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P90 Indexing Left Ventricular Mass to Body Size: Which Method is the Most Appropriate in Early Adulthood?

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ABSTRACT

Introduction: Left ventricular mass (LVM) predicts cardiovascular risk. In early life, LVM is conventionally indexed to height 2.7 [1], although this may not account for sex differences in growth. We investigated allometric scaling of LVM to height, lean mass (LM) and body surface area (BSA) in a UK birth cohort.

Methods: 861 individuals underwent echocardiography to assess LVM at age 17.7 (SD 0.3) years and 24.0 (SD 0.6) years. LM was quantified using dual-energy X-ray absorptiometry. Group and sex-specific allometric relationships were determined by linear regression, following log transformation of x and y variables ($\log(y) = a + b * \log(x)$) ($b$ = scaling exponent).

Results: LVM showed a linear relationship with LM and log(height), although the intercepts differed by sex. At age 17, the exponent relating LVM to height in males and females combined was 2.67 (95% CI: 2.41, 2.91), very close to the suggestion of height 2.7. Sex-specific estimates for height were lower and close to the estimate of 1.7 [2], at 1.77 (1.17, 2.37) and 1.83 (1.35, 2.31), for males and females, respectively. The female exponent at age 24 remained close to 1.7, while the male exponent increased to 2.14 (1.54, 2.73). Exponents for LM and BSA remained similar between ages 17 and 24 (see Table 1 for detail).

Conclusion: A universal approach for allometric indexing of LVM may be inappropriate in early adulthood, and indexation may need to be both age- and gender-specific. It remains unclear which indexing method is superior at these ages, although height may be unsuitable. These observations may have important implications for identifying young individuals with cardiac hypertrophy.

Table 1

		Height			Lean			BSA		
		n	Coefficient (+ 95% CI)	*p*	*n*	Coefficient (+ 95% CI)	*p*	*n*	Coefficient (+ 95% CI)	*p*
Age 17	Group	861	2.67 (2.41, 2.91)	<0.001	861	0.85 (0.80, 0.91)	<0.001	861	1.76 (1.64, 1.88)	<0.001
	Male	333	1.77 (1.17, 2.37)	<0.001	333	1.18 (1.00, 1.36)	<0.001	333	1.69 (1.45, 1.93)	<0.001
	Female	528	1.83 (1.35, 2.31)	<0.001	528	1.10 (0.96, 1.24)	<0.001	528	1.36 (1.20, 1.53)	<0.001
Age 24	Group	861	2.97 (2.70, 3.23)	<0.001	861	1.07 (1.01, 1.13)	<0.001	861	1.78 (1.66, 1.90)	<0.001
	Male	333	2.14 (1.54, 2.73)	<0.001	333	1.20 (1.05, 1.35)	<0.001	333	1.60 (1.36, 1.84)	<0.001
	Female	528	1.65 (1.11, 2.19)	<0.001	528	1.10 (0.98, 1.23)	<0.001	528	1.32 (1.15, 1.50)	<0.001

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