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EVALUATE TO DIFFERENCE OF SUBENDOCARDIAL AND SUBEPICARDIAL LAYERS CIRCUMFERENTIAL STRAIN USING 2D SPECKLE-TRACKING IMAGING IN NORMAL SUBJECTS COMBINED WITH EXERCISE STRESS TESTING

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Objectives To observe the variability of which variation of normal subjects short-axis of the left ventricular subendocardial and subepicardial layers myocardial circumferential strain during isovolumic end-diastolic in the exercise stress, and to analyse the differences of the different myocardial layers strain.

Methods Echocardiography was performed in 43 healthy students at rest, maximal aerobic power and recovery after exercise. Store the dynamic images of the left ventricular basal, papillary muscle

and apical short-axis view. Subendocardial and subepicardial layers myocardial circumferential strain (ENCS, EPCS) of three short-axis during isovolumic end-diastolic were analysed using X-strain software, to acquire the mean circumferential strain of Subendocardial (B-ENCS, M-ENCS, A-ENCS) and subepicardial (B-EPCS, M-EPCS, A-EPCS) myocardial layers for each short axis of six segments at basal, papillary muscle and apical levels. Analyse the differences of the different layers myocardial strain.

Results

1. The ENCS of the left ventricular basal, papillary muscle and apex levels are greater than EPCS during exercise (At rest: -20.41 ± 4.60 vs $-8.27 \pm 4.58\%$, -20.47 ± 13.07 vs $-8.40 \pm 3.99\%$, -24.34 ± 10.35 vs $-8.29 \pm 3.65\%$. At maximal aerobic power: -12.45 ± 9.53 vs $-5.02 \pm 3.89\%$, -14.06 ± 9.18 vs $-4.76 \pm 3.89\%$, -23.61 ± 15.10 vs $-7.92 \pm 5.52\%$. At recovery after exercise: -16.28 ± 9.38 vs $-7.05 \pm 3.41\%$, -22.45 ± 6.70 vs $-7.75 \pm 3.18\%$, -27.26 ± 9.85 vs $-8.66 \pm 7.02\%$, $p < 0.01$).
2. ENCS and EPCS of the basal, papillary level short-axis during isovolumic end-diastolic are decreased at first and then increased during exercise ($p > 0.05$).

Conclusions

1. In normal subjects, subepicardial and subepicardial layers myocardial circumferential strain are consistent with the physiological changes myocardial during exercise.
2. During exercise, subepicardial and subepicardial layers myocardial circumferential strain are different, and we can identify myocardial ischaemia of different levels by 2DSE.