

Silent cerebral infarctions (SCI) are defined by the presence of cerebral infarction in the absence of corresponding clinical symptomatology. SCI is a type of cerebral small-vessel disease, which includes white matter hyperintensities and cerebral microbleeds. Although the occurrence of SCI is not associated with obvious clinical symptoms, SCI is associated with increased risk of morbidity, mortality, cognitive decline and dementia.

AF is the most common cardiac arrhythmia, affecting an estimated 1-2% of the adult population. AF is an independent predictor of SCI. SCI was diagnosed by MRI of 92% in patients with persistent AF, 89% in patients with paroxysmal AF, and 46% in patients without AF.

The relationship between AF and SCI is not completely understood. The most common site of intracardiac thrombus formation in patients with AF is the LA, specifically the left atrial appendage (LAA), the source of embolic thrombi in more than 90%. In AF, the classic Virchow triad for thrombogenesis is observed. This includes blood stasis; abnormalities of the vessel wall; and regional and systemic inflammation resulting in a prothrombotic and hypercoagulable state.

Percutaneous LAA suture ligation is an innovative treatment for AF patients with a high risk of bleeding and thrombus formation. It seeks to reduce the number of thromboembolic events including brain strokes. In our previous study we have shown that the LAA elimination from the circulatory system reduces thromboembolic risk and improves the coagulation parameters. We can therefore assume that LAA closure and complete elimination from the cardiovascular system may reduce risk and prevalence of silent ischemic strokes and neurodegenerative disorders.

Encouraged by the obtained results, we wish to continue studying the impact of left atrial appendages on the pathogenesis of thromboembolic events, especially on silent cerebral infarctions that present no clinical symptoms but increase morbidity, mortality and neurodegeneration. To date, no studies have evaluated the role of LAA isolation on SCI prevalence. In addition, the researchers of this project are the only team in the world assessing the impact of LAA elimination on coagulation. Therefore, the authors of this project have the greatest experience in the world in this area.

The scientific aims of this study are:

1. To evaluate the impact and changes in coagulation and hemostasis on the occurrence and progression of silent cerebral infarctions and other thromboembolic complications in patients with atrial fibrillation.
2. To evaluate the correlation between anatomical structure, size and hemodynamics parameters of individual heart chambers on the occurrence and progression of silent cerebral infarctions and other disorders in patients with atrial fibrillation.
3. To evaluate the impact and changes after left atrial appendage elimination on the occurrence and progression of silent cerebral infarctions and other complications in patients with atrial fibrillation.