

Cryptogenic strokes may find explanation in the heart

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More than half of the patients who have suffered a stroke with no well-defined aetiology have an enlarged left atrial appendage of the heart, according to a Finnish study. The results indicate that the enlargement of the left atrial appendage may be an independent risk factor of strokes with cardiac origin.

Mr Mikko Taina, Licentiate of Medicine, presented the results in his doctoral thesis at the University of Eastern Finland.

Stroke is the leading cause of long-term disability and a major burden on health-care resources worldwide. Stroke is responsible for 10 per cent of all deaths, being the second most common cause of mortality. However, more than a third of all [ischemic strokes](#) are cryptogenic, which means that their aetiology is unclear.

Stroke diagnostics relies on imaging

The data for the study is comprised of patients who suffered a sudden [stroke](#) and were treated in the emergency room of Kuopio University Hospital in 2005–2009. Conventionally, a stroke diagnosis is made on the basis of the patient's symptoms and computed tomography. A CT scan is performed in order to determine whether the patient's paralysis symptom is caused by a cerebral or carotid embolism, or an intracranial haemorrhage. It is crucial to tell the difference between an embolism and a haemorrhage, as the wrong treatment can worsen the patient's

symptoms and, in the [worst case scenario](#), lead to the patient's death. Over the past decade, computed tomography has been used not only to exclude haemorrhages but also to locate embolisms in the brain and the neck.

A wider imaging window gives information about the heart

In the present study, [computed tomography](#) was used to scan not only the blood vessels in the brain and the neck, but also in the heart. Emboli from cardiac origins account for 15–30% of all ischaemic strokes. Most cardiac thrombi originate from the left atrial appendage. The study examined the volume of the left atrial appendage in stroke patients. An enlarged left atrial appendage could be explained by paroxysmal atrial fibrillation, or be an independent risk factor of stroke. Atrial fibrillation is the most important cause of intracardiac clotting.

The study focused especially on patients whose stroke could not be explained with the help of the traditional examination methods. This group of patients is important, because the aetiology of 30–40% of all brain blood clots remains a mystery. In this group of [patients](#), the left atrial appendage was on average 67% larger than in the healthy control group. The difference is statistically very significant, even when the patient's body size and the presence of diseases that enlarge the atrial appendage were taken into consideration.

A reliably measurable, independent variable

The study also focused on the reliability of atrial appendage volume measurements as well as on factors that can cause enlarged atrial appendage. It was found that left atrial appendage volume measurements were reproducible irrespective of image quality or scanner generations.

It seems that an enlarged atrial appendage is extremely poorly explained by the known [risk factors](#). This could indicate that enlarged atrial appendage is an [independent risk factor](#) of stroke caused by cardiac origins.

More information: Taina M, Korhonen M, Haataja M, Muuronen A, Arponen O, Hedman M, Jäkälä P, Sipola P, Mustonen P, Vanninen R. (2014) "Morphological and Volumetric Analysis of Left Atrial Appendage and Left Atrium: Cardiac Computed Tomography-Based Reproducibility Assessment." *PLoS ONE* 9(7): e101580. [DOI: 10.1371/journal.pone.0101580](#)

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