

Effects of Balloon Pulmonary Valvuloplasty on ventricular arrhythmogenesis

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Objectives: Recently, increasing number of studies have showed that the peak and the end of the electrocardiographic T wave (Tp-e) corresponds to the transmural dispersion of ventricular repolarization and the prolongation of the Tp-e interval has been reported to be associated with ventricular arrhythmias. Tpeak-end interval, Tp-e/QT and Tp-e/QTc ratios are used as an index of ventricular arrhythmogenesis. As an independent variable from heart rate that is suggested a strong predictor of sudden death in cardiac patient population. The aim of this study was to assess ventricular repolarization in patients with severe pulmonary valve stenosis who underwent balloon valvuloplasty and also was to assess the relation between the ventricular repolarization and residual pulmonary valve gradient.

Methods: Thirty patients who underwent balloon valvuloplasty between January and August 2014 were enrolled into study and 50 age and sex matched healthy subjects were also recruited as control group. ECG recordings of patients vs control group measurements revealed Tp-e interval of 85 ± 17.3 vs 82.5 ± 14.9 msec ($p=0.049$), QTc 426.9 ± 33.9 vs 393.7 ± 25.6 msec $p=0.03$, QT dispersion 33.6 ± 20.4 vs 29.4 ± 18.5 msec $p=0.01$, Tp-e/QTc ratios 0.19 ± 0.03 vs 0.21 ± 0.04 $p=0.23$. The ECG measurement of these parameters showed a strong correlation between pulmonary valve residual gradient, Tp-e interval ($r=0.88$, $p<0.01$), QT dispersion ($r=0.86$, $p<0.01$) and Tp-e/QTc ($r=0.77$, $p<0.01$).

Conclusion: Balloon valvuloplasty is the procedure of choice for the valvular stenosis at all ages however, patients with residual gradient may have the risk of ventricular repolarization heterogeneity. Therefore, patients who have significant pulmonary residual gradient after pulmonary balloon valvuloplasty may more prone to ventricular arrhythmias and these patients should be closely follow up for the risk of ventricular arrhythmias and sudden cardiac death.