 18 months post ablation

Completion date
01/04/2019

Eligibility

Key inclusion criteria
1. Patients with persistent AF defined as 7 days or more of AF as evidenced by either:
1.1 rhythm strip or
1.2. written documentation
2. Undergoing first AF ablation as per recent HRS consensus document (has not had a previous left atrial ablation or cardiac surgical procedure)
3. Age ≥ 18 years

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 years

Sex
All

Key exclusion criteria
1. Contraindication for DE-MRI with a full dose of contrast agent
2. Contraindication to beta blockers, if necessary, for DE-MRI
3. Women currently pregnant
4. Mental or physical inability to take part in the study
5. Inability to be placed in MRI due to body mass or body habitus
6. Known terminally ill patients
7. Subjects without daily access to a smart phone or tablet compatible with the ECG Check application and ability to upload ECG tracings for the entire follow up period.

Date of first enrolment
01/04/2016

Date of final enrolment
01/04/2017

Locations

Countries of recruitment
Australia

Belgium

Canada

China

France

Germany

Italy

Netherlands

Spain

United States of America

Study participating centre
Johns Hopkins University
Baltimore
Maryland
United States of America
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Study participating centre
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Sponsor information

Organisation

St Jude Medical

Organisation
Siemens Medical Solutions USA, Inc.

Organisation
Medtronic Clinical Operations

Organisation
St. Jude Medical

Funder(s)

Funder type
Industry

Funder Name
St. Jude Medical

Alternative Name(s)
St. Jude Medical, Inc., SJM

Funding Body Type
Private sector organisation

Funding Body Subtype
For-profit companies (industry)

Location
United States of America

Funder Name
Siemens USA

Alternative Name(s)
Siemens Corporation, Siemens, Siemens in the USA

Funding Body Type
Government organisation

Funding Body Subtype
For-profit companies (industry)

Location
United States of America

Funder Name
Medtronic

Alternative Name(s)
Medtronic Inc.

Funding Body Type
Private sector organisation

Funding Body Subtype
For-profit companies (industry)

Location
United States of America

Results and Publications

Individual participant data (IPD) sharing plan
Not provided at time of registration

IPD sharing plan summary

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Protocol article		01/04/2021	13/01/2022	Yes	No
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes