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ATRIAL FIBRILLATION RESEARCH IN CATALONIA (AFRICAT)

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1. Project summary

Atrial fibrillation (AF) is one of the leading causes of morbidity and mortality in our society, increasing the risk of death, heart failure and stroke. This is a very prevalent cardiac arrhythmia, affecting 1% of the general population and being more frequent in the elderly population. The diagnosis of AF is a challenge because it is often asymptomatic and paroxysmic (separated episodes), especially in the early stages of the disease. Improvement in the detection of AF would have a very positive impact on current health systems. However, systematic screening programs have not shown a clear benefit.

The aim of the AFRICAT project was to design and implement a sequential screening program for high-risk populations in Catalonia, integrating clinical, electrocardiographic and biological information.

In the first phase of the project we performed a complete evaluation of 100 patients from Barcelona and Tortosa, aged between 65 to 75 years old with hypertension and diabetes. To diagnose atrial fibrillation, a Holter device was used to monitor heart rate continuously for one month. All the participating individuals underwent blood sampling and a conventional electrocardiogram at the consultation. Moreover, different rapid diagnostic devices for this arrhythmia were tested. The blood of the included patients was used to discover new detectable biomarkers in the blood that may be useful in selecting patients at high risk for atrial fibrillation.

Similarly, a second phase of the project, which is still being carried out and will end this summer, is including 400 new patients with the same characteristics from Barcelona, Reus and Tortosa. Similarly to the first phase, these patients are invited to a clinical visit and monitored with a Holter device during one month. This phase will serve to validate the biomarkers obtained in the first phase.

In addition, a clinical model has been defined to select those patients at high risk of atrial fibrillation in our territory.

With the results of this project we are in a position to design a screening program that could be applied to the entire community with a great social and economic impact in

terms of reducing cardiovascular mortality, sequelae due to stroke and heart failure, and reduction of the associated costs.

2. Results obtained

As a result of the AFRICAT project, a predictive clinical model of atrial fibrillation has been described in our population, i.e. the clinical variables that could be used to select the patients with the highest risk of atrial fibrillation.

A panel of 4 detectable blood biomarkers that have been altered in patients with atrial fibrillation has also been discovered. As part of the project, these biomarkers are being validated in a larger population of 400 patients.

Finally, the use of different rapid atrial fibrillation devices in the context of a screening program have been explored.

The most immediate result is that new atrial fibrillation has been detected in 11 cases out of the 100 evaluated in phase I of the project. These patients have been informed and will be able to benefit from preventive treatments such as anticoagulation. During Phase II of the ongoing project a similar percentage of atrial fibrillation cases are expected to be detected and may benefit from this early detection.

3. Relevance to possible future implications

These results can be applied in the design of a real screening program in the Catalan population. The described clinical model could be used to select patients at risk, to be invited to participate in the screening. Then, if the biomarker replication is successful, biomarkers could be used to detect those patients at high risk for AF at an early stage, even if the electrocardiogram is normal. These patients could be monitored more intensively.

This screening would allow the cost-effective early detection of atrial fibrillation when patients still have no symptoms. Early detection would allow these patients to be treated, avoiding some of the consequences of this arrhythmia such as stroke.

As an intermediate step, the results of this project may lead to the design of a clinical trial comparing the effect of a screening program to the clinical practice, in terms of reducing the incidence of stroke and other vascular diseases.

4. Scientific bibliography generated

N-Terminal Pro B-Type Natriuretic Peptide's Usefulness for Paroxysmal Atrial Fibrillation Detection Among Populations Carrying Cardiovascular Risk Factors. Elena Palà, Alejandro Bustamante, Josep Lluís Clúa-Espuny, Juan Acosta, Felipe Gonzalez-Loyola, Juan Ballesta-Ors, Natalia Gill, Andrea Caballero, Jorge Pagola, Alonso Pedrote, Miguel Angel Muñoz, Joan Montaner. *Frontiers in Neurology* 2019. doi: <https://doi.org/10.3389/fneur.2019.01226>