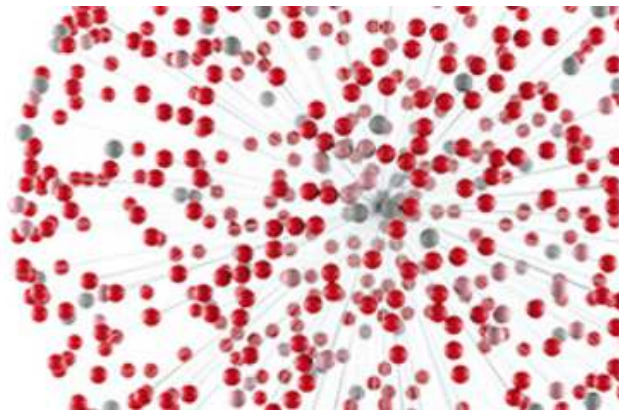


ESC Congress Munich 2018

25-29 August

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Remote long-term monitoring of EKG using connected garments after failure of conventional diagnosis strategy: contribution of an innovative method of e-cardiology.

J.-M. TARLET 1,2; D. COULON 1; V. CATON 1; G. BOCCARA 2; S. HOUAMRIA 3; M. SILVESTRI 2; M. GUENOUN 4.

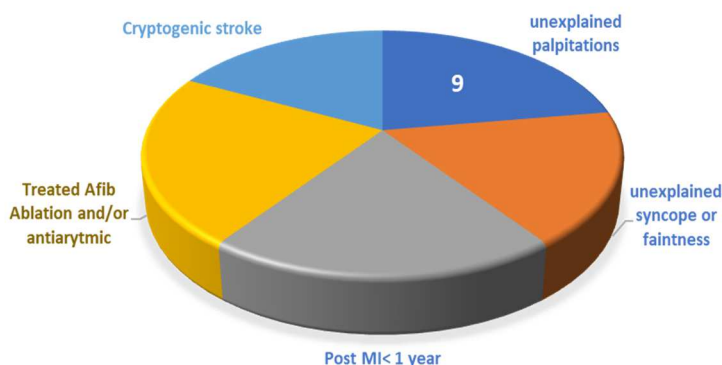
- 1: @HEALTH, Aix-en-Provence, France.
- 2: Axiom Clinic, Aix-en-Provence, France.
- 3: Clairval Clinic, Marseille, France.
- 4: European Hospital, Marseille, France.

Presented on august 27th.

Background: a significant number of symptoms, palpitations, faintness, strokes remain unexplained after exhaustive exploration using conventional diagnosis means. The advent of e-cardiology could help increase diagnosis sensitivity of cardiac rhythm disorders in such clinical situations.

Purpose: to evaluate feasibility and relevance of a new tool of e-cardiology to detect cardiac rhythm disorders not documented with conventional strategies. To evaluate its impact on therapeutic management of affected patients.

Method: continuous monitoring (6 months period) of EKG of 40 patients referred by their treating cardiologist for unexplained symptoms. Use of a connected garment for permanent and ambulatory monitoring, filtered by an algorithm in evaluation phase at first level, sending alarms (EKGs potentially pathological) to a platform where cardiologists interpret and analyze signals on a 24/7 basis at second level. Patients have been categorized in 5 groups: cryptogenic strokes (7), unexplained palpitations (9), unexplained syncope or faintness (7), treated AF (9), first year post MI (8).



Results: 95% of patients used the garment at least 6 days a week, 86% every day. Average monitoring time was 17.4 hours/day, with a 15 weeks average monitoring. 100% of patients sent interpretable signals.



An exemple of ten seconds AFib EKG recorded.

The analysis of signals consisted in a combination of artificial intelligence and cardiologist expertise (semi-supervised Machine Learning). 166000 signals were treated by the algorithm and dispatched to the platform in case of abnormalities, among them 7000 have been confirmed as pathological by cardiologists, corresponding to 115 rhythmic disorders event, which allowed to establish a new diagnosis for 42% of patients (17). No false negative has been identified after reviewing EKGs not considered as abnormal by the algorithm. Mean time before event detection was 4.9 weeks (1-13). Mean event number per patient was 2.88 (1-15). Each of the 17 patients received a specific treatment by their treating cardiologist on the basis of the established and documented diagnosis. Diagnosis per group were: cryptogenic stroke: 3 asymptomatic AF (42%), unexplained palpitations: 1 polymorphic TV (11%), unexplained syncope: 1 atrioventricular block and 3 sick sinus syndromes (57%), treated AF: 4 AF, 3 of them asymptomatic (44%), first year post MI: 0 event.

Cryptogenic stroke	3 asympto AFib
Palpitations	VT 1
Syncope faintness	3 Av bloc & 1 Sick Sinus
Treated Afib	4AF (3 asympto)
Post Myocardial Infarction	0

Conclusion: this pilot study confirms the reliability of the tool, the feasibility of the method and the relevance of the decision-making chain. It allows a very long term monitoring acceptable for the patient, cost-effective and applicable to a very large number of patients. It must be confirmed by a multicentric study planned for 1500 patients.