Validation of Novel Risk Prediction Models in Patients with Brugada Syndrome: A Multicenter Study in Japan

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Background

Risk stratification in patients with Brugada syndrome (BrS) is challenging, especially in those at intermediate risk.

Asymptomatic patients with BrS are considered to be at low risk, with an annual ventricular fibrillation (VF) incidence of 0.2%–0.6%. BrS is typically diagnosed in the 30s to 40s in most patients, and the risk of developing VF is not negligible given the extended life expectancy following the diagnosis of BrS.

The Predicting Arrhythmic evenT (PAT) score has recently been demonstrated to be excellent for predicting future arrhythmic events in patients without prior VF. However, validation studies are lacking.

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Objective

- This study aimed to assess the performance of the PAT score in predicting future VF events in patients with BrS in a Japanese multicenter cohort.

Method

- Of consecutive 523 patients with a type 1 electrocardiogram (ECG) pattern recorded between 2002 and 2015, 413 patients (mean age, 50.9±13.6 years; 395 men) with available ECG data from 59 hospitals in Japan were included.
- The PAT score was calculated for all patients with BrS. High-risk patients with BrS were identified as those having a PAT score ≥10.
- The risk of developing VF was investigated in the total cohort, and in 314 patients (mean age 51.4±13.8 years; 296 men) who did not have VF at the time of enrollment.

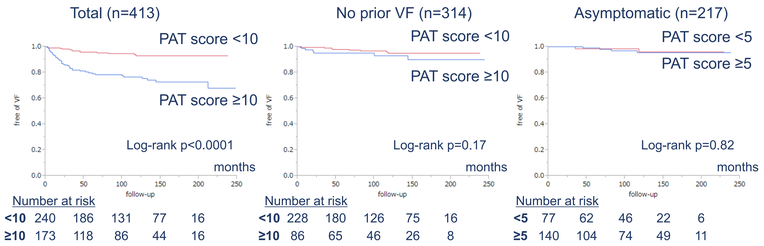
PAT score	
Risk factor	Score
History of SCD/SCA/VT/VF	7
T-peak T-end ≥100 msec	5
Arrhythmic or unexplained syncope	5
VT/VF during drug challenge testing	4
Prolonged PR ≥200 msec	4
Type-1 in peripheral leads	3
aVR sign (R wave amplitude ≥3 mV)	3
Fragmented QRS	3
ER in inferolateral leads	3

Results

Baseline clinical characteristics

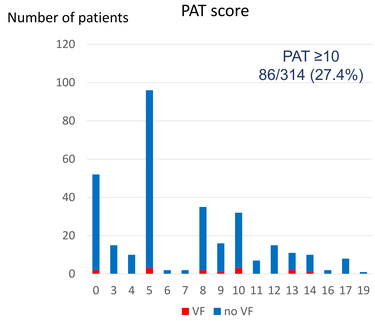
Characteristic	Total (n=413)	History of VF (n=99)	Without prior VF (n=314)	P-value
Age, (years)	50.9 ± 13.6	49.3 ± 13.1	51.4 ± 13.8	0.08
Men, n (%)	395 (95.6)	99 (100)	296 (94.3)	0.01
Spontaneous type 1 ECG pattern, n (%)	284 (68.8)	78 (78.8)	206 (65.6)	0.01
History of atrial fibrillation, n (%)	68 (16.5)	29 (29.3)	39 (12.4)	0.0002
History of arrhythmic or unexplained syncope, n (%)	97 (23.5)	0 (0)	97 (30.9)	<0.0001
Family history of sudden death, n (%)	91 (22.0)	22 (22.2)	69 (22.0)	1.0
T-peak-to-T-end interval ≥100 ms, n (%)	260 (63.0)	60 (60.6)	200 (63.7)	0.63
VT/VF during drug challenge testing, n (%)	2 (0.5)	0 (0)	2 (0.64)	1.0
Prolonged PR interval ≥200 ms, n (%)	87 (21.1)	28 (28.3)	59 (18.9)	0.047
Type-1 ECG pattern in peripheral leads, n (%)	36 (8.7)	17 (17.2)	19 (6.1)	0.002
aVR sign, n (%)	50 (12.1)	15 (15.2)	35 (11.2)	0.29
Fragmented QRS, n (%)	38 (9.2)	15 (15.2)	23 (7.3)	0.027
Early repolarization in inferolateral leads, n (%)	51 (12.3)	17 (17.2)	34 (10.8)	0.11
Inducible VF during electrophysiological study, n (%)	240/324 (74.1)	48/78 (61.5)	192/246 (78.0)	0.0049

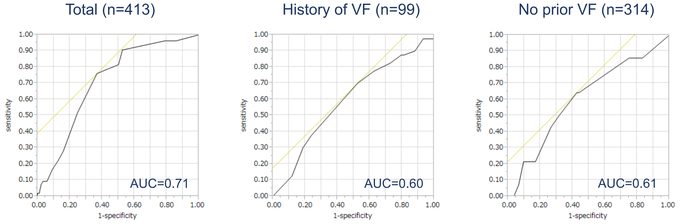
Kaplan-Meier Analyses of freedom from VF during the follow-up period



- During the 106.8-month follow-up period, 54 patients (13.1%) experienced VF events.
- Of the 314 patients without prior VF at enrollment, 86 (27.4%) had a PAT score ≥10, and 14 (4.5%) experienced VF events during the follow-up period.
- The incidence of VF events during the follow-up period was significantly higher in patients with PAT scores ≥10 than in those with scores <10 (41/173 [23.7%] vs. 13/240 [5.4%], p<0.0001) in the total cohort.
- No difference was observed in the incidence of VF events between patients with PAT scores ≥10 and <10 among the 314 patients without prior VF (6/86 [7.0%] vs. 8/228 [3.5%], p=0.22).

Distribution of PAT in patients without prior VF





- In the 314 patients without prior VF, the area under the curve of the PAT score was 0.61, and a PAT score ≥10 predicted future VF events with a sensitivity and specificity of 42.9% and 73.3%, respectively.

Conclusion

- This Japanese multicenter registry demonstrated that the novel risk stratification model could not accurately predict future VF events in patients with BrS, but without prior VF.
- Further studies including a larger number of asymptomatic patients will be required to identify risk factors.

Disclosures

none