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Deciphering the Phenotypes in Idiopathic VF and Early Repolarization- New Insights

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Although genetic testing discovered many ion channel mutations, only a part of individuals with unexplained SCD or IVF have currently a genetic etiology. Whole-exome studies appears deceiving in wide populations although cardiac structure -genes variants are often identified. The complexity of gene interaction result in phenotypes (the pathophysiologic substrate) which are highly variable. Detailed electrophysiological evaluation have been performed in young patients surviving IVF defined after comprehensive negative investigations. Body surface recordings were used to identify the regions of drivers maintaining VF. Then, endo- epicardial mapping was performed to analyze electrograms in the regions of drivers. Abnormal electrograms indicating localized structural pathology were found in 65% of patients. The pathology involved only a part of the ventricular wall (particularly epicardium) and a limited surface ; explaining why they were undetected by imaging. In others patients, Purkinje abnormalities were the dominant mechanism. Nearly 90% of IVF could be classified as either 'cardiomyopathic' depolarization abnormality or 'Purkinjopathy'. In early repolarization/ inferolateral J wave, we will report a 3-center study involving 54 patients with high density endo-epicardial mapping at the time of J-wave. Two distinct substrates, delayed depolarizion or abnormal early repolarization, could explain the J wave, with significant implications for diagnostic or therapy. New data will also be presented using optical mapping in explanted human hearts. Therefore, the spectrum of arrhythmogenic diseases leading to SCD in apparently normal hearts comprises an emerging subgroup underlied by depolarization abnormalities that may or may not have an ECG expression. A simplified mechanistic classification based on the primary pathogenesis can be proposed.