Introduction: The available non-invasive electrocardiographic examination only provides weak predictive value for the risk of sudden cardiac death (SCD) in the structurally healthy heart population. To investigate the prognostic value of the QRS vectorcardiogram of the surface electrocardiogram (ECG) on the SCD risk stratification.

Methods: This retrospective study enrolled 346 patients from January 2016 to December 2018. Patients with congenital heart disease or heart failure were excluded. 72 patients have experienced sudden cardiac death. All the SCD patients have cerebral performance category 1 or 2. The surface ECG was recorded during an electrophysiology study, and inter-QRS descriptions were analyzed. The inter-leads QRS dispersion, the percentage of the loop area (PL), and the loop dispersion were compared between groups.

Result: A total of 315 patients (mean age of 51.9 ± 17.4 years old, 49.8% male) were analyzed. The basic demographic variables were comparative. In the model of multivariate analysis, coronary artery disease, PR interval, V4-5 dispersion, and PL could be the predictors for SCD. In subgroups analysis of SCD, CAD and the V3-4 dispersion could be used to predict etiology of SCD.

Conclusion: To the first time, the parameters of QRS loop descriptors of surface ECG precordial leads could be used as non-invasive markers to identify the patients experiencing SCD from the normal population. It could also be used to determine prognosis in subgroup analysis and determined possible etiology.