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More vigorous exercise mimics remote ischemic preconditioning and provides benefit in cardiac rehabilitation patients

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Abstract

Remote ischemic preconditioning has been shown to reduce the extent of myocardial infarction during an ischemic event as well as prior to a planned cardiac intervention. Vigorous exercise has been shown to have similar cardiovascular benefits to remote ischemic preconditioning in healthy individuals. Despite this effect, many individuals who exercise regularly present with cardiovascular disease. Those individuals who participate in cardiac rehabilitation programs provide a unique opportunity to determine whether the effects of more vigorous exercise prior to a cardiac event result in improved outcomes. We analyzed our cardiac rehabilitation database and compared individuals with the highest and the lowest exercise capacity as determined by their peak oxygen consumption on a CPX test prior to initiating a cardiac rehabilitation program to compare baseline characteristics and outcomes. Group 1 (VigEx) includes individuals with higher MVO2 (mean MVO2 33 and METS 9) and Group 2 (LowEx) includes those with lower MVO2 (mean MVO2 11 and METS 3). Men accounted for 95% of the total in the VigEx group. Women made up 31% of our total population but only accounted for 5% of those in VigEx. VigEx had lower mean BMI than LowEx (26 v. 34). Smokers comprised only 19% of the total in VigEx but 30% in LowEx. Only 5 % of VigEx subjects had diabetes, whereas 60% of LowEx had diabetes. VigEx had 17% of its subjects with 0-1 CV risk factors compared to none of the subjects in LowEx. LowEx had 36% with >5 CV risk factors but only 7% of VigEx had > 5 CV risk factors. Only 12% of VigEx subjects required coronary artery bypass grafting and 41% underwent percutaneous coronary intervention. In LowEx, 27% required CABG and 12% underwent PCI. 72% of the subjects in VigEx had a preserved ejection fraction but only 50% of subjects in LowEx. None of the subjects in VigEx had severely reduced ejection fraction, while 28% of LowEx had an EF < 30%. In conclusion, individuals with cardiovascular disease who participate in more vigorous exercise prior to their cardiac event have improved EF and decreased need for CABG, and may obtain a protective benefit similar to RIPC. Also, given the safety of vigorous exercise in the cardiac rehabilitation population and its similar effects to RIPC, cardiac rehabilitation programs should promote vigorous exercise capable individuals. Further studies could be considered in cardiac rehabilitation patients who cannot perform more vigorous exercise to determine if a program of RIPC would provide further benefit.

Biography

Jodi Tinkel completed her medical training at the University of Toledo Medical center and is currently an assistant professor and invasive cardiologist at UT. She is the medical director of cardiac rehabilitation and has research interests in ischemic preconditioning, platelet activation, cardiac imaging and plaque stability.