Utility of Duranta®, a wireless patch-type electrocardiographic monitoring system, for detecting covert atrial fibrillation in patients with cryptogenic stroke

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Background & Objectives

Subcutaneous implantable electrocardiographs have been shown to be highly effective for detecting covert atrial fibrillation (af) in cryptogenic stroke. However, due to their invasiveness, these devices are not indicated for all patients with cryptogenic stroke, creating a need for non-invasive methods that perform better than conventional Holter-type ambulatory electrocardiography in detecting covert af. We evaluated the clinical application and effectiveness of a wireless patch-type electrocardiographic monitoring system Duranta®, which was developed in Japan as a monitoring device for patients with chronic disease or patients at home at the end of life.

Subjects & Methods

A Duranta® (Figure 1) was used to detect covert af in patients with 27 acute ischemic stroke of undetermined source, in which embolic source was not identified by a routine examination from 2016. The laboratory findings were compared between two groups, which were detected (Paf(+)) and not detected (Paf(-)) covert af.

Figure 1: Duranta® ECG monitoring system (※)

※ Akiyama H, et al. Utility of Duranta, a wireless patch-type electrocardiographic monitoring system developed in Japan, in detecting covert atrial fibrillation in patients with cryptogenic stroke: A case report. Medicine (Baltimore). 2017 Feb;96(6):e5995. doi: 10.1097/MD.00000000000005995.

Results

During continuous monitoring using the Duranta® for 3 to 31 days, 5 patients with covert af (18.5%) were detected on mean 3.2 ± 3.1 day and af lasted for 345.4 ± 305.4 min (Table 1).

	Paf (+) (N=5)	Paf (-) (N=22)	All (N=27)	p value
Range of age (years)	65 ~ 84	34 ~ 89	34 ~ 89	-
Mean age (years)	77.2 ± 7.5	72.0 ± 12.5	72.9 ± 11.9	N.S.
Gender; Male (cases)	3	11	14	N.S.
Placing period (day)	11.0 ± 5.4	13.3 ± 7.5	12.9 ± 7.2 (3~31 days)	N.S.
Time from device placement to onset of paf (day)	3.2 ± 3.1	-	-	-
Duration of paf (min)	345.4 ± 305.4	-	-	-
Risk factors				
Hypertension (%)	3 (60.0)	13 (59.1)	16 (59.3)	N.S.
Diabetes mellitus (%)	1 (20.0)	9 (40.9)	10 (37.0)	N.S.
Hyperlipidemia(%)	3 (60.0)	8 (36.4)	11 (40.7)	N.S.
Tobacco (%)	4 (80.0)	7 (31.8)	11 (40.7)	N.S.
Alcohol (%)	1 (20.0)	5 (22.7)	6 (22.2)	N.S.
Range of NIHSS score on admission (median)	0 ~ 25 (5)	0 ~ 24 (5)	0 ~ 25 (5)	N.S.

N.S.: not significant (t-test or Fisher's exact test)

Table 1: Characteristics of the patients between two groups

There were no significant differences in BNP (207.2 ± 216.5, 254.9 ± 596.4 pg/ml, respectively) and D-dimer (1.3 ± 1.0, 4.2 ± 7.6 µg/ml) in serum, and LAD (37.4 ± 7.5, 35.4 ± 6.0 mm) measured by transthoracic echocardiography, meanwhile, there were significant differences in peak systolic velocity in the left atrial appendage (29.4 ± 7.5, 63.7 ± 21.3 cm/sec; p=0.037) measured by transesophageal echocardiography between two groups (Table 2).

N.S.: not significant

	Paf (+) (N=5)	Paf (-) (N=22)	all (N=27)	p value (t-test)
Blood				
RDW	15.2 ± 1.7	14.4 ± 1.3	14.5 ± 1.4	N.S.
BNP (pg/ml)	207.2 ± 216.5	254.9 ± 596.4	245.7 ± 544.7	N.S.
D-dimer (µg/ml)	1.3 ± 1.0	4.2 ± 7.6	3.7 ± 7.1	N.S.
Transthoracic echocardiography				
LAD (mm)	37.4 ± 7.5	35.4 ± 6.0	35.8 ± 6.4	N.S.
EF (%)	64.2 ± 8.3	63.1 ± 12.8	63.3 ± 12.1	N.S.
FS (%)	35.2 ± 6.3	34.7 ± 8.5	34.8 ± 8.1	N.S.
Transesophageal echocardiography				
PSV (cm/sec)	29.4 ± 7.5	63.7 ± 21.3	54.7 ± 3.6	0.037
SEC (case)	0	0	0	N.S.

Table 2: Laboratory findings between two groups

Discussion

Several studies, such as the CRYSTAL-AF and the EMBRACE studies, reported that the detection rate for covert af increased as the duration of electrocardiographic monitoring (by implantable cardiac monitor (ICM) or non-invasive ambulatory ECG monitoring) became longer and the detection rate within 1 year observation period was approximately 12.4% to 33.3% (Table 3).

We suggested that Duranta® was beneficial in the early detection of covert af in cryptogenic stroke because our detection rate of 18.5% was never inferior to that of the previous studies.

Publication year	Authors	Detection rate of covert af by using ICM (observational month)		
2013	Ritter, et al		17% (13M)	
2013	Cotter, et al	25% (8M)		
2013	Etgen, et al		27% (12M)	
2014	Sanna, et al	8.9% (6M)	12.4% (12M)	30% (36M)
2015	Poli, et al	28% (6M)	33.3% (12M)	

Table 3: Detection rate of covert af by using ICM

Conclusions

This study demonstrated that Duranta® can detect covert af more efficiently than 24-hours Holter ambulatory electrocardiography. A non-invasive wireless patch-type electrocardiographic monitoring system Duranta®, which is placed at a precordial position, was useful in early detecting covert af in patients with cryptogenic stroke.

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The authors declare that they have no competing interests.