

# THE DETECTION OF RIGHT VENTRICULAR POST EXTRASYSTOLIC POTENTION IN NORMAL ADULTS BY CINEANGIOGRAPHIC METHODS

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*This investigation was made in 12 normal people. Right ventricular volumes and right ventricular post extrasystolic potentiation was calculated cineangiographically. Right ventriculography was done in 30° right anterior oblique position. Electrode catheter was put in right ventricular apex, and an extrasystole was created with an external pacemaker stimulus.*

*Right ventricular end-diastolic volume (EDV), end-systolic volume (ESV), stroke volume index (SVI), ejection fraction (EF) was estimated in both normal and post-extra systolic first beat.*

*In normal beat EDV was found to be  $67 \pm 5$  ml/m<sup>2</sup>, while ESV  $24 \pm 4$  ml/m<sup>2</sup>, SVI  $41 \pm 2$  ml/m<sup>2</sup>, and EF  $61 \pm 4\%$ .*

*In post extrasystolic first beat EDV was found to be  $77 \pm 5$  ml/m<sup>2</sup>, while ESV  $24 \pm 4$  ml/m<sup>2</sup>, SVI  $53 \pm 2$  ml/m<sup>2</sup>, and EF  $68 \pm 4\%$ . These data concluded that EDV, ESV, SVI and EF were increased in post-extrasystolic first beat.*

**Key words:** Right ventricular post-extrasystolic potentiation, cineangiographic detection.

**T**he increase in the contractility of the heart with the first sinus pulse following the extrasystole was first identified by Longendorff in 1885<sup>1</sup>. The potentiation observed with the first sinus pulse following the extrasystole enables the evaluation of the myocardium, and shows the contractile reserve of the myocardium<sup>2</sup>.

Although the volume of the ellipsoid-like left ventricle was known since 1958, the right ventricle cavity was measured first in 1971 because of its complicated and irregular structure which shows no similarity with any

known geometric model. A single, common geometric model couldn't be specified for the right ventricular volume formulas and different methods have been developed<sup>3,9</sup>.

Although the right ventricular volumes of normal subjects have been studied by two researches in three different works<sup>8,10</sup>, we couldn't find any document about the potentiation of the right ventricle with the first sinus pulse following the extrasystol in the literature.

In this study: 1) The cineangiographic determination of right ventricle volumes in normal adults; 2) The cineangiographic detection of the potentiation of the right ventricle during the first sinus pulse following the extrasystol, is aimed.

## Material and Methods

This investigation was made in 12 normal people. Right ventricular volumes and right ventricular post extrasystolic potentiation was calculated angiographically. Right ventriculography was done in 30° right anterior oblique position. Electrode catheter was put in right ventricular apex transvenously and an extrasystol was created with an external pacemaker stimulus.

Right ventricular end-diastolic volume (EDV), end-systolic volume (ESV), stroke volume index (SVI), ejection fraction (EF) was estimated in both normal and post-extrasystolic first beat.

## Statistical Analysis

Results were expressed as mean  $\pm$  standard deviation and the importance control of the differences between the mean values was made by student's t test. The p value of below 0.01 was accepted as statistically significant.

## Results

By the normal pulse the following values were calculated: EDV:  $67 \pm 3$  ml/m<sup>2</sup>, ESV:  $26 \pm 5$  ml/m<sup>2</sup>, SVI:  $41 \pm 5$  ml/m<sup>2</sup>, and EF:  $61 \pm 4\%$ .

By the first sinus pulse following the extrasystol those values were calculated: EDV:  $77 \pm 5$  ml/m<sup>2</sup>, ESV:  $24 \pm 4$  ml/m<sup>2</sup>, SVI:  $53 \pm 2$  ml/m<sup>2</sup>, and EF:  $68 \pm 4\%$ .

The differences between the normal pulse values and the values of first sinus pulse following the extrasystol are as follows: EDV:  $11 \pm 1$  ml/m<sup>2</sup>, ESV:  $2 \pm 1$  ml/m<sup>2</sup>, SVI:  $12 \pm 2$  ml/m<sup>2</sup>, and EF:  $8 \pm 2\%$ .

In the importance control of the differences of the normal pulse and the first sinus pulse following the extrasystol, the following values are calculated:

EDV (t) = 40, p < 0.01  
ESV (t) = 7.1, p < 0.01  
SVI (t) = 27.0, p < 0.01  
EF (t) = 12.3, p < 0.01

## Discussion

The right ventricular volumes of normal babies and children have been studied before using different methods. But this kind of studies are not much. In the study of Ferlinz on 8 cases by using two way cineangiographic three-sided pyramid method; EDV was calculated as  $76 \pm 11$  ml/m<sup>2</sup> while SVI:  $50 \pm 6$  ml/m<sup>2</sup>, and EF:  $66 \pm 6\%$ <sup>8</sup>. The same author found the EDV as  $69 \pm 13$  ml/m<sup>2</sup> and ESV as  $22 \pm 5$  ml/m<sup>2</sup> on 10 cases by using one-way cineangiographic three sided pyramid method<sup>9</sup>. Wiroblewski, calculated EDV as  $94 \pm 11$  ml/m<sup>2</sup>, ESV as  $49 \pm 6$  ml/m<sup>2</sup>, SVI as  $46 \pm 5$  ml/m<sup>2</sup>, and EF as  $49 \pm 2\%$  on 7 cases by using his method of two-way cineangiographic changed area-length method<sup>10</sup>.

The right ventricular volumes that have been determined in 12 adults in our study is in accomodation with the both studies that has been made by Ferlinz.

Depending on these results, by the first sinus pulse following the extrasystol, the ESV, SVI and EF increase. The results are also statistically significant.

We haven't found in the literature anything about a research of the potentiation of the right ventricle following the extrasystol using cineangiographic methods.

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