

‘Physiological hypertrophy of the heart’ is a misnomer

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The term ‘hypertrophy’ means an abnormal growth (eg, cardiac hypertrophy is understood as an abnormal growth of cardiac mass due to an increase in the size of myocytes). A second meaning of the term ‘physiological’ is, according to the dictionary, normal. Taking the above interpretations into consideration, we arrive at an amusing semantic incompatibility: cardiac physiological hypertrophy would mean ‘normal abnormal growth of the heart’. Authors who coined this term most likely intended to refer to cardiac hypertrophy achieved by physiological stimuli.

The next logical question is whether there is a specific subtype of cardiac hypertrophies mislabelled as ‘physiological’ hypertrophies. For example, in a recent authoritative review, Tomanek (1) divides hypertrophies into the following groups: hypertrophies due to: pressure overload; volume overload; hyperthyroidism; and cardiomyopathies. However, the term ‘physiological hypertrophy’ is avoided.

Most publications using the term ‘physiological hypertrophy’ concern changes in the heart after chronic physical exercise. Occasionally, it is also used to describe cardiac changes during pregnancy or in hyperthyroidism.

Several functional, morphological and/or biochemical differences between ‘physiological hypertrophy’ and the remaining types of ‘pathological’ cardiomegalies are reported. All of these changes are usually considered to be reversible. Generally, the distinctions are presented as differences between a ‘good’ hypertrophy and a ‘bad’

hypertrophy (2,3). However, the line of distinction between these two types of hypertrophy is fuzzy. The so-called ‘bad pathological’ hypertrophy can be adaptive if the primary cause is reversed before the development of intrinsic myocardial disease, while ‘physiological’ hypertrophy can be maladaptive if it is quantitatively excessive and sustained (4). For instance, Pelliccia et al (5) described a residual cardiac hypertrophy in >20% elite athletes after a long-term deconditioning period.

The degree to which an increase in cardiac mass induced by exercise is usually modest. An exception is the sizeable increase in cardiac mass due to an enhanced physical activity that is genetically coded in so-called ‘active’ animals. For example, a sizeable increase in cardiac mass was found in wild (ie, sewage) rats when compared with laboratory rats (6), as well as a significantly higher cardiac mass in hares compared with that in rabbits (7). A clinical example of genetically coded cardiomegalies would be familiar hypertrophic cardiomyopathy mutations (8).

In conclusion, the term ‘physiological growth’ is acceptable in situations when there is a temporary increase in the mass of the uterus and breasts during pregnancy. On the other hand, the term ‘physiological hypertrophy’ to describe an increase in cardiac mass due to exercise is not accurate. In this case, the commonly used term ‘athlete’s heart’ would be more appropriate (9).

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