



## LECTURE

# Long-term electrocardiographic monitoring in embolic stroke of undetermined source

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### Abstract

Between 15–40% of all ischaemic strokes are of undetermined etiology. The term “cryptogenic stroke” has been extensively used in the literature to describe this subtype of stroke. However, this does not take into account the extent and quality of the investigation performed or the classification system used. In 2014, the term embolic stroke of undetermined source (ESUS) was coined by the CS/ESUS international working group [1]. This allows a more comprehensive investigation and exclusion of presumed non-embolic stroke mechanisms during evaluation. In a systematic literature review to assess the frequency of ESUS, patient features, and prognosis using PubMed from 2014 to present, on the basis of 9 studies, the reported frequency of ESUS ranged from 9% to 25% of ischaemic strokes, averaging 17% [2]. From 8 studies involving 2045 ESUS patients, the mean age was 65 years and 42% were women; the mean NIH stroke scale score was 5 at stroke onset (4 studies, 1772 ESUS patients). Most (86%) ESUS patients were treated with antiplatelet therapy during follow-up, with the annualized recurrent stroke rate averaging 4.5% per year during a mean follow-up of 2.7 years (5 studies, 1605 ESUS patients). There is an important need to better define antithrombotic prophylaxis for this frequently occurring subtype of ischaemic stroke, especially since the recent publication of the NAVIGATE-ESUS trial. In this study, rivaroxaban was not superior to aspirin with regard to the prevention of recurrent stroke after an initial embolic stroke of undetermined source and

was associated with a higher risk of bleeding [3]. Frequently patients with ischaemic stroke do not undergo cardiac rhythm monitoring required for the diagnosis of ESUS. Additionally, the CRYSTAL-AF and the EMBRACE trials published in 2014 reported that episodes of previously unrecognized atrial fibrillation (AF) could be detected in 9% to 16% of patients with cryptogenic ischaemic stroke if the duration of cardiac monitoring was prolonged beyond 24 hours of Holter ECG monitoring [4, 5]. Atrial fibrillation after cryptogenic stroke was most often asymptomatic and paroxysmal and thus unlikely to be detected by strategies based on symptom-driven monitoring or intermittent short-term recordings. In these trials, prolonged ECG monitoring offered greater opportunities for the detection and treatment of one of the most common and important modifiable risk factors for recurrent stroke. The detection of AF after ischaemic stroke is relevant since stroke patients with undetected AF have a comparatively high risk of recurrence of ischaemic stroke if they remain untreated. Thus, the diagnosis of AF is important for secondary prevention of ischaemic stroke, even if the documentation of AF does not automatically imply a cardio-embolic cause of stroke. The detection of previously undiagnosed atrial fibrillation can be improved in patients with ischaemic stroke to optimize stroke prevention. Since the optimal duration and mode of ECG monitoring has not yet been finally established, there is an actual need to better identify patients that can, in a

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cost-effective strategy, be submitted to long term monitoring for AF detection in the ESUS population. Recently, the "Heart and Brain" consortium of the German Cardiac Society and the German Stroke Society emitted an expert opinion based recommendation regarding this subject [6]. In this statement, they propose a strategy combining an extended and high-quality ECG monitoring with patient selection based on clinical, laboratory, echocardiographic and electrographic parameters so that the likelihood of non-permanent AF detection, and thus the efficiency of ECG monitoring, can be improved.

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