

C64. Relationship Between Exercise Induced Heart Rate Increase And The Formation Of Microbubbles And Hits In Mechanical Heart Valve Implanted Patients

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OBJECTIVES: The formation and collapse of vapor-filled bubbles near a mechanical heart valve is called cavitation. Cavitations are suggested to be responsible for the formation of bubbles, which could be detected in vivo by doppler ultrasonography (USG) as HITS (high intensity transient signals) in cranial circulation. It is found that the presence of HITS observed at prosthetic heart valve patients does affect the cognitive function. In our study we investigated the relationship between exercise induced heart rate increase and HITS formation in cranial circulation.

METHODS: 39 mechanical heart valve implanted (mitral and aortic position)(47 valves) patients aged between 18-80 years old were included in our study. Microbubbles were counted in left ventricular cavity via transtoracic echocardiography at rest per cardiac cycle. Afterwards transcranial doppler USG were performed and HITS were counted in each patient's middle cerebral artery at five minutes duration. Subsequently exercise test according to Bruce protocol performed. After achieving maximal heart rate, microbubbles in left ventricle and HITS were counted again.

RESULTS: Microbubbles in left ventricle and transcranial HITS increased after exercise significantly regarding resting values (15,79±10,91 microbubbles /beat vs. 26,51±18,00 microbubbles/beat, p<0.001; 6,13±8,07HITS/5_min. vs. 13,15±15,87HITS/5_min., p=0.001). There was a significant correlation between microbubbles and HITS counts after peak exercise (r=0,55, p<0.001).

CONCLUSIONS: In our study we found that the microbubbles were increasing as the heart rate increased and more HITS were propelled to the cerebral circulation. As previously shown before, HITS can alter cognitive functions. Therefore heart rate control is essentially important in these patients to protect neurocognitive functions.

Findings

	MINIMUM	MAXIMUM	MEAN	STD DEVIATION
REST MICROBUBBLE	2	57	15,79	10,91
POSTEXERCISE MICROBUBBLE	5	90	26,51	18,00
REST HITS	0	36	6,13	8,01
POSTEXERCISE HITS	0	56	13,15	15,87
REST MITRAL VALVE CLOSURE SLOPE (CM/SN)	16,0	82,0	41,94	17,38
POSTEXERCISE MITRAL VALVE CLOSURE SLOPE(CM/SN)	35,0	162,0	71,87	32,63

Correlation Analysis

