Reviewer's report

Title: Muscle fiber-type distribution predicts weight gain and unfavorable left ventricular geometry: a 19 year follow-up study

Version: 1 Date: 2 September 2005

Reviewer: Victor G. Davila-Roman

Reviewer's report:

General
In this study the authors report on the value of type-I skeletal muscle to predict obesity and left ventricular (LV) structure and function at 19-year follow-up in healthy men. At baseline in 1984, skeletal muscle fiber-type distribution (by actomyosin ATPase staining) was studied in 63 healthy men (aged 32-58 years). The follow-up in 2003 included echocardiography, measurement of obesity-related variables, physical activity and blood pressure. They found that among the 40 men not using cardiovascular drugs at follow-up, low type-I% predicted higher heart rate, higher blood pressure, and higher LV fractional shortening, which they attribute to increased sympathetic tone. Low type-I% also predicted smaller LV chamber diameters (P<0.009) and greater relative wall thickness (P=0.034), indicative of concentric remodeling. These findings were explained by “the association of type-I% with obesity related variables. Type-I% was an independent predictor of follow-up body fat percentage, waist/hip ratio, weight gain in adulthood, and physical activity (in all P<0.001). After including these risk factors in the regression models, weight gain was the strongest predictor of LV geometry explaining 64% of the variation in LV end diastolic diameter, 72% in end-systolic diameter, and 53% in relative wall thickness.” They concluded that “low type-I% predicts fatness and weight gain especially in the mid abdomen, and consequently unfavorable LV geometry indicating increased cardiovascular risk.”

The manuscript is well written, concise and clear. Cross-sectional studies have shown that low type-I% has been found to be associated with obesity, with insulin resistance, and with higher blood pressure. The presumed unifying hypothesis of their work is that low type-I% leads to left ventricular remodeling and/or dysfunction, and ultimately to its associated increased cardiovascular mortality. The authors have published a previous paper using the same population (ref #17) showing that a high proportion of type-I fibers is a predictor of low blood pressure. Not surprisingly, since they performed this analysis in exactly the same population, the present paper is somewhat similar to the previous one. In the present study the obesity-related variables explained 53% to 72% of the variability in the echocardiographically-determined measurements (ie, LV ed/es volumes and RWT). This is a unique population and the observations are provocative.

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Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

1. The major concern that I have with this study is that number of patients studied is small (this is understandable given that the subjects were recruited 19 yrs earlier). However, care must be taken to derive generalizations from such a small number of patients, particularly since the number of those with low type-I% was so small (n=11).

2. A low E/A ratio (<1) is suggestive of impaired LV relaxation, and NOT of ‘poorer diastolic function’ as the authors state. Furthermore, the E/A ratio is an age-, heart-rate-, LV mass, and load-dependent variable, and as such, any conclusions derived from this measurement have to be taken with skepticism. In this particular study, since the low type-I% group had higher LV mass, higher HR, and higher BP, this analysis is likely flawed. Ideally the E/A ratio would be corrected for all these variables (as they did with age), but given the small number of subjects, such an analysis
may not be robust. Short of doing this, any diastolic findings should be totally downplayed or even better, removed. Doing this does not in any way diminish the important findings of the study.

3. I assume that the study population was quite homogeneous (ie, all white men), and thus these findings may not be applicable to other racial/ethnic groups. If so, this should be stated.

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Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

1. There are too many tables and figures, some could be deleted. Tables 5 and 6 are very similar – suggest deleting T5.
2. Figures: include r and p values within the figure.
3. Abstract: Instead of “low type-I% predicts fatness” it may be better to state “low type-I% predicts obesity”.
4. There are a number of typographic and/or syntax errors and/or incomplete sentences.

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Discretionary Revisions (which the author can choose to ignore)

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**Which journal?**: Appropriate or potentially appropriate for BMC Medicine: an article of importance in its field

**What next?**: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

**Quality of written English**: Needs some language corrections before being published

**Statistical review**: Yes

**Declaration of competing interests**: I declare that I have no competing interests.