Prognostic significance of Ventricular Fibrillation Induced by Non-Aggressive Protocol of Programmed Electrical Stimulation in Brugada Syndrome.

Tomonari Kimura
Hiroshi Morita
Saori Asada
Yoshimasa Morimoto
Masakazu Miyamoto
Koji Nakagawa
Nobuhiro Nishii
Atsuyuki Watanabe
Hiroshi Ito

Introduction: Prognostic significance of programmed electrical stimulation (PES) in patients with Brugada syndrome (BrS) is controversial. One of the reasons of the different results of significance of PES will be resulted from non-uniform PES protocol, such as induction sites, minimum coupling interval (CpI) and number of extrastimuli, in each center. The optimal protocol of the PES for predicting prognosis has not been established in BrS.

Methods: The subjects of this study were comprised of 211 patients with BrS who had not experienced documented ventricular fibrillation (VF) (201 males, age: 46±13 years). The subjects included 125 asymptomatic patients and 86 patients with syncope. We performed PES with 2 basic cycle lengths (600 and 400ms) and up to 3 extrastimuli at right ventricular apex (RVA) and RV outflow tract (RVOT) in each patient. Minimum CpI of extrastimuli was 180ms. We terminated induced VF by direct cardioversion if it continued ≥15 sec. If VF terminated spontaneously within 15 sec, we defined it as non-sustained polymorphic ventricular tachycardia (NS-PVT). We evaluated time from initial visit to the hospital to the VF event by Cox’s proportional hazards model.

Result: PES induced VF in 97 patients (46%) with a protocol of CpI ≥180ms and 46 patients (22%) with CpI ≥200ms. The CpI that induced VF was 197±17ms (range: 180-260ms). The number of extrastimuli that induced VF was 1 extrastimulus in 6 patients (5%), 2 extrastimuli in 55 patients (57%) and 3 extrastimuli in 36 patients (37%). Site of induced-VF was RVA in 24 patients (25%), RVOT in 38 patients (39%) and both in 35 patients (36%). Twenty-four patients (11%) experienced VF during follow-up. Induced VF by PES with CpI ≥180ms was associated with arrhythmic events during follow-up (hazard ratio [HR]: 3.3, confidence interval [CI]: 1.4-8.5, p<0.01). Induced NS-PVT was not associated with VF events. The risk of arrhythmic events increased if VF was induced by PES with longer CpI (unit HR of induced VF/ +10ms of CpI: 1.3, CI: 1.0-1.6, p=0.03). Induced-VF by 1 or 2 extrastimuli was significantly associated with VF event (HR: 15.2 [p<0.01] and 2.9 [p=0.03], respectively), whereas VF induced by 3 extrastimuli did not predict VF. Induction site, effective refractory periods and HV interval did not predict VF events.

Conclusion: The present study showed that induced VF by PES with long CI of 1 or 2 extrastimuli could predict VF in BrS patients without documented VF. Non aggressive PES protocol will be associated with occurrence of VF events.