



Extended automatic analysis of continuous ECG monitoring (aCEM) substantially improves the identification of patients with newly diagnosed atrial fibrillation during hospitalization for acute ischemic stroke

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Background and Purpose

Atrial fibrillation (AF) accounts for approximately 20% of all ischemic strokes¹. Therapeutic anticoagulation is highly effective in stroke prevention in these patients. However, despite thorough inpatient work-up including ECG on admission and telemetry monitoring early detection of AF after stroke remains challenging. Recent observational studies and randomized clinical trials such as CRYSTAL AF³ or EMBRACE⁴ promote prolonged ECG-monitoring for the detection of AF. The present study aimed at estimating the role of extended automatic analysis of continuous ECG monitoring (aCEM) for detecting AF already during hospitalization.

Methods

Six hundred and eighty consecutive patients with ischemic stroke (n= 523) or TIA (n= 157) admitted to our Stroke Center in 2014 were included in this analysis. Generally, they received an ECG on admission, followed by standard continuous telemetry ECG monitoring (CEM) during their stay on our stroke unit (24-72 hours), and finally portable aCEM (Apoplex medical, SRAclinic, Figure 1) on the early rehabilitation unit. Out of these 680 patients, 105 did not undergo CEM but received portable aCEM directly. On the other hand in patients with otherwise clearly explained determined stroke etiology such as symptomatic high grade stenosis or small vessel disease aCEM was not performed. Moreover, approx. 5% of patients did not undergo additional aCEM due to organizational reasons such as early discharge to other hospitals or to rehabilitation centers.



Figure 1.- Portable automatic continuous ECG monitoring (Apoplex Medical Technologies, SRA Clinic, Germany)

Results

A total of 151 patients were discharged with the diagnosis of AF (Figure 2), which was already known on admission in 97 (64%) and newly diagnosed in 54 (36%). From the latter group, ECG on admission identified 27 with AF (18% from total of 151), CEM 14 (9%) and portable aCEM detected an additional 11 patients (7%). One patient with an implanted ECG-recorder showed AF-episodes at read-out and another patient fainted during hospitalization and demonstrated AF on the concomitantly written ECG.

Among the 680 ischemic strokes admitted to our Stroke Center in 2014, 436 received aCEM (at least for 12h). Automatic CEM identified 51 patients with episodes highly suggestive of AF. After systematic review of the suspicious episodes provided by aCEM by our cardiologists, AF was confirmed in 11 patients. Artifacts and clinically less relevant arrhythmias were present in the remaining 40 patients.

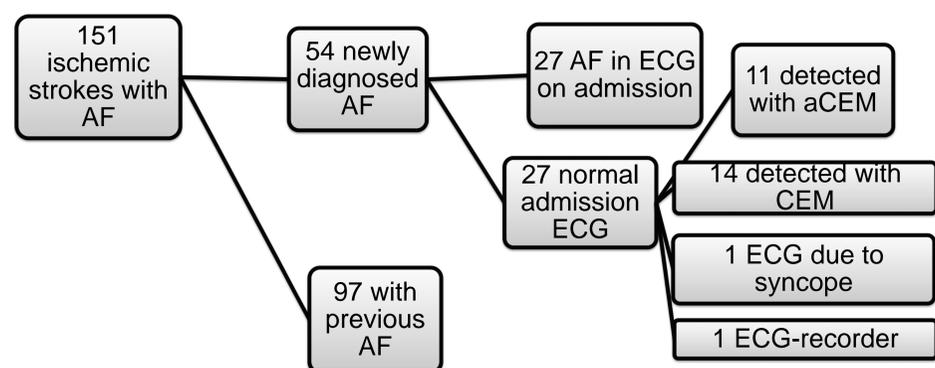


Figure 2.- Atrial Fibrillation detection in patients with ischemic stroke in Cantonal Hospital Aarau during 2014

Conclusions

Portable aCEM efficiently extends the monitoring armamentarium and considerably contributes to the identification of stroke patients with paroxysmal AF, most likely due to a prolonged monitoring period. Moreover, aCEM allows for a rational allocation of resources and might serve to reduce stroke recurrence by optimizing secondary stroke prevention.

Bibliography

¹Ferro J. Cardioembolic stroke: an update. *Lancet Neurol.* 2003;2:177-88

²Secondary stroke prevention. Hankey GJ. *Lancet Neurol.* 2014 Feb;13(2):178-94

³Atrial fibrillation in patients with cryptogenic stroke. Gladstone DJ, Spring M, Dorian P, Panzov V, Thorpe KE, Hall J et al. *N Engl J Med.* 2014 Jun 26;370(26):2467-77

⁴Cryptogenic stroke and underlying atrial fibrillation. Sanna T, Diene HC, Passman RS, Di Lazzaro V, Bernstein RA, Morillo CA et al. *N Engl J Med.* 2014 Jun 26;370(26):2478-86