

Myocyte cellular hypertrophy is responsible for ventricular remodeling in the hypertrophied heart of middle aged individuals in the absence of cardiac failure.

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OBJECTIVE: The aim was to measure changes in the numbers and size of ventricular myocytes in human hearts with marked ventricular hypertrophy and no clear signs of cardiac failure, to determine whether myocyte cellular hypertrophy is the only factor involved in the increase in cardiac mass.

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RESULTS: Eight hypertrophied human hearts, weight 561(SD 68) g, were collected at necropsy from hypertensive patients who died from non-cardiac causes and were compared with eight normal hearts, weight 387 (37) g, obtained from healthy individuals who also died from non-cardiac causes. **With cardiac hypertrophy, left and right ventricular weight increased by 53% and 57%, whereas myocyte cell volume increased by 112% and 84%, respectively.** The disproportion between the increase in ventricular weight and the increase in myocyte volume was due to a 30% and 16% loss in left and right ventricular myocytes following hypertensive hypertrophy. Myocyte loss also provoked a 319% and a 188% increase in the amount of replacement fibrosis in the left and right ventricular myocardium. These tissue and cellular processes resulted in an expansion in ventricular mass which exceeded the thickening of the wall so that an increase in cavitory volume occurred in both ventricles.

CONCLUSIONS: Myocyte cellular hypertrophy is responsible for ventricular hypertrophy in hypertensive cardiomyopathy in its compensated stage. Myocyte loss precedes the impairment in ventricular pump function and may be implicated in the initiation of ventricular maladaptation.

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