

Ventricular arrhythmias arising from valvular structures – a look at the valve disease through an ECG

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Cardiologists are familiar with valvular heart diseases but often they do not perceive heart valves as source of ventricular arrhythmias (VA). In patients with structural heart disease (SHD) VAs originate from a substrate in diseased myocardium, while in patients without SHD most common origins are outflow tracts (OT)¹. Premature ventricular complexes (PVC) from OT are either from subvalvular, valvular or supra-valvular myocardium as there are myocardial extensions above the semilunar valves, these VAs are created predominantly by mechanism of triggered activity or enhanced automaticity^{1,2}. Papillary muscles, mitral and tricuspid anulus, aortomitral continuity and other sites in a structurally normal heart can also be the origin VAs. There are general and specific ECG characteristics that can localize the origin of VAs: bundle branch block type, axis, QRS polarity in lead V6, QRS duration, precordial transition, maximal deflection index, and so forth, therefore mapping of the PVC starts in the region that is presumed by ECG characteristic³. While different anti-arrhythmic drugs (AAD) aim at different mechanisms; calcium channel blocker can suppress triggered activity and beta-blocker can suppress automaticity, in general ablation is more effective in clinically meaningful reduction of PVCs compared to AAD (up to 95% vs. up to 25%)⁴. Ablations are generally safe but complication rates of catheter ablation in aortic root are not negligible and include myocardial rupture and tamponade, stroke, valvular damage, and coronary artery occlusion; these complications can be lowered by usage of intracardiac ultrasound (ICE)^{1,4}. When mapping arrhythmias from the valves, we should stop perceiving the heart structures or valves as isolated parts and acknowledge that regional anatomy of these structures is among the most complex of those encountered by cardiac electrophysiologists, e.g., aortic valve is directly related with both atria, the interatrial septum, the right ventricular outflow tract and pulmonary valve, and the aortomitral continuity. Ablation is highly effective in suppression of PVCs, it has low numbers of complications, but ablation in aortic region brings serious complications to the table, therefore shared decision making with the patient and usage of ICE is of utmost importance.

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LITERATURE

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