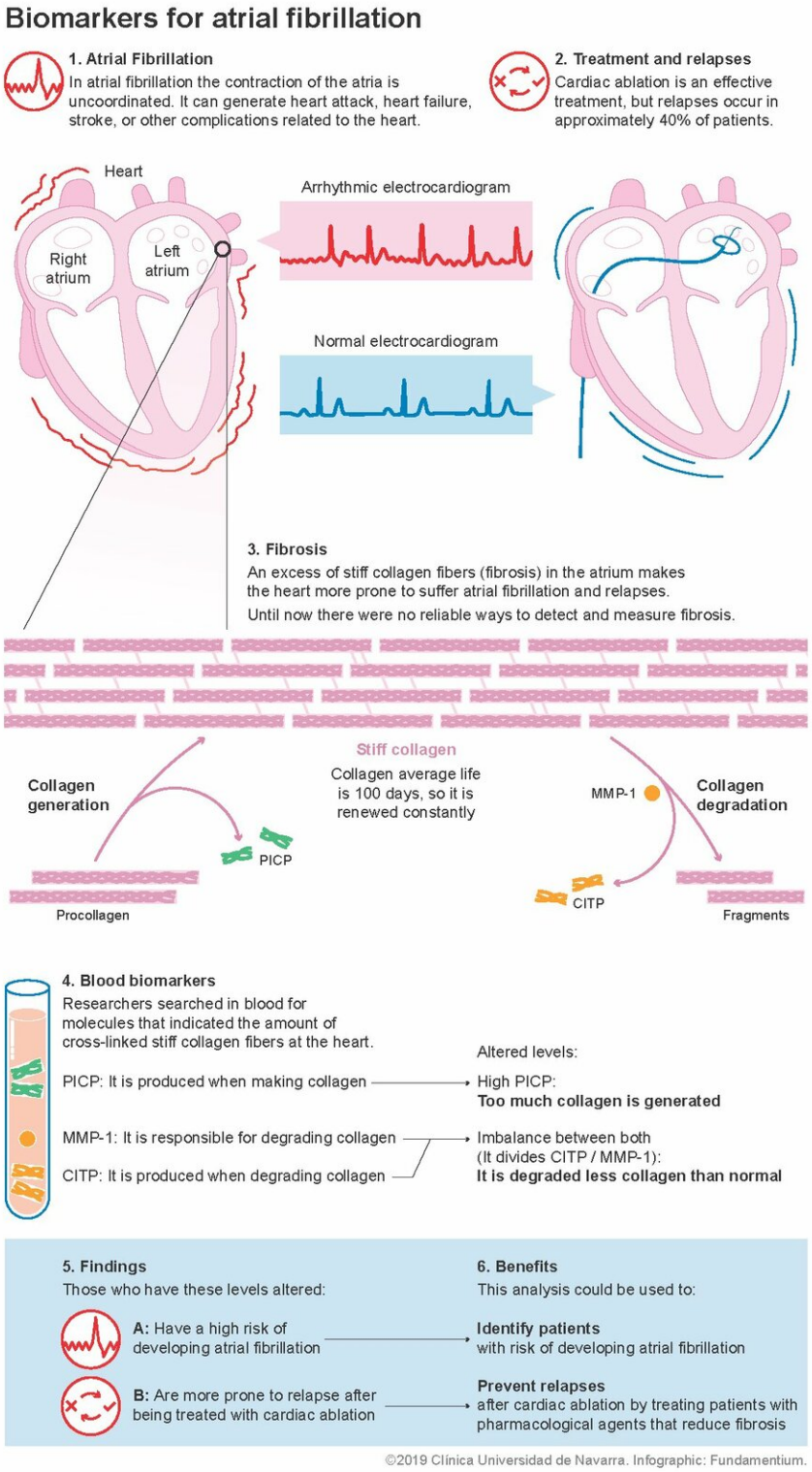
New study identifies biomarkers to predict the risk of atrial fibrillation

April 3 2019


Biomarkers for atrial fibrillation
1. Atrial Fibrillation
In atrial fibrillation the contraction of the atria is uncoordinated. It can generate heart attack, heart failure, stroke, or other complications related to the heart.
2. Treatment and relapses
Cardiac ablation is an effective treatment, but relapses occur in approximately 40% of patients.
Heart
Right atrium
Left atrium
Arrhythmic electrocardiogram
Normal electrocardiogram
3. Fibrosis
An excess of stiff collagen fibers (fibrosis) in the atrium makes the heart more prone to suffer atrial fibrillation and relapses.
Until now there were no reliable ways to detect and measure fibrosis.
Stiff collagen
Collagen average life is 100 days, so it is renewed constantly
Collagen generation
PICP
Procollagen
MMP-1
Collagen degradation
CITP
Fragments
4. Blood biomarkers
Researchers searched in blood for molecules that indicated the amount of cross-linked stiff collagen fibers at the heart.
Altered levels:
PICP: It is produced when making collagen
High PICP:
Too much collagen is generated
MMP-1: It is responsible for degrading collagen
CITP: It is produced when degrading collagen
Imbalance between both
(It divides CITP / MMP-1):
It is degraded less collagen than normal
5. Findings
Those who have these levels altered:
A: Have a high risk of developing atrial fibrillation
B: Are more prone to relapse after being treated with cardiac ablation
6. Benefits
This analysis could be used to:
Identify patients
with risk of developing atrial fibrillation
Prevent relapses
after cardiac ablation by treating patients with pharmacological agents that reduce fibrosis
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Atrial fibrillation causes and the benefits of the new findings. Credit: Clínica Universidad de Navarra and Fundamentium

Scientists at the University of Navarra (Spain), in collaboration with clinicians from the University Hospital of Donostia, have identified two biomarkers associated with the risk of suffering atrial fibrillation, a cardiac ailment that affects more than 33.5 million people globally. In the European Union, it is present in 8.8 million people over 55 years of age and in Spain, it affects more than 4 percent of the population over 40 years of age. The World Health Organization considers this disease as an epidemic due to its high morbidity and mortality, and a public health problem due to its high prevalence.

Atrial fibrillation is the most common alteration of heart rhythm (arrhythmia). It happens when the heart pumps blood in an accelerated and irregular way, thus increasing the risk of suffering a heart attack, heart failure, stroke, or other complications. Some common causes are heart disease or hormonal changes. It can be treated with medications and procedures such as cardiac ablation to correct irregular heart rhythms.

Researchers at Cima, Clínica Universidad de Navarra and the Faculty of Sciences, have predicted the appearance of this cardiac ailment via blood sample analysis. "The alteration of three molecules related to collagen metabolism (CITP, MMP-1, and PICP) determine the risk of suffering atrial fibrillation and the response to its treatment," explains Dr. Javier Díez, director of the Cardiovascular Disease Program at Cima, Head of Research of the Department of Cardiology and co-director of the Department of Nephrology at the Clínica Universidad de Navarra.

The study was involved 392 patients, 150 of them treated with cardiac ablation. "We have found that patients with low blood levels of the CITP/MMP-1 ratio and elevated levels of PICP have a high risk of developing atrial fibrillation and that it recurred after cardiac ablation. The confirmation of these findings can lay the foundations to precisely adjust the most optimal treatment and follow-up for each patient according to these two biomarkers," adds Dr. Díez, also from CIBERCV.

More information: Susana Ravassa et al, Combination of Circulating Type I Collagen-Related Biomarkers Is Associated With Atrial Fibrillation, *Journal of the American College of Cardiology* (2019). DOI: 10.1016/j.jacc.2018.12.074

Provided by Universidad de Navarra